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With the assistance of

GENTLEMEN EMINENT IN SCIENCE AND LITERATURE.

THE

FIRST AMERICAN EDITION,

Corrected and improved by the addition of numerous articles relative to

THE INSTITUTIONS OF THE AMERICAN CONTINENT,

ITS GEOGRAPHY, BIOGRAPHY, CIVIL AND NATIONAL HISTORY, AND TO VARIOUS DISCOVERIES IN

SCIENCE AND THE ARTS.

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THE AMERICAN EDITION
OF THE NEW
EDINBURGH ENCYCLOPÆDIA.

HYGROMETRY.

1. UNDER the article Evaporation, we explained the manner in which water is supposed to be elevated, and suspended in the atmosphere: we now propose to take a view of the various contrivances which have been employed for detecting the presence of aqueous vapour in that fluid, and ascertaining, not only the relative, but the absolute quantity of moisture, which exists at different times in given portions of air.

2. The foundation of almost all the contrivances which have hitherto been employed for that purpose, is the affinity for moisture possessed by a variety of substances. This affinity is exerted more or less by a considerable number of bodies; but it is displayed, in the most eminent degree, by sulphuric acid, the fixed alkalies, several of the earths, the salts denominated deliquescent, more especially the muriate and nitrate of lime; as well as by many substances of animal or vegetable origin, particularly hair, membrane, horn, ivory, whalebone, feathers, the beards of corn, wood, cordage, paper, &c. All these substances possess the property of abstracting moisture from the atmosphere; but the union which they form with it is so very slight, that they readily yield it up again to the air when that fluid has by any means become drier, either by an increase of temperature, or the deposition of the water which formerly existed in it in a vaporous state. Hence the condition of these bodies with respect to humidity, may be employed as an indication of the quantity of moisture contained in a given volume of the air by which they are surrounded. The epithet *Hygroscopic* has been applied to substances used for this purpose; and the various instruments which have been formed of them, are called *Hygrometers*, or *measurers of moisture*.

3. The alterations of dryness and humidity to which all hygroscopic bodies are subject, are accompanied with corresponding changes in their weight and dimensions; and, therefore, all hygrometers are constructed so as to have a reference by their indications, either to change of weight or change of volume. The latter of these changes, though frequently less appreciable in its extent than variation of weight, is however more readily, as well as more conveniently estimated; and hence the greater number of hygrometers consist of some animal or vegetable substance, having a fibrous structure, the expansions of which by moisture are rendered more sensible by mechanical contrivances. Some hygrometers, however, are constructed so as to indicate changes of humidity in the medium to which they are exposed, by changes of weight, arising from the absorption or extrication of moisture; and one of these instruments, invented by Mr Leslie, perhaps the most accurate of them all, is formed upon a principle which cannot be referred either to change of weight or of volume.

4. It is only of late that hygrometers have been constructed with any degree of accuracy. The earlier instruments which bear that name were extremely imperfect: the mechanical part was executed in a very rude manner, and no attention was paid to the graduation of the scale which marked the enlargement or contraction of the hygroscopic substance, farther than to make it point out mere differences in the state of the air with respect to moisture. No attempt was made to determine two fixed points, as in the case of the thermometer, by which the various scales might be reduced to a common standard; and still less to ascertain the absolute quantity of moisture in a given volume of air, corresponding to the different points of the scale employed. In short, nothing higher was aimed at in the construction of a hygrometer, than to obtain some substance which suffered considerable variations of bulk, by the absorption of moisture, without the smallest regard to the regularity of its dilatations. Almost all of them were very unwieldy; and none of them could be applied to nice researches into the hygrometric state of small portions of air. To describe the construction of them, with much minuteness, would therefore be as useless as inconsistent with the limits of this article.

5. Both animal and vegetable substances of a fibrous structure, possess the property of being dilated by moisture, in a direction transverse to the fibres; and, accordingly, the lateral expansion of these bodies furnishes the principle upon which a considerable number of hygrometers are constructed. One of the earliest hygrometers of this kind was proposed by Mr Coniers in 1676. The whole contrivance is of the rudest kind; and though it is scarcely worthy of notice, we shall give a brief description of it, in order that some idea may be formed of the imperfect state of hygrometry at that period. AAAA (Plate CCCXXV. Fig. 1.) represents a frame

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of wood grooved in the inside for admitting two pannels of deal B, B to play freely at top and bottom. The pannels, which are placed so as to have their fibres in a vertical position, are fastened to the frame at each side, and a sufficient interval is left between them, to allow full scope for the wood to dilate itself in a lateral direction. The axis of the index, which is at C, by receding from F, or approaching nearer to it, gives a circular motion to the index itself, by means of a slender metallic chain, which passes round the axis, and is fastened to one of the pannels at F. W is a weight or counterpoise connected with the axis by means of a string passing over the pulley D, and attached to the arm CG, and which causes the index to descend, as the pannels expand by moisture. Several other contrivances of a similar kind are described in the Philosophical Transactions for that period, but they are all equally rude and imperfect.

6. The most accurate hygrometer, constructed on the principle of a lateral expansion, is that of De Luc. The substance he employs in preference to all others, is whalebone cut transversely into thin slips. Such is the tenacity of this substance, that, according to De Luc, these slips may be a foot long, and a line in breadth, without weighing above one-fourth of a grain, and yet be capable of supporting a weight of about 160 grains. The instrument is fitted up in various forms by different artists; but the general principles of its construction are nearly the same in all. Mr Adie, Edinburgh, constructs it in the following manner. ABCD, Fig. 2. represents the frame-work of the instrument, to the upper part of which is attached the graduated circle EF, capable of being elevated or lowered at pleasure, to suit the length of the slip of whalebone *a b*. The whalebone, which is usually about 10 inches in length, is fastened at *a* between two slips of brass by means of a screw, and in a similar manner at *b*, where it is connected with a slender silk band which moves over the axis, to the extremity of which the index is fixed; and it is kept in a state of uniform distension, by a silk thread passing round the axis, (to which it is fixed,) in a direction contrary to that of the silk band, and fastened at the lower extremity to a spiral gilt silver wire *d e*. This spiral spring forms, by its reaction, an excellent counterpoise to the whalebone, as it acts with the smallest energy when the latter is most weakened by dilatation.

7. The extreme points of the scale, by which the intermediate divisions are graduated, are determined in the following manner: To obtain the point of extreme humidity, or complete saturation with moisture, De Luc is not satisfied with exposing the instrument to a portion of air perfectly saturated with the vapour of water, but he actually immerses it in that fluid, and allows it to remain in it, till it ceases to suffer any farther dilatation. The point on the circular scale, to which the index reaches, is then marked as *extreme moisture*. The opposite point, namely, that of *extreme dryness*, is obtained by enclosing the instrument under a receiver with a quantity of dry quicklime, and allowing it to remain exposed to its action, till the whalebone attains its greatest degree of contraction, which is generally in about three weeks. The quicklime, by its attraction for moisture, gradually absorbs the watery vapour contained in the air, which, in its turn, abstracts moisture from the whalebone, till an equilibrium is established between the attraction of the two substances for vapour. As the whalebone becomes drier, its fibres continually approach towards each other; and at last, when it ceases to yield any moisture, it also ceases to suffer contraction, and the index points to extreme dryness. The length of the slip of whalebone is so proportioned to the diameter of the axis, or arbor to which the index is fixed, that the interval between the points of extreme moisture and dryness embraces a range which is somewhat less than a complete revolution; and this interval is then divided into 100 equal parts. The zero of the scale is usually marked at extreme dryness, and the divisions are in that case numbered upwards to extreme moisture, which is marked 100. Some artists, however, reverse this order, and place the zero at extreme moisture,—a practice, which cannot fail to lead to mistakes in recording the indications of the instrument.

7. Saussure, to whom we are indebted for many useful and interesting observations on hygrometry, has stated several objections against this instrument, applicable both to the substance of which it is formed, and the manner of determining the extreme points of the scale. He affirms, that whalebone, being a substance of a muscular or gelatinous nature, would admit of an indefinite relaxation by moisture, were it not for certain filaments, which connect the fibres with each other, but do not prevent them from separating beyond the limits, to which their hygroscopical affinity for moisture in the vaporous state would dilate them. He maintains, therefore, and we think with justice, that to immerse such a substance in water, in order to obtain the greatest relaxation of which it is susceptible, is to reduce it to a condition which it can never afterwards arrive at by the influence of vapour; and consequently, that all the divisions of the scale, which are included between the perfect humidity of the whalebone, and the point corresponding to the complete saturation of air with moisture, are entirely useless. He adds, that if whalebone is to be used at all in the construction of hygrometers, the point of extreme moisture should be marked probably where 80° stands in De Luc's scale.

8. With respect to the use of dry quicklime as a desiccative, Saussure seems to suspect that this substance produces a degree of dryness less perfect than the fixed alkalies in a caustic state; and that, at any rate, the slowness with which it attracts moisture, renders it less fit for the purpose. Strongly concentrated sulphuric acid, or paper soaked in muriate of lime, and then well dried, absorb moisture more rapidly than either: the former, in particular, when inclosed under a receiver with a given volume of air, causes the index of a hygrometer to advance as many degrees towards extreme dryness, in a few hours, as dry quicklime would do in as many days. As the attraction of sulphuric acid for moisture varies, however, with its degree of concentration, it is proper to employ it always of the same specific gravity, otherwise the point of extreme dryness will not be the same in all hygrometers. An uniformity of scale would thus be obtained, whether the point of extreme dryness were absolute, or merely relative.

9. For examining the hygroscopic state of small quantities of air, De Luc gives the instrument a form, which renders it more commodious for being introduced under a receiver. Fig. 3. represents a front view of the instrument constructed for that purpose, of its actual size. *a a a* is a frame of brass, which is connected with a similar frame behind. The dotted line *c b b b d* represents the slip of whale bone fixed at *c* to an adjusting screw, passing over the pullies *b b b b*, and joined at *d* to a slender metallic plate of annealed silver. This metallic plate *d e f* moves over a pulley *e*, and is joined at *f* to the moveable part *g* of the vernier *h h h h*. From the top of the moveable vernier *i* proceeds another slender metallic plate of the same pliant material, the opposite extremity of which is fixed to the pulley *k*. This pulley is supported on the same axis with a smaller pulley *l*, which is connected, by means of a slender metallic plate, with the upper extremity of the bent lever *m*, *n*, the shorter arm of which *n* is pressed by a spring. It is easy to see from the figure of the instrument,

that when the whale-bone is dilated by absorbing moisture, the vernier will ascend by the action of the spring upon the lever; and *vice versa.*

10. The instrument may be fitted up in the form of a watch, by fixing the whale-bone to the circumference of a wheel, and distending it gently by a weak spring. The contraction and enlargement of the whale-bone might then be indicated by a hand fixed to the arbor of another wheel, and moving along the circular graduation of a dial-plate. Other contrivances of a similar kind will readily suggest themselves to the ingenious artist.

11. Hygrometers have also been constructed of substances, which seem to suffer a dilatation in all directions by moisture. On this principle, De Luc constructed some time ago a hygrometer of ivory, by giving a portion of that substance intended to be affected by moisture the form of a thin slender tube, and then inserting into it, at one extremity, a capillary tube of glass, about 14 inches long, and $\frac{1}{50}$ inch in diameter. The ivory is recommended to be taken from an elephant's tooth of considerable size, a few inches from the top, and as near the surface as possible, in order that it may be of an uniform grain in different instruments. This hygrometer is represented in Fig. 4. Plate CCCXXI. where *b g b* represents the ivory tube open at *b b*, and shut at *g*. This tube, which is 2 inches 8 lines in length, and 2½ lines in diameter, internally, is bored in the direction of its fibres, and reduced by turning it on a lath, till its thickness is about $\frac{3}{16}$ths of a line, except at the two extremities, where it is left somewhat thicker, to give it greater strength. The piece *a a d d*, which is made of brass, connects the ivory with the glass tube, by means of gum mastich, or any other adhesive substance. The part of the ivory tube *b c b c*, is protected from the moisture of the air by a brass verrel, which prevents it from splitting. Before being fitted up, the ivory tube is usually moisted on the outside, which may be done very conveniently, and to a proper degree, by surrounding it with wet cambric, and allowing it to remain till the moisture permeates through the ivory.

12. The mercury is introduced by first inserting a horse hair into the bore of the glass tube, sufficiently long to pass completely through it, and reach about an inch beyond its lower extremity, into the ivory tube. A slip of paper, four or five inches long, is then wrapt round the upper part of the glass tube, and tied tightly to it; leaving about three inches of the paper projecting beyond it, so as to form a kind of funnel for pouring the mercury into the tube. A quantity of mercury being then poured into the paper tube, is afterwards gradually made to descend into the ivory tube, partly by gentle agitation, and partly by means of the horse hair, which is moved continually upwards and downwards, till the whole of the air is extricated, and the instrument filled with the proper quantity of mercury. This being done, the range of the scale is adjusted in the following manner: The instrument is immersed in a vessel of water, kept at the freezing point, by little bits of ice floating in it, where it is allowed to remain until the ivory has attained its greatest possible dilatation, which is known by the mercury in the tube becoming stationary. The lowest point which it reaches is then marked as the zero of the scale. One fixed point being thus obtained, the other divisions are determined by previously ascertaining the relation subsisting between the internal capacity of the ivory tube and that of the glass tube, and graduating the instrument accordingly. For this purpose, De Luc employed a glass tube which had formerly been used as a thermometer, the divisions of which he knew, and the bulb of which was intentionally broken, in order that the quantity of mercury contained in it might be accurately weighed. The weight of the mercury in the ivory tube being also determined, it was easy to form a new thermometrical scale adapted to the glass tube and the ivory bulb. For let M be the weight of the mercury in the original thermometer, D the length of a degree upon its scale, m the weight of the mercury in the ivory tube, and d the length of a degree upon its scale, we have evidently,

$$M : m :: D : d.$$

The scale affixed to the glass tube was accordingly divided into as many divisions as it admitted, each of which was made to equal d. By this mode of forming the scale, it is unnecessary to observe, that the instrument would be in reality a thermometer, provided the ivory were not affected by moisture; but the ivory being dilated and contracted by moisture, will give rise to corresponding deviations from the mere effect of temperature, and thus, by means of an attached thermometer, the effect due to dryness or moisture may be accurately separated from the rising and sinking of the mercury in the glass tube, by means of heat and cold. The excess of the hygrometrical degrees above the degrees indicated in similar circumstances by an ordinary thermometer, is to be considered as the sole effect of dryness in contracting the ivory; while a difference of a contrary kind is to be ascribed to an opposite cause.

13. Mr Leslie, who has devoted some attention to this instrument, has proposed a modification, which, as he himself remarks, has perhaps carried the hygroscope thus formed to as high a state of improvement as such an imperfect instrument admits. The shell of ivory is turned, in his construction, into an elongated spheroid, about an inch and a quarter in length, and reduced so thin as to weigh only eight or ten grains. At its greatest expansion it contains about 300 grains of mercury. The upper end, which is adapted to the body by means of a delicate screw, has a slender glass tube inserted into it, six or eight inches long, and a bore nearly $\frac{1}{15}$th part of an inch in diameter. The point of extreme humidity is determined, as in the case of De Luc's instrument, by immersing the bulb in water, or surrounding it with a wet bit of cambric. The divisions of the scale, however, are determined somewhat differently: Mr Leslie distinguishes the tube into spaces, which correspond to the thousandth part of the entire cavity, and each of which contains about $\frac{3}{10}$ths of a grain of mercury. The ordinary range of the scale includes about 70 of these divisions. The upper extremity of the tube is covered with a small ivory cap, which admits the air, but prevents the escape of the mercury, thus rendering the instrument portable. Mr Leslie remarks, that the contraction of the mercury corresponding to equal increase in the dryness of the air, is six times greater at the beginning of the scale than at the 70th division; and that it seems to be in general inversely as the number of hygrometric degrees, reckoning 20° below. He therefore places another scale on the opposite side of the tube, the interval between zero and 70° being divided into 100°, and corresponding to the unequal portions, from the number 20 to 120 in a logarithmic line, (see Plate CCCXXV. Fig. 5. By extending the logarithmic divisions farther in conformity with the base of the scale, 320 of its degrees would correspond to 108 of the equable divisions, or a contraction of 108 parts in a thousand, with respect to the capacity of the bulb. At the dryness, however, of 300 of his own hygrometer, Mr Leslie never found the contraction of the ivory to exceed 105. It would have been more satisfactory, if the temperature at which the observations were made had been given, as we shall afterwards shew that 300, on Mr Leslie's hygrometer, may correspond to very different

portions of moisture in the medium to which it is exposed.

14. The instrument we have described, though very unfit for delicate observations, may nevertheless be used in certain cases with advantage. The slowness of its indications, when its scale has once been compared with that of a more accurate instrument, is well fitted to point out general results, corresponding to considerable intervals of time between the observations. Mr Leslie has suggested, that on this account, it may be usefully employed to ascertain the degree of humidity which prevails in the higher regions of the atmosphere, and to determine the hygroscopic state of certain kinds of goods, such as grain, wool, cotton, &c. For the latter purpose, all that is necessary is to thrust the instrument among the substances, whose condition, with respect to moisture, we wish to determine, and to observe the degree which it indicates after it has been allowed to remain a suitable length of time.

15. Under hygroscopic instruments constructed on the principle of a general dilatation by moisture, we may briefly notice the hygrometer of Chiminello, to whom the prize proposed in 1783 by the Academy of Sciences at Manheim for the best comparable hygrometer was adjudged. The substance he employed was the barrel of a quill, fitted up in the same manner as the ivory hygrometers, already described. The graduation of the scale was determined by means of two fixed points. The point of extreme moisture was obtained by immersion in water; that of extreme dryness, by exposing the instrument, for the space of four hours, before a moderate fire, at a temperature equal to 25° of Reaumur, or 88¼° of Fahrenheit. The quill, by exposure to heat, becomes somewhat contracted; and though the contraction is not so great as would be produced by extreme dryness, Chiminello considered it sufficiently uniform in different quills to serve as a fixed point in his scale. It is obvious, however, that an instrument graduated in so vague a manner is totally unfit for any philosophical purpose.

16. Having alluded to this instrument, it may be worthy of remark, that it is probably owing to the hygroscopic property of their feathers that birds are enabled to judge of approaching rain or fair weather. For it is easy to conceive, that an animal having a thousand hygrometers intimately connected with its body, must be liable to be powerfully affected, with regard to the tone of its organs, by very slight changes in the dryness or humidity of the air; particularly when it is considered, that many of the feathers contain a large quantity of blood, which must thus be alternately propelled into the system, or withdrawn from it, according to their contraction or dilatation by dryness or moisture. This view of the subject seems to afford a satisfactory explanation of the extreme sensibility which birds in general shew to coming changes in the weather.

> Haud equidem credo, quia sit divinitus illis
> Ingenium, aut rerum fato prudentia major;
> Verum, ubi tempestas, et cœli mobilis humor
> Mutavere vias; et Jupiter humidus Austris
> Densat, erant quæ rara modo, et quæ densa, relaxat;
> Vertuntur species animorum, et pectora motus
> Nunc alios, alios, dum nubila ventus agebat,
> Concipiunt.
>
> VIRGIL. Geor. Lib. i. 415.

17. An hygrometer constructed upon similar principles, but much more delicate in it's indications, has lately been proposed by Mr Wilson of Dublin. The substance he employs is rat's bladder; which, besides having an extensive range of dilatation, is affected by very slight changes in the hygroscopic state of the air. The scale is graduated by exposing the instrument to air saturated with moisture for the point of extreme humidity; and by afterwards inclosing it in a receiver, over mercury, with a quantity of concentrated sulphuric acid, for the point of extreme dryness. The interval between the range of these two points is then divided into 100 equal parts. These points, however, must obviously vary with the temperature of the mercury; and though this objection, which is applicable to all these mercurial hygrometers, may be obviated to a certain extent by enlarging the diameter of the tube, it cannot be entirely removed without diminishing the delicacy of the instrument, unless the precautions, adopted by De Luc, be observed in the construction of the scale. The rat's bladder hygrometer is liable to another objection, which, on account of the difficulty attending the construction of the instrument, is of considerable force; the elevation of the mercury in the tube, by the contraction of the membranous substance, must occasion a pressure in the bladder, which, in some cases, may amount to nine or ten pounds on the square inch, according to the range of the scale. The distension occasioned by such a pressure cannot fail to affect the accuracy of the instrument, and even to expose it to destruction. According to the observations of Lord Gray, this instrument corresponds pretty nearly in its indications with the whale-bone hygrometer of De Luc.

18. An hygrometer depending on the principle of a general expansion by moisture, and fitted up in the same manner as the hygrometer of De Luc just alluded to, has been strongly recommended by Jean Baptiste, a Capuchin friar of St Martin at Vicenza. The hygroscopic substance used in the construction of this instrument is a narrow slip of the allantois of a calf, the thin membrane which envelopes the fœtus of animals before birth. The point of extreme moisture was fixed by exposing the instrument to air saturated with aqueous vapour. Another point was determined by heating to the temperature of 50° of Reaumur, or 144½° of Fahrenheit, a small stove, which was kept open, and preserved for some time as nearly as possible at the same temperature, and then introducing the instrument into it, where it was allowed to remain so long as the allantois suffered contraction. According to Jean Baptiste, the degree of dryness obtained by this process is fixed and invariable. The intermediate space on the scale, between the extreme points thus determined, was divided as usual into 100 equal parts. In a subsequent part of this article we shall demonstrate, that no fixed point can be obtained for the graduation of an hygrometer, by a mere exposure of the instrument to an elevated temperature; and, consequently, the scale of this hygrometer can no more be relied upon than that of Chiminello. The substance itself, however, we have reason to think, from the experiments we have made with it, is exceedingly fit for hygrometric purposes.

19. But of all the hygroscopic instruments which we have hitherto described, and which are constructed on the principle of a general, or at least of a longitudinal expansion, the hygrometer of Saussure is by far the most delicate, as well as the most accurate and uniform, in its indications. The substance which he selected, in preference to every other, was a human hair, the elongations and contractions of which by moisture and dryness, though less extensive than some of the substances already mentioned, may be rendered sufficiently sensible by mechanical contrivances. As the value of this instrument has been greatly enhanced by the late researches of Gay Lussac, a particular description of it is the more necessary: we shall therefore give an account of the different parts of it in detail.

20. The general appearance of the instrument is nearly the same as that of the whalebone hygrometer of De Luc,

which seems indeed to have been borrowed from it, the priority of invention being due to Saussure. The upright pillars *a a a a*, Fig. 4, which support the dial-plate, are fixed to the rectangular frame *b b b b*, at each corner of which is a screw for fixing the instrument to the bottom of its case, when it is exposed to the external air. The dial-plate is made to slide along the pillars *a a*, and is thus capable of being raised to any particular altitude, in order to suit the length of the hair. The screws *n*, *n*, Fig. 6. only one of which is visible in the representation of the instrument, are intended to fix the dial-plate after it has been raised to the proper height. The lower extremity of the hair is held fast by the chops of the screw pinions *d*, and the upper extremity of it is fixed in a similar manner at *c*. The pinions *c* also serve to connect the hair with a thin slip of silver which is rolled round the arbor *f e*, and fixed to it. The part of the arbor on which the silver thread is wound is usually cut in the form of a spiral groove, and made quite flat at the bottom, in order that the slip of silver may be always at the same distance from the axis of the arbor. The hair is kept in a state of equable distension by means of a small weight *g* of three or four grains, which is suspended on the opposite side of the arbor, and is sufficient to stretch the hair without breaking it. When the instrument is transported from place to place, the weight *g* is prevented from vibrating, by fixing it in the crayon *i*, which is intended to receive it, and in which it is securely fixed by means of the screw *k*. The crayon itself is moveable along the bar *h h*, and may be fixed in any position by the screw *l*. The index *o o* is fixed to the extremity of the pivot of the arbor *f e*, and points out, by its indications on the graduated arch of the dial plate, the hygrometric state of the hair.

21. Saussure determined the point of extreme dryness, by placing the instrument under a receiver, with a suitable quantity of dry caustic alkali, and allowing it to remain till the hair ceased to suffer any contraction. The point of extreme dryness thus determined, though perhaps not absolute, gives, according to Saussure, a degree of dryness which is perfectly fixed and uniform. The point of extreme moisture is obtained, by placing the instrument over water in the inside of a receiver, the sides of which are kept constantly bedewed with moisture. The included air being thus surrounded on all sides with water becomes completely saturated with moisture; the hair in its turn is gradually reduced to the same state, and soon attains its greatest degree of elongation, so that another fixed point in the scale is obtained. If the space described by the index between these two points is greater than a complete revolution, the hair may be shortened till its length is properly accommodated to the range of the scale. The temperature of the air at the time the two extreme points are determined is of no importance: it may indeed affect the hair thermometrically, in the same manner as it affects other substances, but it produces no change in the hygroscopic indications. The reason of this will appear afterwards, when we come to take a theoretical view of the instrument. At present it may be sufficient to remark, that, in this respect, the hygrometer of Saussure has a decided advantage over the whalebone hygrometer of De Luc, which, according to the temperature, ranges from 80° to 100° in air saturated with moisture, where of course it should remain stationary. Saussure divides his scale sometimes into 360°, and sometimes into 100°, the divisions being reckoned, in both cases, from extreme dryness, which is assumed for the zero of the scale, towards extreme moisture, which is marked 360°, or 100°, according to the division adopted.

22. The principal advantages of Saussure's hygrometer are derived, 1st, From the unchangeable nature of the material of which it is formed, by means of which it retains its hygroscopic power longer than any other organic substance; 2d, From the extreme tenuity of the substance itself, which enables it to assume very quickly the state of the surrounding medium; and, 3d, From the little effect which, in consequence of this tenuity, it produces on the hygroscopic state of the medium to which it is exposed. De Luc has endeavoured, more it would appear from a desire to recommend his own instrument than to promote the cause of science, to show that hair is totally unfit for hygrometric purposes; and having very gratuitously assumed the contractions and expansions of whalebone as a standard of reference for other hygroscopic substances, he has taken it for granted, that the indications of Saussure's hygrometer must be incorrect, because in certain circumstances they do not coincide with those of his own. He maintains, also, that hair, after it attains its greatest degree of elongation, begins to suffer a contraction, particularly if it be allowed to remain beyond a certain time in air saturated with moisture; but this objection, which is only applicable to hairs of a peculiar structure, may be obviated by attending to the directions of Saussure, who was aware of the fact, and particularly enjoined, that such hairs as retrograded more than 2° should be rejected as unfit for the construction of hygrometers. On the whole, we have no hesitation in saying, that of all the hygroscopic instruments which have hitherto been formed of organic substances, the hygrometer of Saussure seems the most regular in its elongations and contractions; the least liable to be affected by exposure to the weather; and the best adapted for ascertaining the hygrometric state of small portions of air. The experiments of Gay Lussac, and the general results he has deduced from them, have given additional value to this instrument, by demonstrating that its expansions are subject to a regular law which admits of analytical investigation. We shall give an account of these afterwards. In the mean time, we shall conclude our remarks on the instrument with a general statement of its indications, compared with those of the whalebone hygrometer of De Luc.

Saussure.	De Luc.	Saussure.	De Luc.
15.6 correspond to	5	88.8 correspond to	55
29.4	10	91.6	60
40.9	15	93.8	65
50.5	20	95.6	70
59.2	25	97.2	75
68 8	30	98.	80
73.	35	100.	85
78.3	40	100.	90
82.1	45	99.3	95
86.1	50	98 3	100

This comparative Table of the indications of the two instruments was drawn up by De Luc himself: its value, however, is greatly diminished by the temperature being omitted, at which the observations were made. The same remark is applicable to the following observations of Bockman, which differ somewhat from those of De Luc.

Saussure.	De Luc.
33 correspond to	10
54	20
65	30
80	40
86	45

22. Some hygrometers are constructed of organic substances of a fibrous structure, twisted either artificially or

spontaneously during their growth. One of the earliest hygrometers of this description was proposed by the celebrated Hooke, and formed of the beard of the wild oat, which twists and untwists itself according to the state of the air with respect to moisture. The beard is fixed at one extremity, and an index being applied at the other in a transverse position, its motions along the graduated circumference of a circle point out the hygroscopic state of the air.

23. Upon a similar principle Mr Molyneux proposed, in 1685, to construct an hygrometer of whip cord or cat-gut, by suspending it from a hook, with a small weight at the lower extremity to give it a proper degree of tension, and carry at the same time an index over a graduated circle described on a fixed board below. We shall give a description of the instrument in a modified form, recommended by Mr Coventry of Southwark. AB, Fig. 7. represents the cat-gut, which may be of any convenient length. It is suspended from the bracket AD, and stretched by the weight F at its lower extremity. At B is a circular card of pasteboard attached to a round bit of cork, through which the cord is made to pass. The circumference of the card is graduated into one hundred equal parts. Another card, connected with the cat-gut in a similar manner, and intended to record the revolutions of the other, is placed at C, at one-tenth of the length of AB from the fixed point A, and divided into ten equal parts. DE is a vertical line, along the frame which supports the cat-gut, and serves to point out the indications of the circular cards. In adjusting the instrument to extreme moisture, the cord is completely moistened with water, and when it ceases to untwist itself, both the circular cards are turned round till the zero upon each points to the vertical line DE. It is more difficult to obtain another fixed point; and indeed this is not very necessary, as the instrument, though it possesses great sensibility, can scarcely be used for any purpose but to point out general differences with respect to moisture.

24. The increase of weight, which all hygroscopic substances acquire by the absorption of moisture, furnishes another general principle for the construction of hygrometers. But as the accuracy of these instruments is liable to be gradually affected by changes in the hygrometric property of the substances themselves, as well as by the deposition of dust and other light bodies on their surfaces, few hygrometers have been constructed on this principle. The substances usually employed for the purpose are, sulphuric acid, the deliquescent salts, and paper. The first of these substances was recommended by Mr Gould so early as 1684, who observed that sulphuric acid, after absorbing a certain portion of water from the atmosphere, continued to retain it till the air became drier, when it again yielded up a portion of the moisture it had previously acquired; and these alternations of the absorption and extrication of moisture always corresponded to the hygroscopic state of the air. He therefore placed a quantity of the acid in a cup in one scale of a balance, and a counterpoise in the other; and ascertained the relative state of the air with respect to moisture or dryness, according as either arm of the balance preponderated. A contrivance of this kind answers well enough for pointing out general results, but it is totally unfit for discovering the hygroscopic state of the air at any particular instant of time. We have found, however, that paper, soaked in a weak solution of the muriate of lime, and then dried, is very rapid in its indications, and capable of being affected by very minute changes; and indeed we have reason to think, from the observations we have made with a small slip of paper prepared in that manner, and suspended from one of the arms of a delicate balance, that an hygrometer constructed upon this principle might be obtained, possessing the utmost sensibility. Other hygrometers of a similar construction have been employed, but they are totally unworthy of notice.

25. Mr Leslie has proposed an hygrometer, totally different in principle from any of those we have considered, but perhaps superior to all of them, both in point of accuracy and delicacy. Hygrometers formed of organic substances are liable to be affected by the partial decompositions, which, by exposure to air and moisture, such bodies continually undergo; and though some of them are composed of materials which resist the action of the weather better than others, none of them can be said to be indestructible, and all of them, in the course of time, lose in a great degree their hygroscopic properties. Their scales, therefore, however accurately constructed at first, are subject to a gradual derangement, and require occasional adjustments to render their indications at all correct. This is certainly a great objection to the use of these instruments; but it is an objection from which the hygrometer of Mr Leslie is entirely free, and as we have derived a formula, by which the absolute quantity of moisture contained in a given volume of air may be accurately determined, in terms of the degrees of its scale, we must now consider it as by far the most accurate hygrometer that has yet been proposed. The instrument consists of two spheres of glass A, B, Fig. 8. connected with each other by a bent tube CDEF, which is fixed to the stand GH, and contains inclosed a small portion of sulphuric acid, tinged with carmine to render it more distinctly visible. When the spheres, both of which are filled with air, are at the same temperature, the liquor in the recurved tube remains stationary; but if one of the balls, as A, be colder than the other B, the air in the latter, by its greater elasticity, immediately depresses the liquor in the limb FE, and raises it in an equal degree in the limb CD. One of the balls is accordingly covered with a coating of cambric, or tissue paper, and kept continually moist with pure water, conveyed to it by filaments of floss silk from an adjoining vessel. The evaporation of the water quickly cools the surface of the ball, in a degree proportioned to the rapidity with which the process is carried on, which will depend partly upon the temperature, and partly upon the dryness of the ambient medium; and hence the depression of the liquor in the limb FE becomes an indication of the relative dryness of the surrounding air. The caloric abstracted from the moistened ball by evaporation is incessantly supplied by the air and the contiguous bodies, and in the course of two minutes the maximum of effect is produced. Were it not for this continual influx of temperature, no limits could be assigned to the degree of cold that might be induced. The scale is formed by dividing the interval between the boiling and freezing points into one thousand equal parts, so that 10° correspond to 1° of the centigrade thermometer, and 50° to 9° of Fahrenheit. This hygrometer acts equally well when the moisture on the balls is in a frozen state; but the heat required for the melting of ice being about a seventh part of what is necessary for the conversion of water into vapour, the temperature of the coated ball will, in like circumstances of the air with respect to moisture, sink a seventh part more than before; and therefore the degrees indicated by the instrument must, in that case, be reduced 1° in 7°, to adapt the scale to the actual state of things.

26. When the instrument is intended to be portable, Mr Leslie prefers the form delineated in Fig. 9. The two balls, being in the same perpendicular line, are protected from injury by a case of wood or ivory; and the instrument may thus be transported from one place to another

with perfect safety. We shall conclude our description of this simple but ingenious instrument, by remarking, that an ordinary thermometer, having its bulb covered with moistened paper, gives the same indications, if its temperature be subtracted from the temperature of the air determined by a naked thermometer, placed in similar circumstances with the other.

Relation between the Indications of Hygrometers, and the absolute Quantities of Moisture in Vapour.

27. Having thus described the construction of the various kinds of hygrometers which have hitherto been employed, we shall now proceed to investigate the relation subsisting between the indications of these instruments, and the absolute quantities of moisture existing in a given volume of the medium to which they are exposed. To enable us to prosecute the subject with sufficient precision, it will be necessary, in the first place, to take a concise view of the quantity of vapour contained in a vacuum, at different temperatures; and, secondly, of the quantity of it which can exist, in the same circumstances, under different pressures, in mixture with air. The experiments of Mr Dalton on the elasticity of steam at various temperatures, together with the recent researches of Gay Lussac, will enable us to solve both these problems with the most perfect precision.

28. Mr Dalton has given a table, containing the results of his admirable experiments on the force of steam for every degree of Fahrenheit's thermometer, from zero to 325°, from which Biot has deduced the following Table, adapted to the centigrade scale.

Temperature.	Force of Vapour in Inches of Mercury.	Ratio of each term to the one which precedes it.
0.	.200	
6.25	.297	1.485
12.50	.435	1.465
18.75	.630	1.450
25.	.910	1.440
31.25	1.290	1.430
37.5	1.820	1.410
43.75	2.540	1.400
50.	3.500	1.38
56.25	4.760	1.36
62.5	6.450	1.35
68.75	8.550	1.33
75	11.250	1.32
81.25	14.600	1.30
87.5	18.800	1.29
93.75	24.	1.27
100.	30.	1.25

29. The first column of this Table contains the temperature, in degrees of the centigrade scale, at the interval of $6\frac{1}{4}$ degrees; the second, the elastic force of vapour in English inches; and the third, the relation in which each term of the elastic force stands to the one immediately above it. It is obvious, that if the same relation subsisted between the terms, in successive order, the numbers in the third column would form a series of quantities in geometrical progression, the first term of which would be .2, and the last 30. The terms, however, continually decrease in a slow and regular manner, as the temperature increases, and therefore the elastic force of vapour cannot proceed in a geometrical series. In order to obtain a general expression for the law of its increase, Biot assumes that the ratio of the terms is constant, and equal to k; then calling F_n the elastic force, corresponding to the temperature $100-n$,

$$F_0 = 30,$$
$$F_1 = 30\,k^1,$$
$$F_2 = 30\,k^2,$$
$$\text{And, in general, } F_n = 30k^n.$$
$$\text{Hence, Log. } F_n = \text{Log. } 30 + n \text{ Log. } k.$$

The supposition, on which this expression is founded, though not rigidly true, will lead to results sufficiently conformable to experiment to justify us in adopting it. The quantity n, Log. k, may be exhibited by a succession of terms of the form $a\,n + b\,n^2 + c\,n^3 +$ &c. and the expression then becomes,

$$\text{Log. } F_n = \text{Log. } 30 + a\,n + b\,n^2 + c\,n^3 + \text{\&c.}$$

the co-efficients a, b, c being constant, and determinable from three equations in which F_n is given, and consequently n. It is unnecessary to take more than three terms of the series, as the co-efficients of the powers of n will be found to diminish much faster than the powers themselves increase. To determine the co-efficients a, b, and c, Biot employs the elastic force of vapour for the temperatures 25, 50 and 75, reckoned downwards from the boiling point; thus, we have,

$$n = 25 \qquad F_{25} = 11.25,$$
$$n = 50 \qquad F_{50} = 3.5,$$
$$n = 75 \qquad F_{75} = .91.$$

$$\text{And, Log. } F_{25} = \text{Log. } 30 + 25\,a + 625\,b + 15625\,c,$$
$$\text{Log. } F_{50} = \text{Log. } 30 + 50\,a + 2500\,b + 125000\,c,$$
$$\text{Log. } F_{75} = \text{Log. } 30 + 75\,a + 5625\,b + 421875\,c,$$

Substituting the values of Log. F_n and Log. 30, and transposing,

$$25\,a + 625\,b + 15625\,c = -\ .4259687,$$
$$50\,a + 2500\,b + 125000\,c = -\ .9330519,$$
$$75\,a + 5625\,b + 421875\,c = -\ 1.5180799.$$

The solution of these equations gives,

$$a = -.013741955,$$
$$b = -.000067427,$$
$$c = +.0000000338.$$

30. The values of a, b, and c, thus determined, being substituted for these quantities, in the general equation, we obtain the following formula for the elastic force of steam at the temperature $100-n$.

$$\text{Log. } F_n = \text{Log. } 30 - .013741955\,n - .000067427\,n^2 + .0000000338\,n^3.$$

31. If n be expressed in degrees of Fahrenheit's scale, the elastic force of vapour for the temperature $212-n$ becomes,

$$\text{Log. } F_n = \text{Log. } 30 - .00854122\,n - .00002081\,n^2 + .0000000058\,n^3.$$

By help of this formula, we have calculated the following Table of the elastic force of steam, from zero to 100° of Fahrenheit, which includes the ordinary range of natural temperature. We have also annexed a column, exhibiting the elastic force of vapour for the same range of temperature, as determined by Mr Dalton. The difference between the corresponding numbers in the two columns seldom exceeds the 1000th part of an inch, except between 75° and 90°, where Mr Dalton's table seems to be a little faulty.

Force of Vapour, in Inches of Mercury, from 0° to 100° Fahrenheit.

Temperature.	Forces of Vapour in Inches in Mercury.		Temperature.	Force of Vapour in Inches of Mercury.	
	According to Biot's Formula.	According to Dalton.		According to Biot's Formula.	According to Dalton.
0	.06121	.064	51	.38640	.388
1	.06359	.066	52	.39977	.401
2	.06605	.068	53	.41356	.415
3	.06861	.071	54	.42779	.429
4	.07126	.074	55	.44249	.443
5	.07401	.076	56	.45764	.458
6	.07685	.079	57	.47328	.474
7	.07980	.082	58	.48940	.490
8	.08286	.085	59	.50604	.507
9	.08603	.087	60	.52320	.524
10	08931	.090	61	.54089	.542
11	.09270	.093	62	.55913	.560
12	.09622	.096	63	.57795	.578
13	.09987	.100	64	.59735	.597
14	.10364	.104	65	.61734	.616
15	.10755	.108	66	.63795	.635
16	.11160	.112	67	.65919	.655
17	.11579	.116	68	.68108	.676
18	.12013	.120	69	.70364	.698
19	.12462	.124	70	.72688	.721
20	.12927	.129	71	.75083	.745
21	.13408	.134	72	.77551	.770
22	.13906	.139	73	.80092	.796
23	.14421	.144	74	.82700	.823
24	.14954	.150	75	.85407	.851
25	.15506	.156	76	.88184	.880
26	.16076	.162	77	91042	.910
27	16667	.168	78	.93987	.940
28	.17277	.174	79	97017	.971
29	.17908	.180	80	1.00137	1.00
30	18561	.186	81	1.03350	1.04
31	.19237	.193	82	1.06656	1.07
32	19934	200	83	1.10058	1.10
33	.20658	.207	84	1.13559	1.14
34	21404	.214	85	1.17161	1.17
35	.22175	.221	86	1.20867	1.21
36	.22972	.229	87	1.24680	1.24
37	.23796	.237	88	1.28602	1.28
38	.24647	.245	89	1.32636	1.32
39	.25527	.254	90	1.36785	1.36
40	.26436	.263	91	1.41059	1.40
41	.27376	.273	92	1.45438	1.44
42	.28346	.283	93	1.49948	1.48
43	.29348	.294	94	1.54585	1.53
44	30384	.305	95	1.59352	1.58
45	31453	.316	96	1.64251	1.63
46	.32557	.328	97	1.69286	1.68
47	.33[illegible]84	.339	98	1.74461	1.74
48	.34875	.351	99	1.79778	1.80
49	.36090	.363	100	1.85241	1.86
50	.37345	.375			

32. Having thus deduced a general expression for the elasticity or tension of vapour at different temperatures, we shall now proceed to investigate its density or absolute weight. The experiments of Gay Lussac, which were conducted with the utmost attention to accuracy, have established, beyond the possibility of doubt, that vapours, when they are subjected to pressure, suffer within certain limits, that is, so long as they retain the elastic form, the same reduction of bulk as permanently elastic fluids. Hence if P be the weight of the liquid reduced to vapour in grammes; N the number of divisions of the receiver, which it occupies in the vaporous state at the temperature of 100° centigrade; v the capacity of one of these divisions in litres at the freezing point: then since $N v$ would be the volume of the vapour, if the receiver itself suffered no expansion by the increase of temperature, its real volume will be $N v\,(1+100k.)$ the quantity k being the cubical dilatation of glass for each degree of the centigrade scale. Also if p be the pressure of the atmosphere at the time of the experiment, and h the height of the mercury in the receiver above its external level, both being expressed in metres, then the volume of vapour in litres, produced by the quantity of liquid whose weight is P, will be

$$\frac{N v\ (1+100\,k)\ (p-h)}{.76},$$

and that of a single gramme

$$\frac{N v\,(1+100\,k)\,(p-h)}{.76\,\mathrm{P}}.$$

33. Now in one of his experiments, Gay Lussac found, that $\frac{6}{10}$ grammes of water being introduced under a receiver, and the temperature raised to 100°, gave a volume of vapour which occupied 220 divisions, each of which was equal in capacity to .00499316 litres; the column of mercury in the inside of the receiver was .052 metres above the external level, and the barometer at the time of the experiment stood at .7555 metres. As mercury is expanded $\frac{100}{5412}$ of its bulk from the freezing to the boiling point, or $\frac{1}{5412}$ for each degree of the centigrade scale, and the temperature of the mercury in the barometer at the time of the experiment was 15°, the height of the column of mercury in the receiver reduced to what it would be at the freezing point, is $\frac{1}{1+\frac{100}{5412}}\times.052$, or .051056 metres; and the height of the mercury in the barometer, corrected in like manner, is $\frac{1}{1+\frac{15}{5412}}\times.7555$, or .75341 metres. Hence $\mathrm{P}=.6$; $\mathrm{N}=220$; $v=.00499316$; $p=.75341$; $h=.051056$; and since the cubical dilatation of glass is .0000262716 for each degree of the centrigrade scale reckoned from the freezing point, $1+100\,k=1.00262716$.

$$\text{And}\ \frac{N v\ (1+100\,k)\ (p-h)}{.76\,\mathrm{P}}=$$

$$\frac{220\times.00499316\times1.00262716\times\overline{.75341-.051056}}{.76\times.6}=1.69641$$

litres. Therefore a volume of vapour equal to 1.69641 litres would contain, at the boiling point, under a pressure of .76 metres of mercury, a quantity of moisture equal in weight to a gramme; or a litre of vapour in the same circumstances would weigh .589481 grammes.

34. If we reduce the result of this experiment to English measures, we shall find that a cubic inch of vapour at the boiling point, when the barometer stands at 29.92196 inches, weighs .149176 grains troy; and consequently a cubic foot of vapour in the same circumstances weighs 257.776 grains.* But, according to the very accurate experiments of Biot and Arago, a litre of dry air at

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* As a cubic inch of water at the temperature of 60° weighs 252.576 grains, a cubic foot of vapour, and a cubic inch of water, in the circumstances stated, weigh very nearly the same.

the boiling point, and under a pressure of .76 metres, weighs .9454476 grammes, and therefore the weight of vapour at the temperature 100° centigrade, is to the weight of air at the same temperature, and under the same pressure, as .589481 to .9454476, or as 5 to 8 nearly. Now as Gay Lussac has proved by experiment, that vapours, so long as they remain in the aeriform state, expand, by increase of temperature, precisely in the same manner as permanently elastic fluids, and suffer corresponding changes of volume by change of pressure; and as he has also dstermined that air expands $\frac{3}{8}$ of its bulk from the freezing to the boiling point of the centigrade scale, and that the expansion is uniform between these points; if P' be the weight in grammes of a litre of vapour, at the temperature t; F_t, the corresponding elastic force; and P the weight, in grammes, of a litre of vapour at the boiling point,

$$P' = \frac{1.375\ PF_t}{.76(1+.00375t)}$$

$$\text{or } P' = \frac{\frac{11}{8}PF_t}{.76\left(\quad + \frac{3t}{800}\right)}$$

35. If we substitute for P its value, viz. .589481 grammes,

$$P' = \frac{853.196\ F_t}{800+3t}, \text{ or } \frac{1.066495\ F_t}{1+.00375t};$$

And if the value of F_t, as determined by the formula laid down in § 30, be substituted for that quantity, the weight of the water contained in a litre of vapour will be expressed entirely in known terms. If the pressure of the barometer be different from .76 metres, and expressed by β, the result must be multiplied by $\frac{\beta}{.76}$. The formula we have given is a little different from that of Biot.

36. The value of P' expressed in English grains, and corresponding to a cubic inch of vapour at the temperature t of Fahrenheit, requires several corrections. In the first place F_t must be determined by the formula in § 31, for Fahrenheit's scale, or taken from the Table constructed from that formula; and, in the next place, the co-efficients 1.375, and .00375, must be adapted, not only to the general graduation of that scale, but to the barometrical pressure at which the boiling point of it is fixed. In the centigrade scale, the boiling point is taken at a barometrical pressure of .76 metres, or 29 92196 English inches, whereas the boiling point of Fahrenheit's scale is fixed under a pressure of 30 inches; but 27 millimetres of increase in the pressure raise the boiling point 1° centigrade, and 30 inches being equal to .76199 metres, the boiling point of Fahrenheit's scale must be $\frac{199}{2700}$, or about $\frac{2}{27}$ of a centigrade degree above the boiling point of the centigrade scale. Consequently the co-efficient 1.375 will be increased, by this correction, to 1.37528; and the co-efficient .00375, after being reduced in like manner to .0037528, must, to make it applicable to the degrees of Fahrenheit, be multiplied by $\frac{100\frac{2}{27}}{180}$, which makes it .002086.

37. By these corrections, our formula becomes

$$g = \frac{.37528\ GF_t}{30(1+.002086.\ \overline{t-32°})}$$

G being the weight in grains of a cubic inch of vapour at the boiling point, and g the weight expressed in the same denomination of an equal volume of vapour at the temperature t. Since G has a reference to the boiling point of Fahrenheit's scale, its value, as formerly determined, must undergo a slight correction, to adapt it to the pressure and difference of temperature at which the two scales are fixed. Under a pressure of 29.92196 inches, it was found to be .149176 grains, at the boiling point of the centigrade scale; but the boiling point of Fahrenheit having been shewn to correspond to $100\frac{2}{27}$ of the same scale, .149176 must be multiplied by $\frac{30}{29.92196}$ to correct it for pressure, and then by $\frac{1}{1+\frac{2}{27}\times .00375}$ to correct it for expansion, by the increase of temperature. These corrections reduce it to .1495204 grains. Therefore

$$g = \frac{1.37528\ GF_t}{30\ (1+.002086\ .\overline{t-32})} = \frac{1\ 37528 \times .1495204F_t}{30\ (1+.002086.\overline{t-32})} =$$

$$= \frac{.0068544F_t}{1+.002086.\overline{t-32}}.$$

38. This expression will give the weight, in grains, of the water contained in a cubic inch of vapour, at the temperature t, and under the pressure of 30 inches of mercury. For the purposes of calculation, it may be reduced to the form,

$$g = \frac{3\ 2859\ F_t}{479.4+t-32} = \frac{3.2859\ F_t}{447.4+t}.$$

To illustrate this formula, let it be required to find the weight of a cubic inch of vapour at 66° of Fahrenheit, under a pressure of 30 inches of mercury.

$$g = \frac{3.2859\ F_t}{447.4+t} = \frac{3.2859\ F^{66}}{447.4+66};$$

And if we introduce the value of F_{66}, which will be found by the Table of the elastic force of vapour to be .63795,

$$g = \frac{3.2859 \times .63795}{513\ 4} = .\ \overset{\text{grains.}}{408\quad 3}$$

Hence a cubic foot of vapour, under the same circumstances, would contain 7.055 grains of moisture.*

39. The following Table, calculated from the formula $g = \frac{.0068544\ F_t}{1+\ 002086.\overline{t-32}}$, exhibits the quantity of moisture contained in a cubic inch of vapour, from zero to 100° of Fahrenheit, under a pressure of 30°.

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* Saussure found, in one of his experiments, that a cubic foot French of vapour contained, at the temperature of 15.°16 Reaumur, or 66.°11 Fahrenheit, a quantity of moisture equal in weight to 11.069 grains French. This result, reduced to English measures, would be 7.498 grains to a cubic foot, differing very little from the quantity determined by our formula. The difference would have been still less, if the temperature had been exactly 66°.

Table of the Quantity of Moisture, in Grains, contained in a Cubic Inch of Vapour, from 0° to 100° of Fahrenheit.

Temperature.	Force of vapour	Weight in grains of the water in a cubic inch of vapour.	Temperature.	Force of vapour.	Weight in grains of the water in a cubic inch of vapour.
0	.0612	.00044957	51	.38640	.00254757
1	.063[illegible]	.000466[illegible]1	52	.39977	.00263044
2	.[illegible]66	.00048296	53	.41356	.00271574
3	[illegible]8	.00050056	54	42779	.00280358
4	.07[illegible]2[illegible]	.00051874	55	.44249	.00289415
5	.074[illegible]1	.00053757	56	.45764	.00298729
6	.07685	.00055697	57	.48328	.00308325
7	.[illegible]798	.00057708	58	.4894[illegible]	.00318197
8	.08286	.00059789	59	.5060[illegible]	.00328366
9	.086[illegible]3	.00061921	60	.52320	.00338832
10	.08931	.00064161	61	.54[illegible]89	.00349599
11	.09[illegible]7	0006[illegible]45	62	.55913	.00[illegible]60679
12	.096[illegible]2	.00068825	63	.57795	.00372089
13	.[illegible]9[illegible]87	0[illegible]071[illegible]	64	.59735	.00383826
14	.1[illegible]364	.00073810	65	.61734	.00395897
15	.10755	00076429	66	.6[illegible]795	.004[illegible]8317
16	.1116[illegible]	.00079136	67	.65919	.00421091
17	.11579	.00081[illegible]31	68	68108	.00434230
18	.12013	.00084819	69	70[illegible]64	.00447745
19	.12462	.00087801	70	.72688	.00461639
20	.12927	.00090882	71	.75[illegible]83	.00475930
21	.13408	00094051	72	.7[illegible]551	.00490628
22	.13906	.00097337	73	.80092	.00505729
23	.1442[illegible]	.00100732	74	82710	.00521259
24	.14954	.00104235	75	.85407	.00537226
25	.15506	.00107851	76	.88184	.00553634
26	.16076	.00111588	77	.91042	.00570487
27	16667	.00115446	78	93987	.00587810
28	.17277	.00119120	79	.97017	.00605617
29	.17908	.00123522	80	1.00137	.00623919
30	18561	.00127758	81	1.03350	.00642708
31	.19237	.00132134	82	1.06656	.00662015
32	.19934	.00136636	83	1.10058	.00681843
33	.20658	.00141303	84	1 13559	.00702209
34	.21404	.00146102	85	1.17161	.00723121
35	.22175	.00151051	86	1.20867	.00744597
36	.22972	.00156156	87	1.24680	.00766648
37	.23796	00161424	88	1.28602	.00789288
38	.24647	.00166852	89	1.32636	.00812529
39	.25527	.00172454	90	1.36785	.00836386
40	.26436	.00178229	91	1.41059	.00860918
41	27376	.00184188	92	1.45438	.00885999
42	.28346	.00190325	93	1 49948	.00911783
43	29348	.00196651	94	1.54585	.00938243
44	30384	.00203178	95	1 59352	.00965392
45	.31453	.00209899	96	1 64251	.00993240
46	.32557	.00216827	97	1.69286	.01021807
47	.33684	.00223878	98	1.74461	.01051113
48	.34875	.00231326	99	1.79778	.01081165
49	.36090	.00238903	100	1 85241	.01111983
50	.37345	.00246714			

40. The formula, by which the above Table was calculated, being adapted to a pressure of 30 inches of mercury, if the pressure of the atmosphere be different, a corresponding correction must be applied: if the height of the barometer in inches be represented by β, then

$$g = \frac{\beta}{30}\left(\frac{.0068544\,F_t}{1+.002086.\overline{t-32}}\right), \text{ or, } g = \frac{.10953\,\beta F_t}{479.4+t-32} = \frac{.10953\,\beta F_t}{447.4+t}.$$

If the value of g be taken from the Table, it must be multiplied by $\frac{\beta}{30}$.

41. The formulæ which we have deduced, for the elastic force of steam, and the weight of the water contained in a given volume of vapour, when the temperature and pressure are given, furnish also the means of ascertaining, under similar circumstances, the force and quantity of vapour which exist, in combination or mixture with atmospheric air. The experiments of Gay Lussac have decidedly proved, that vapours, so long as they exist in the aëriform state, not only undergo the same change of mechanical condition by change of temperature and pressure, but that the same thing holds true, when they are mixed with vapours of a different kind, or even with permanently elastic fluids. The apparatus which Gay Lussac employed for demonstrating this important fact, is delineated in Fig. 1. Plate CCCXXVI. AB represents a cylindrical tube, accurately graduated; R and R′ are two stop-cocks of iron; TT′ is a bent tube of glass communicating with AB at T. The whole apparatus having been well dried, the tube AB was filled with dry mercury, recently boiled; a balloon, furnished with a stop-cock *r*, and filled with dry air, was then firmly connected with the tube AB, after which the stop-cocks *r* and R′ were opened, thus making a communication between them. The stop-cock R was next opened, and a quantity of mercury allowed to make its escape by the recurved tube *a b*. The gas was thus allowed to dilate itself, till it was reduced to some particular state of rarefaction. The stop-cocks R and R′ were then shut. The inclosed gas in the cylinder AB being rarefied, by its increase of volume, the level of the mercury in it is found to stand higher than that of the mercury in the bent tube TT′: but the gas is easily reduced to the pressure of the atmosphere, at the time of the experiment, by pouring mercury into the tube TT′, till H and *h* have the same level. The liquid to be reduced into vapour is introduced into AB, by removing the balloon, and applying another stop cock R″, the tube connected with which is surmounted by a small funnel V. The stop-cock R″ has a small cavity on one side of it, capable of containing a single drop of the liquid to be subjected to experiment, and by means of which any given portion of it may be introduced into AB. The liquid being thus brought in contact with the dry gas, is gradually converted into vapour; and when the addition of it ceases to increase the volume of the gas, a sufficient quantity is introduced, to exist in a vaporous state, at the temperature and pressure at which the experiment is made. The elasticity of the gas being augmented by the vapour, the mercury is elevated in the tube TT′ above its former level, and the gas, together with the vapour with which it is mixed, thus sustains a greater pressure than that of the atmosphere. It would be easy to make an allowance for the difference of level, and determine by calculation the volume which both ought to occupy under that pressure; but the apparatus itself furnishes the means of obtaining the proper correction, by allowing the mercury to flow out at *b*, until its level in AB and TT′ is the same. If N be the number of divisions occupied originally by the gas, N′ the number of divisions occupied by the mixture, and *p* the pressure of the atmosphere, which we shall suppose remains the same during the experiment, the elastic force of the gas, in consequence of its increase of volume, will now be $\left(\frac{N}{N'}\right)p$, and if f be the elastic force of the vapour, the joint elasticity of both will be $f + \frac{Np}{N'}$.

But this being exactly equal to the atmospherical pressure, we have

$$p = f + \frac{N p}{N'}.$$

$$\text{Hence } f = p - \frac{N p}{N'} \text{ or } p\left(\frac{N' - N}{N'}\right).$$

42. It appears, by the experiments of Gay Lussac, that when the values of N′, N, and p are substituted for these quantities, the value of f deduced from the formula, is exactly the same as would be obtained for the elastic force of vapour at the same temperature, and under the same pressure, by the formula laid down in § 31. Hence it has been justly inferred that the vapour, in union or mixture with the gas, retains its own peculiar elasticity, and exerts the same tension as if no gas were present. This result furnishes by far the strongest argument which has yet been adduced, that vapour exists in air, not in a state of chemical union, but merely of mechanical mixture. In a hygrometrical point of view, this is a fact of the utmost importance, as it enables us to determine the precise volume which a mixture of vapour and dry air would occupy at a given temperature, and under a given pressure. All that is necessary is to determine f by the formula for calculating the elastic force of vapour at the given temperature, and then to substitute it for that quantity in the expression $f = p\left(\frac{N' - N}{N'}\right)$. We should thus obtain

$$N' = \frac{p N}{p - f}.$$

To illustrate this formula by example, let it be required to determine the enlargement of volume which dry air receives when saturated with vapour, at the temperature of 66° of Fahrenheit, and under a pressure of 30 inches of mercury. Since we wish to determine merely the relative increase of volume, N may be considered as unity; and $f_{66} = .63795$.

$$\text{Therefore } N' = \frac{p N}{p - f} = \frac{30}{30 - .63795} = \frac{30}{29.36205} = 1\,\tfrac{1}{46}.$$

Hence dry air at the temperature of 66° is, when saturated with moisture, expanded $\frac{1}{46}$ of its original bulk.*

43. The following Table constructed from the above formula, exhibits the dilatation of air by moisture, from 32° to 100°, under a pressure of 30 inches of mercury; and also the numbers by which the bulk of air, in a state of complete saturation with vapour, must be multiplied, in order to reduce it to its real volume, if it were deprived entirely of water. Its value in pneumatic researches will be duly estimated by the philosophical chemist.

Temperatures.	Increased volume, the original bulk being unity.	Multipliers.
32	1.0064	.99336
33	1.0068	.99311
34	1.0071	.99286
35	1.0074	.99261
36	1.0077	.99234
37	1.0080	.99207
38	1.0083	.99178
39	1.0086	.99149
40	1.0089	.99119
41	1.0092	.99087
42	1.0095	.99055
43	1.0099	.99022
44	1.0102	.98987
45	1.0106	.98952
46	1.0109	.98915
47	1.0113	.98877
48	1.0117	.98837
49	1.0122	.98897
50	1.0126	.98755
51	1.0130	.98712
52	1 0135	.98667
53	1.0140	.98621
54	1.0145	.98574
55	1.0150	.98525
56	1.0154	.98478
57	1.0160	.98422
58	1.0166	.98369
59	1.0172	.98313
60	1.0178	.98256
61	1.0184	.98197
62	1.0190	.98136
63	1.0196	.98074
64	1.0203	.98009
65	1.0210	.97942
66	1.0217	.97873
67	1.0225	.97803
68	1.0232	.97730
69	1.0240	.97654
70	1.0248	.97577
71	1.0257	.97497
72	1.0265	.97415
73	1.0274	.97330
74	1.0283	.97243
75	1.0293	.97153
76	1.0303	.97060
77	1.0313	.96998
78	1.0323	.96867
79	1.0334	.96766
80	1.0345	.96662
81	1.0357	.96555
82	1.0369	.96445
83	1.0381	.96331
84	1.0393	.96215
85	1.0406	.96094
86	1.0420	.95971
87	1.0434	.95844
88	1.0448	.95713
89	1.0463	.95579
90	1.0478	.95440
91	1.0493	.95298
92	1.0509	.95152
93	1.0526	.95002
94	1.0543	.94847
95	1.0561	.94688
96	1.0579	94525
97	1.0598	.94357
98	1.0617	.94185
99	1.0637	.94007
100	1.0658	.93825

To illustrate the use of the above Table† by example, let it be required to determine the enlargement of volume which a cubic foot of atmospheric air acquires by standing over water, when the temperature of the air is 70°, the barometrical pressure 29.25 inches, and the level of the water in the inside of the receiver 9.5 inches above its level on the outside.

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* Saussure found by his experiments, that dry air at the temperature of 15°.16 Reaumer, or 66°.11 Fahrenheit, was expanded 1.54th, which is wonderfully near the truth, considering the manner in which it was determined.

† As the Table can only be applied with perfect accuracy, when the level of the water, in the outside and inside of the receiver, is exactly the same, the results afforded by the examples must be considered merely as near approximations.

The increased volume for the temperature 70° being 1.0248, the enlarged bulk of the air, under a pressure of 30 inches of mercury, is 1728×1.0248 or 1770.85 cubic inches. This accordingly would be the increased volume under that pressure; but the pressure being different, a corresponding correction must be applied to the result: in the first place, a column of water of the height of 9.5 inches is equivalent to a column of mercury of the height of .098 inches, the heights being inversely as their specific gravities; and, therefore, the actual pressure sustained by the air and the vapour, in the supposed circumstances, is equal to 29.25—.098, or 29.152 inches of mercury; and, lastly, the expanded volume 1.770.85 must be multiplied by $\frac{30}{29.152}$ to obtain its augmentation by the diminished pressure, which reduces it to 1822.36 cubic inches.

To propose an example of an opposite description, let it be required to find the actual volume of air contained in a receiver standing over water at the temperature of 60°, when the barometrical pressure is 30.45 inches, and the level of the water in the inside of the receiver eight inches above its level on the outside; supposing also the apparent quantity of air to be 850 cubic inches.

The multiplier in the table for the temperature 60° being .98256 the reduced volume, under a pressure of 30 inches, is $850 \times .98256$, or 835.176 cubic inches; and this result corrected for the pressure becomes $835.176 \times \frac{30.45 - .059}{30}$, or 846.061 cubic inches.

44. By means of the apparatus formerly described, Gay Lussac examined the tension of vapour when a smaller quantity of moisture was introduced into the cylinder AB, than was sufficient to saturate completely the space previously occupied by the air which it contained; and in all cases he found, that the elastic force of the vapour, in its attenuated state, was affected by variations of pressure, precisely in the same manner as permanently elastic fluids, the reduction of bulk which it sustained being always inversely proportional to the pressure. Thus, if N represent the bulk of the air, on introducing a single drop of water, the volume N was gradually enlarged to N′; and allowing a part of the mercury to flow out, until its surface in AB, and the bent tube TT′ was the same, the included air in mixture with the vapour was brought to the same pressure as at the beginning of the experiment. If an additional portion of mercury be now allowed to escape, the surface of the mercury in the bent tube descends below the surface of the mercury in the cylinder AB; so that if the difference of level be represented by h, the elastic force of the mixture of air and vapour will be $p-h$, the quantity p denoting, as before, the barometrical pressure at the time of the experiment. If the change of volume resulting from the change of pressure be now examined, it is found, in all cases, to be the same as would be obtained with dry air; so that if N″ be the space occupied by the mixture in its new state of dilatation, we have, invariably,

$$\frac{N'}{N''} = \frac{p-h}{p}.$$

45. To determine what change this result implies in the elastic force of the vapour, let f be the force which the mixture exerted when it occupied the space N′, and f' the force which it exerts under the volume N″; then since p is the pressure of the atmosphere, the elastic force of the air in the receiver, when together with the vapour it occupied the space N′, must have been $p-f$, is now, on account of the enlargement of volume, reduced to $(p-f)\frac{N'}{N''}$. If to this elastic force of the air we add the elastic force of the vapour, we obtain for the elasticity of the mixture $f'+(p-f)\frac{N'}{N''}$; and, consequently,

$$f'+(p-f)\frac{N'}{N''} = p-h.$$

But it is found by experiment, that

$$\frac{N'}{N''} = \frac{p-h}{p}, \text{ or } p-h = p\left(\frac{N'}{N''}\right)$$

Therefore,

$$f'+(p-f)\frac{N'}{N''} = p\,\frac{N'}{N''}.$$

And, $f' = f\left(\frac{N'}{N''}\right)$.

This result, which has been deduced by Biot from the experiments of Gay Lussac, demonstrates what had been formerly stated by Dalton, that the elastic force of vapour, however attenuated the latter may be, changes in all cases with the volume, precisely in the same the manner as that of the gases. Hence it may be concluded, that, so long as vapour retains the aëriform state, the quantity of it which can exist in mixture with air, is exactly the same as in a vacuum of equal extent, when the pressure and temperature are the same; and, therefore, the Table (§ 39.) which expresses the weight in grains of a cubic inch of vapour, from zero to 100° of Fahrenheit, may be applied with perfect accuracy to determine the weight of the moisture contained in a cubic inch of air, when the tensions or elasticities of both are the same. The only circumstance necessary for this application of the Table, so important to the purposes of hygrometry, is some means of ascertaining the elasticity of the vapour in admixture with the air. Mr Dalton has suggested one method of doing this, which is extremely simple, as well as susceptible of the greatest accuracy.

46. The method to which we have alluded is founded on the principle, that if vapour, in an attenuated state, (that is, in a state such that the space which it occupies is capable of holding an additional portion of moisture in the vaporous condition,) be cooled down till it just begin to deposit itself in the form of dew, the volume to which it is then reduced must be completely saturated with moisture; and consequently the vapour in this reduced state must possess the same elasticity as unmixed vapour at the same temperature. In the case of the atmosphere, we can determine the temperature at which this deposition takes place, by presenting to it a body cooled down continuously from the temperature of the air, until its surface begins to be bedewed with moisture; and for this purpose, no contrivance seems more convenient than that proposed by Mr Dalton, which we shall now briefly describe.

47. Having taken a cylindrical glass vessel, Mr Dalton poured cold water into it, the temperature of which was gradually reduced by cooling mixtures when necessary. He then carefully watched, till he observed an incipient deposition of moisture on the surface of the jar; after which he examined the temperature of the water, and assumed it as the temperature at which the moisture in the atmosphere would just be retained in a state of vapour. If a deposition of dew took place immediately, he allowed the jar to stand for some minutes to receive an increase of temperature, wiping it from time to time on the outside with a dry linen towel, till it entirely ceased to exhibit the

appearance of moisture on its surface, and then examined the temperature of the water as before. If due precautions be employed, the temperature, at which the dew is formed on the surface of the jar, may be determined to the fifth part of a degree of Fahrenheit. Let the temperature thus obtained be represented by τ, and let $\varphi\tau$ be the corresponding elastic force of vapour at its maximum of solution; also let f' be the elastic force of the vapour, in the state of attenuation in which it actually exists in the atmosphere, at the temperature t; then since nothing more is necessary but to dilate this vapour from the temperature τ to the temperture t, in order to reduce it from the force φ to the force f'

$$f' = \varphi_\tau \left(\frac{1 + .002086\,\overline{t - 32}}{1 + .002086\,\overline{\tau - 32}} \right) = \varphi_\tau \left(\frac{447.4 + t}{447.4 + \tau} \right) =$$

$$\varphi_\tau \left(1 + \frac{t - \tau}{447.4 + \tau} \right)$$

48. Again, since the number of grains contained in a cubic inch of vapour at the temperature τ, and under a pressure of 30 inches of mercury is $\frac{.0068544\,\varphi_\tau}{1 + .002086\,\overline{\tau - 32}}$; and since $f' \varphi_\tau \left(1 + \frac{t - \tau}{447\,4 + \tau} \right)$; therefore if g' be the number of grains of moisture in a cubic inch of air, the temperature of which is t, and the point of deposition τ, and actual tension f',

$$g' = \frac{.0068544\,f'}{1 + 002086\,t} = \frac{3.2859\,f'}{447.4 + t}$$

$$\text{or } g = \frac{3\,2859\,\varphi_\tau}{447.4 + \tau}.$$

And if the pressure of the barometer be β

$$g' = \frac{.10953\,\beta f'}{447.4 + t},$$

$$\text{or } g' = \frac{.10953\,\beta\,\varphi_\tau}{447.4 + \tau}.$$

To illustrate this formula by an example, let us suppose that, when the temperature of the air is 65°, the point of deposition 54°, and the height of the barometer 29.5, it were required to find, in these circumstances, the number of grains of moisture in a cubic inch of air,

$$g' = \frac{.10953\,\beta\,\varphi_\tau}{447. + \tau} = \frac{.10953 \times 29\,5 \times 42779}{447.4 + 54} = \overset{\text{grains.}}{.0027567}.$$

49. Another method of determining the value of f', and the corresponding value of g' may be derived from the formula of Mr Dalton, $E = \frac{m}{30}\left(f_t - f'\right)$, in which E denotes the number of grains evaporated in a minute, from the surface of water contained in a cylindrical vessel, 6 inches in diameter, and 1 inch deep; f_t the entire tension of vapour at the temperature of the air t; and f' the tension which it actually exerts. The co-efficient m is different, in different circumstances: when the air is perfectly calm and tranquil, it is 120; in a moderate breeze, it amounts to about 150; and in a high wind it rises to upwards of 180. If we employ the mean 150, we obtain

$$E = \frac{150}{30}\,(f_t - f')$$

$$\text{or } E = 5\,(f_t - f')$$

$$\text{Hence } f' = f_t - \frac{E}{5}.$$

These formulæ may be applied to the solution of several important problems in meteorology. Thus, when the mean temperature and annual evaporation of a place are known, the formula $f' = f_t - \frac{E}{5}$ will enable us to determine the mean state of the air of that place, with regard to moisture. Let us take for example the mean annual evaporation of Great Britain, which is reckoned about 24 inches; this in a minute would be ·00004563 inches, and applied to a cylindrical vessel 6 inches in diameter, would correspond to .32587 grains.

$$\text{Hence } f' = f_t - \frac{\cdot 32587}{5}$$

And if we reckon the mean temperature 50°, and substitute for f_t the corresponding elastic force of vapour, taken from the table in § 31, we obtain,

$$f' = \cdot 37345 - \frac{\cdot 32587}{5} = \overset{\text{inches.}}{\cdot 308276}.$$

Having found f' the number of grains corresponding to that tension, at the temp. 50°, may be found by the formula for determining g in § 38: we thus have

$$g' = \frac{3\,2859\,f'}{447.4 + t} = \frac{3\,2859 \times \cdot 308276}{447.4 + 50} = \overset{\text{grains.}}{\cdot 00203652}.$$

It will be found by the table that this number of grains corresponds to 44°.1, which, in the present case, is the mean temperature at which moisture will begin to deposit itself in Great Britain; that is, about 6° below the mean temperature.*

50. The value of g' might have been found without having recourse to the formula $g' = \frac{3\cdot 2859\,f'}{447\cdot 4 + t}$, by taking a proportional part of the weight of moisture, held in the vaporous state, at the entire tension of 50°, corresponding to the actual tension ·308276. Thus the entire tension at 50°, being ·37345 inches, and the weight of the corresponding quantity of moisture, in the vaporous state, ·00246714 grains, we have

$$\overset{\text{inches.}}{\cdot 37345} : \overset{\text{inches.}}{\cdot 308276} :: \overset{\text{grains.}}{\cdot 00246714} : \overset{\text{grains.}}{\cdot 00203652}$$

If we take the mean annual evaporation of a place near the equator, the mean point of deposition is found to be nearly the same number of degrees below the mean temperature, as we have determined it in the case of Great Britain. Thus at Whydah, on the coast of Africa, the mean temperature of which by the formula, $t = 58° + 27$ cos. 2 Lat. is 84° 2, the mean annual evaporation is stated at 64 inches, or at the rate of ·86899 grains per minute from the disc of Mr Dalton; and hence

$$f' = f_t - \frac{E}{5} = f_{84\cdot 2} - \frac{\cdot 86899}{5} = 1\cdot 14279 - \cdot 173798 = \overset{\text{inches.}}{\cdot 968992}$$

By proceeding as before, the number of grains corresponding to a cubic inch of vapour, under the tension .968992 inches, and at the temperature 84°.2, will be found to be .00598944, which corresponds to the quantity of moisture, in a cubic inch of vapour, for the entire tension of 78°.6; so that, at Whydah, the mean point of deposition is 5°.6 below the mean temperature. It seems probable, from these results, that the mean point of deposition, for any place, is about 6° below the mean temperature; though we admit observations are still wanting to warrant so general a conclusion. Mr Dalton affirms, that the point of deposition is generally from 1° to 10° below the mean heat of the 24 hours; we have usually found it to be from 6° to 7°.*

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* Dr Dobson found, by observation, that the mean temperature of deposition, at Liverpool, was 7° below the temperature of that place.

51. The following formula, which we have deduced on the supposition that the mean point of deposition is 6° below the mean temperature, seems to agree pretty well with observation. Let t be the mean temperature; f_t the entire force of vapour corresponding to t; and φ_τ the entire force of vapour corresponding to the temperature τ, or $t-6$; then if A be the mean annual evaporation in inches,

$$A = 365 \left(f_t - \varphi_\tau \left(1 + \frac{t-\tau}{447.4+\tau}\right)\right).$$

The mean daily evaporation, for any place, according to this formula, is $f_t - \varphi_\tau \left(1 + \frac{t-\tau}{447.4+\tau}\right)$, or nearly $f_t - \varphi_\tau$.

Let it be required to find, by it, the mean annual evaporation, at a place in Lat. 45°, the mean temperature of which is 57°.

$$A = 365 \left(f_t - \varphi_\tau \left(1 + \frac{t-\tau}{447.4+\tau}\right)\right) =$$

$$= 355 \left(f_{57} - \varphi_{51} \left(1 + \frac{57-51}{447.4+51}\right)\right) =$$

$$= 365\,(.47328 - .3864 \times 1.012) = \overset{\text{inches.}}{30.02}.$$

For the purposes of calculation, the expression may be reduced to the approximated, but more commodious, form,

$$A = 365 \left(f_t - \frac{81}{80}\varphi_{t-6}\right).$$

By means of this formula, we have deduced the following Table, which expresses the mean annual and daily evaporation, from the equator to either pole, for the different parallels of latitude, at the interval of 5°. The mean annual temperature corresponding to each latitude, was derived from Meyer's formula.

Latitude.	Mean Temp.	Mean Evaporation in inches.		Diff. in yearly evap. for every 5° diff. lat.
		Daily.	Yearly.	
0	85	.18938	69.10	
5	84.6	.18717	68.32	.78
10	83.4	.18085	66.01	2.31
15	81.4	.17073	62.32	3.69
20	78.7	.15786	57.62	4.70
25	75.4	.14133	52.32	5.30
30	71.5	.12769	46.61	5.71
35	67.2	.11222	40.96	5.65
40	62.7	.09785	35.72	5.24
45	58.	.08463	30.89	4.83
50	53.3	.07312	26.71	4.18
55	48.8	.06327	23.09	3.62
60	44.5	.05517	20.14	2.95
65	40.6	.04860	17.74	2.40
70	37.3	.04362	15.92	1.82
75	34.6	.03990	14.56	1.36
80	32.6	.03732	13.62	.94
85	31.4	.03584	13.09	.53
90	31.	.03537	12.91	.18

The last column contains the differences of the mean annual evaporation corresponding to every 5° of difference of latitude. These appear to increase, according to some regular law, from the pole to the parallel of 30°; after which they begin to diminish, and continue to decrease to the equator. The greatest differences take place near the limits of the trade winds. Hence it might be inferred, that the most copious depositions of moisture should occur a few degrees on either side of the tropics.

52. As the temperature of every place, for the whole year, ranges between two extreme points, corresponding to the alternations of summer and winter; so it exhibits, every 24 hours, a corresponding difference with respect to the vicissitudes of day and night. In the case of the daily change of temperature, there is some interval between the *maximum* and the *minimum*, which may be regarded as the temperature belonging to the season of the year; and, though this point will not always be a mean between these extremes, it will in general approach very near it. If this mean temperature were to rise and sink regularly, as the season advanced and declined, without being subject to daily fluctuation, the quantity of moisture which could exist in the atmosphere, at any given time, might be determined with the utmost precision; since nothing more would be necessary for that purpose, than to calculate the maximum quantity of vapour for the temperature, by the formula in § 39. A variety of causes, however, which are too complicated in their nature to admit of being reduced under any general law, (but of which the vicissitude of day and night is the principal,) continually conspire to raise and depress, by turns, the temperature of every place above or below its mean level for the season; and hence the quantity of moisture in the atmosphere will generally be less than the quantity corresponding to the mean temperature, but at all times nearly equal to that belonging to the minimum temperature. If it be less than the latter quantity, the process of evaporation will gradually supply the deficiency; if it be greater, the excess will quickly be precipitated in the form of dew, rain, or snow, according to the temperature, and the extent of its depression, below the minimum temperature.

In short, the mean point of deposition, which we formerly represented by τ, and for which φ_τ is the corresponding elastic force of vapour, must be nearly the same as the minimum temperature of any place on any given day.

It appears by the following observations, extracted from the meteorological journal for 1815, kept by the Rev. Mr Gordon of Kinfauns, that the minimum temperature of Perth, and consequently the mean point of deposition for that place, is about 6° below the mean temperature, thus coinciding very nearly with the result formerly deduced from theory, as the mean point of deposition for Great Britain and the globe in general.

In the following Table, the depression of the minimum temperature below the mean temperature for each month, has evidently some relation to the indications of Leslie's hygrometer. This relation will be better understood, after we have explained more particularly the manner in which that instrument is affected by the elasticity of the vapour existing in the atmosphere; at present we shall only remark, that as observations made with any hygrometer are of very little value, unless the temperature at the time be given, we have inserted in the last column the mean temperature of the air when the observations were taken.

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* The mean point of deposition might also be ascertained, in a general way, by the mean height of the clouds, and the rate of the diminution of temperatare as we ascend in the atmosphere.

Months.	Minimum Temperature.	Mean Temperature by four Observations.	Depression of Minimum below mean Temperature.	Monthly mean of Leslie's Hygrometer by three daily observations.	Temperature.
January	28.484	31.903	3.419	4.9	33
February	35.661	39.946	4.285	8.1	42
March	34.855	40.229	5.374	14.7	43
April	36.916	44.616	7.700	23.1	47
May	45.451	51.976	6.525	23.0	54
June	48.950	56.366	7.416	29.7	59
July	50.306	58.125	7.819	32.0	61
August	50.855	57.761	6.906	27.7	60
September	46.900	53.304	6.404	20.3	55
October	42.645	47.278	4.633	12.2	49
November	31.383	36.333	4.950	7.8	38
December	27.790	31.927	4.137	6.5	33
	479.196	548.764	69.568	210.0	57.4
Mean annual results.	39.933	45.730	5.797	17.5	47.8

53. From what we have stated respecting the mean minimum temperature, it may be inferred, that since the quantity of moisture in the atmosphere must at all times be nearly equal to the maximum quantity of it that can be maintained in the vaporous state at that temperature, a depression of a few degrees below it must in general be accompanied with a deposition of moisture in some form or other. Hence we can perceive the reason why the air becomes damper towards evening; and why more rain falls during the night than during the day.

54. The law by which evaporation is regulated, in a medium either absolutely dry or partially occupied with vapour, will enable us to investigate the relation subsisting between the diminution of temperature induced by that process, and the humidity of the ambient air. For since we have shewn, under the article EVAPORATION, that water, during its transition into the state of vapour, absorbs 898° of caloric; and consequently, that the evaporation of about the 900th part of a given portion of that fluid would depress the temperature of the whole mass one degree, provided it had no communication with the surrounding bodies; and moreover, since the quantity of water evaporated, in the same circumstances, is proportional to $f_t - f'$, it follows that the cold produced by evaporation must be a function of the same quantity. Therefore if D represent the reduction of temperature, by evaporation, from the moistened bulb of a thermometer, covered with some bibulous substance; f_t the entire force of vapour for the temperature of the air t; and f' the force of the vapour actually existing in the atmosphere, we may evidently have an equation of the form, $D = m(f_t - f')$, in which m is a constant co-efficient, to be determined by experiment, and modified afterwards, if necessary, by a correction depending on the diminished temperature of the evaporating surface.

55. The conditions implied in this equation will receive considerable illustration, by representing, in a more palpable form, the different quantities concerned, by means of a diagram. Let AC, Fig 2 therefore, represent the temperature of the air, and consequently the temperature also of the covered thermometer, before moisture is applied to it; let the line AT represent the time reckoned from A, the parts AD, DD′, &c. being equal intervals; then, the bulb being moistened, if DE denote the reduction of temperature produced by evaporation in the time AD, and D *d* (some part of DE) the proportional quantity of heat which flows into the covered ball in the same time; since the reduction of temperature depends upon the constant quantity $f_t - f'$, the bulb of the thermometer would cool uniformly, and to an indefinite degree, were it not for the incessant influx of caloric, which being always the same proportional part of the excess of the temperature of the air above that of the covered ball, gradually increases until BH (which is the same part of BG that D *d* is of DE,) becomes equal to DE. The diminution of temperature by evaporation being now exactly counterbalanced by the influx of heat from the contiguous air, the cooling process attains its utmost limits; and GH represents the difference between the temperature of the air and that of the covered thermometer, which henceforth continues stationary.

56. It must be evident, however, from the view we have taken of the cooling process, that a thermometer with a moistened bulb ought to be reduced through the same number of degrees in equal times, and thus reach the maximum of effect in a sudden and abrupt manner,—a supposition which is neither consistent with the law of continuity, nor conformable to observation: for, though the diminution of temperature is at first nearly uniform, the effect gradually diminishes as the process advances, and the differences, becoming every instant smaller and smaller, are at last altogether evanescent. The cause of this deviation from the state of things we at first supposed, is to be ascribed to the diminished evaporation arising from the cooling of the moistened surface; so that the reduction of temperature in the first interval of time, instead of being represented by E *d*, the difference between DE and D *d*, will properly be represented by *d e*, the minute quantity E *e* being so taken, as to represent the diminished effect occasioned by the reduction of temperature already induced. In like manner, the total effect, instead of being accurately represented by HG, will be represented by H*g*; and the curve A *g* will thus exhibit the march of the thermometer from the beginning to the end of the process. The intervals A*d*, *dd′*, &c. will still represent equal portions of time; and the perpendiculars *d e*, *d e′*, &c. the reduction of temperature at the end of those times. A tangent to the curve at *g* will be parallel to AH,—a condition which is necessary to prevent a violation of the law of continuity.

57. It may be inferred from this graphical delineation, that since the extent of the evaporation, together with the reduction of temperature which it occasions, is diminished by the cooling of the evaporating surface, the expression $D = m(f_t - f')$ will require some correction; and as this correction must have a direct relation to D, the simplest way of applying it is to give the equation the form,

$$D - \frac{D}{n} = m(f_t - f'),$$

$$\text{Hence } \left(\frac{n-1}{m\,n}\right) D = f_t - f'.$$

The co-efficients m and n being two constant quantities to be determined by experiment, the equation will resume the simplicity of its original form, by supposing $\frac{m\,n}{n-1} = p$;

we thus have, $D = p\,(f_t - f')$. This equation, however, will only express the value of D by a near approximation. To render the expression consistent with the properties of the curve, whose ordinates represent the progressive reductions of temperature by evaporation from the moistened bulbs, it seems necessary to give it the form,

$$D = \left(p - \frac{D}{r}\right)(f_t - f').$$

58. The co-efficients p and r, particularly the former, being important elements in any equation which should express the quantity of moisture contained in the atmosphere, in terms of f_t. f' and D, we instituted a series of the most laborious experiments to determine their values with accuracy. For this purpose we had recourse to Mr Dalton's method of finding the point of deposition, whose elastic force we formerly denoted by ϕ_{τ}; and, from the precautions we observed, we have reason to think that our experiments were calculated to determine that point within the fifth part of a degree of Fahrenheit. We generally employed two jars of a cylindrical shape, one of glass, and the other of tin-plate. Each of them was about eight inches deep, and six inches in diameter; it being convenient to have them of a considerable size, that their temperature, when they are filled with cold water, may not be raised too quickly by the superior temperature of the surrounding bodies. We also used occasionally, for the same purpose, a vessel of silver, which, on account of its resplendent surface, is admirably fitted to shew the slightest deposition of moisture on it. These vessels were filled with water, cooled down several degrees below the point of deposition, and placed near one another on a table, at a sufficient distance from the thermometers employed to indicate the temperature of the air t, and the point of depression of the moistened bulb produced by evaporation. The experiments were generally performed in a large octagonal apartment, about 50 feet in diameter, and 30 feet high; and in order that the smallest deposition of moisture might be perceptible, the jars were observed at the distance of fifteen feet with a powerful telescope. By this means, when no sensible deposition appeared to the naked eye, however closely the jars were examined, the drops of moisture, which formed on their surfaces, were so much magnified, as to be seen increasing gradually in size. The jars were wiped from time to time with a clean dry towel; but unless this operation was performed with the utmost care, the telescope discovered large tracts of moisture, which could not be discerned without its assistance. The state of the thermometers was accurately observed at the same time, and a rotatory motion frequently given to the water. When the deposition of moisture on the surface of the jars was no longer perceptible, the temperature of the different thermometers was carefully noted. Sometimes the temperature of the water in the jars was again reduced, by stirring bits of ice in it till it was lowered a degree or two below the point of deposition, to remove all chance of error, and ascertain the limits within which it might range. The difference in the result seldom exceeded the fourth part of a degree. It is proper also to remark, that the point of deposition, as determined by the different jars, was always the same.

59. The temperature of the air at the time of these experiments was observed with two excellent mercurial thermometers, one of which was made by Jones, and the other by Adie; and the temperature of the water in the jars was determined by a good thermometer of Crichton. The reduction of temperature produced by evaporation was ascestained by two mercurial thermometers; two thermometers filled with spirit of wine, and covered with moistened tissue paper; and two hygrometers of Mr Leslie. One of the mercurial thermometers possessed the utmost delicacy, and had a range of scale, which easily gave the 10th part of a degree. The largest of the spirit of wine thermometers had a bulb $2\frac{5}{8}$ inches in diameter; and its tube, which was two feet long, included a range of scale from 32° to 60°. This instrument, on account of its size, and the great capacity of alcohol for caloric, was more slowly reduced in its temperature than the other thermometers with covered bulbs; but, after a certain lapse of time, all of them became stationary nearly at the same point, the difference never exceeding a small fraction of a degree. It is easy to perceive, indeed, that whether the thermometrical ball be large or small, the inclosed fluid, whatever it may be, must ultimately reach the same temperature; for since the quantity $f_t - f'$, which regulates the evaporation, is constant, the evaporation must always cool down the moistened surface to the same pitch, and thus gradually abstract heat from the thermometrical fluid, precisely in the same manner as if the bulb consisted entirely of water, (due allowance being made for the difference of capacity for caloric,) until the reduction of temperature is counterbalanced by the influx of heat from the air. If the specific heat of the inclosed fluid be great, the process will be longer in producing its maximum of effect; but the diminution of temperature by evaporation, and the influx of heat by communication, being in all cases to each other in the same constant ratio, the reduction of temperature must be always the same. Hence the diminution of temperature indicated by Leslie's hygrometer invariably corresponds to that of the most sluggish thermometer, with a moistened bulb.

60. To determine what influence the atmospherical pressure might have on these results, Leslie's hygrometer, having its bulb duly moistened, was placed with a quantity of sulphuric acid in a cup, under a large receiver, on the plate of an air-pump, and allowed to remain till it became stationary. In a few minutes it sunk down to 26°; the temperature at the time being 48½°, and the atmospherical pressure 29.6. The air was then exhausted till the guage stood successively at 6, 12, 18, and 24 inches, when the following results were obtained:

Height of the gauge in inches of mercury.	Pressure.	Degrees of Leslie's hygrometer.
0	29.6	27
6	23.6	34
12	17.6	44
18	11.6	62
24	5.6	91

From these experiments it may be safely inferred that, within the limited range of atmospherical pressure, the evaporation from the moistened bulb of a thermometer is inversely proportional to the height of the barometer. This conclusion might, indeed, have been drawn from the fact, that the evaporation from the surface of water is, in all cases, proportional to $f_t - f'$; since the mechanical influence of pressure must be the same, whether resulting from the elasticity of air or vapour. Hence our formula $D = \left(p - \frac{D}{r}\right)(f_t - f')$ corrected for atmospherical pressure, becomes

$$D = \frac{30}{\beta}\left(p - \frac{D}{r}\right)(f_t - f').$$

It now only remains, therefore, to determine the co-efficients p and $\frac{1}{r}$; and for this purpose two equations are necessary.

61. In one of the experiments which we made to ascertain the necessary data, when the barometer stood at 29.75, Leslie's hygrometer at 85°, and De Luc's at 27°.6, the temperature of the air was 67°.2, that of the thermometers with moistened bulbs 52°, and the point of deposition 35°.7. We thus have

$f_t = f_{67.2} = .66357$ - - - - - - - - - - - - § 31.

$\varphi_\tau = \varphi_{35.7} = .22723$ - - - - - - - - - - - - § 31.

$f' = \varphi_\tau\left(\frac{447.4 + t}{447.4 + \tau}\right) = .24223$ - - - - - - - - § 47.

$D = 67.2 - 52 = 15.2$ by the covered thermometers,

or $D = 85 \times \frac{9}{50} = 15.3$ by Leslie's hygrometer, § 25.

$D = \frac{15.2 + 15.3}{2} = 15°.25$, using the mean.

The values of f_t, f', and D being substituted in the general equation $D = \left(p - \frac{D}{r}\right)(f_t - f')$, we obtain

$$15.25 = \frac{30}{29.75}\left(p - \frac{15.25}{r}\right)(.66357 - .22723.)$$

$$\text{And } p - \frac{15.25}{r} = 34.66$$

$$\text{or } p = 34.66 + \frac{15.25}{r}$$

In another experiment of the same kind, when the barometer stood at 30.025, Leslie's hygrometer at 38° 3, and De Luc's at 42°, the temperature of the air was 56°.42, the temperature of the thermometers with moistened bulbs 49°.51, and the point of deposition 39°.5. From these data we have,

$f_t = f_{56.42} = .46421$

$\varphi_\tau = \varphi_{39.5} = .25981$

$f' = \varphi_\tau\left(\frac{447.4 + t}{447.4 + \tau}\right) = .26895$

$D = 56.42 - 49.51 = 6.91$, by the covered thermometers.

$D = 38.3 \times \frac{9}{50} = 6.89$, by Leslie's hygrometer.

Using the mean $D = \frac{6.91 + 6.89}{2} = 6.9$.

Hence we have by substitution, as before,

$$6.9 = \frac{30}{30\ 025}\left(p - \frac{6.9}{r}\right)(.46421 - .26895)$$

$$\text{And } p = 35\ 34 + \frac{6.9}{r}$$

$$\text{But } p = 34.66 + \frac{15.25}{r}$$

Therefore $p = 35.9$, and $r = 12.3$.

62. It appeared by the mean result of a very great number of experiments, performed with the utmost care, and in various states of the air with regard to pressure, temperature, and humidity, that the value of p must be greater than 35.5, but less than 36.5. The value of r embraced a wider range, and varied from 5 to 15; it is obvious, however, from the nature of the equation, that p is the more important of these co-efficients, and that the value of D can be but slightly affected by any change in the value of r. We cannot err greatly, therefore, if we take 36 for the value of p, and 10 for that of r. The formula

$$D = \frac{30}{\beta}\left(p - \frac{D}{\beta}\right)(f_t - f')$$

will thus become

$$D = \frac{30}{\beta}\left(36 - \frac{D}{10}\right)(f_t - f')$$

$$\text{And } f' = f_t - \frac{\frac{\beta}{30} D}{36 - \frac{1}{10} D}$$

$$\text{Or } f' = f_t - \frac{\frac{1}{6}\beta D}{180 - \frac{1}{2} D}$$

This formula will enable us to find, by means of the Table in § 39, the absolute quantity of moisture contained in the atmosphere, when the pressure of the barometer, the temperature of the air, and that of a thermometer having its bulb covered with moistened paper, are given. Thus, let it be required to find the quantity of moisture contained in a cubic inch of air, when the barometrical pressure is 29.35, the temperature of the air 65°, and the temperature of a thermometer with a moistened bulb 51°.5.

$$f' = f_t - \frac{\frac{1}{6}\beta D}{180 - \frac{1}{2} D} = f_{65} - \frac{\frac{1}{6} \times 29.35 \times 13.5}{180 - 6.75} =$$

$$= .61734 - .38116 = .23618.$$

And by § 50,

$$\overset{\text{in.}}{.61734} : \overset{\text{in.}}{.23618} :: \overset{\text{grains.}}{.00395897} : \overset{\text{grains.}}{.0015146}$$

Hence, in the supposed state of things, there is .0015146 gr. of moisture in a cubic inch of air, which would correspond to 35°, as the point of deposition. The point of deposition by actual observation was 35°.45; and De Luc's hygrometer stood, at the time, at 27°.

63. If we substitute the value of f' for F_t in the formula $g' = \frac{.10953\,\beta F_t}{474.4 + t}$, (as laid down in § 40.) we obtain

$$g' = \frac{.10953\left(f_t - \frac{\frac{1}{6}\beta D}{180 - \frac{1}{2} D}\right)\beta}{447.4 + t}$$

This expression will accordingly give the weight in grains, of the moisture in a cubic inch of air; when f_t, the entire force of vapour for the temperature of the air t; D, the difference of the temperature between a naked thermometer, and one with a moistened bulb covered with tissue paper; and β, the height of the barometer are known. The value of f_t is obtained by the Table in § 31; and that of D and β by observation.

64. The manner in which the formula is expressed, renders it capable of being easily reduced to the different gra-

graduations of the thermometrical scale. Thus if D be expressed in degrees of Leslie's hygrometer, since the interval between the freezing and boiling points in that instrument is divided into 1000 equal parts, if L denote the number of degrees which it indicates,

$$g' = \frac{.10953\left(f_t - \frac{\frac{1}{8}\beta L}{1000 - \frac{1}{2}L}\right)\beta}{447.4 + t}$$

And in the centigrade scale,

$$P' = \frac{1.066495\left(f_t - \frac{\frac{1}{6}\beta D}{100 - \text{[illegible]}}\right)\beta}{1 + .00375\,t}$$

P′ being the weight in grammes of the moisture in a litre of air, and β the height of the barometer in metres.

65. As the conclusions which Mr Leslie has deduced from his experiments lead to results differing in some respects from those we have obtained, it may be proper to give a brief account of the mode of investigation he adopted. This is the more necessary, as he expressly mentions that two different methods led to the same results. "One of these methods," to use his own words, "was in a large close room, to bring an hygrometer, conjoined with a thermometer, successively nearer to a stove intensely heated, and to note the simultaneous indications of both instruments; or to employ two nice thermometers, placed beside each other, and having their bulbs covered respectively with dry and with wet cambric. By taking the mean of numerous observations, and interpolating the intermediate quantities, the law of aqueous solution in air was laboriously traced. But the other method of investigation appeared better adapted for the higher temperatures. A thin hollow ball of tin, four inches in diameter, and having a very small neck, was neatly covered with linen, and being filled with water nearly boiling, and a thermometer inserted, it was hung likewise in a spacious close room, and the rate of its cooling carefully marked. The experiment was next repeated, by suspending it to the end of a fine beam, and wetting with a hair pencil the surface of linen, till brought in exact equipoise to some given weight in the opposite scale. Ten grains being now taken out, the humid ball was allowed to rest against the point of a tapered glass tube, and the interval of time, with the corresponding diminution of temperature, observed when it rose again to the position of equilibrium. The same operation was successively renewed; but as the rapidity of the evaporation declined, five, and afterwards two grains only, were, at each trial, withdrawn from the scale. From such a series of facts, it was easy to estimate the quantities of moisture which the same air would dissolve at different temperatures, and also the corresponding measures of heat expended in the process of solution. By connecting the range of observations," continues Mr Leslie, "it would appear, that air has its dryness doubled at each rise of temperature, answering to 15 centesimal degrees. Thus at the freezing point, air is capable of holding a portion of moisture represented by 100 degrees of the hygrometer; at the temperature of 15 centigrade, it could contain 200 such parts; at that of 30° it might dissolve 400; and at 45° in the same scale 800. Or, if we reckon by Fahrenheit's divisions, air absolutely humid, holds at the limit of congelation the hundred and sixtieth part of its weight of moisture; at the temperature of 59° the eightieth part; at that of 86° the fortieth part; at that of 113° the twentieth part; and at that of 140° the tenth part. While the temperature, therefore, advances uniformly in arithmetical progression, the dissolving power which this communicates to the air mounts with the accelerating rapidity of a geometrical series."

66. Before we examine the results of these experiments, which we have no doubt were conducted with every attention to accuracy, we may state, that the conclusion which has been drawn from them respecting the law of aqueous solution, is totally irreconcileable with the results obtained by Dalton and Gay Lussac. This will appear, by comparing the weight of a cubic inch of vapour for the various temperatures, in Table § 31, deduced from their experiments; and according to which, the solving power follows a different law from that stated by Leslie, though chiefly, we believe, on account of its simplicity, it is the one generally admitted. It will be seen by the following Table, that if the the temperatures be taken in an arithmetical progression, the quantities of moisture held in solution form a succession of quantities, the terms of which increase in a faster ratio than the terms constituting a geometrical series.

Quantity of Moisture in Solution.	Successive Temperatures at which the solving Power is doubled	
	According to Leslie.	By our Table.
100	32	32.
200	59	53 2
400	86	75.6
800	113	99.4

According to the experiments of Leslie, the solving power is doubled every 27 degrees; whereas, according to our Table, this takes place at different intervals, which increase slowly with the temperature, the mean being 23.4 from the freezing point to 100° of Fahrenheit.

67. We shall now compare the result furnished by our formula, with that derived by Mr Leslie from his mode of determining the point of deposition; and we shall take the example from his Treatise on the Relations of Air to Heat and Moisture. "Suppose," says he, "the hygrometer to mark 52°, while its wet ball has a temperature of 20 centesimal degrees, or 68° by Fahrenheit; the dissolving power of air at this temperature being 252,* its distance from absolute humidity will therefore be 200, which is the measure of solution answering to 15 centesimal degrees, or 59° by Fahrenheit. The same air would consequently, at the depressed temperature of 59°, shrink into a state of absolute saturation; and if cooled lower, it would even deposit a portion of its combined moisture, losing the eightieth part of its weight at the verge of freezing." Such is the result deduced by Mr Leslie. We shall now compare it with the weight of the moisture in a cubic inch of air, as determined by our formula. The moistened ball having a temperature of 68°, while it indicates 52, the temperature of the air t is $68° + \frac{9 \times 52}{50}$, or 77°.2; the height of the barometer is not taken into account, but we shall suppose it 30. We thus have,

$$g' = \frac{.10953\left(f_{77.2} - \frac{5 \times 52}{1000 - 52}\right) \times 30}{447.4 + 77.2} =$$

$$= \frac{.10953 \times .91651 - 26694 \times 30}{524.6} = \overset{\text{grains.}}{0040675}$$

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* Mr Leslie does not describe how this number is obtained; but it is obviously, according to his views, the tenth term of a geometrical series, of which the first term is 200, the last term 400, and number of terms 28.

This result would correspond by the Table to 66° nearly, being 7° higher than the point of deposition found by Mr Leslie. The absolute quantity of moisture, however, in a cubic inch, as deduced by his method, agrees very nearly with the result given by our formula. According to his view, air absolutely humid holds, at the temperature of 59°, the eightieth part of its weight of moisture; now a cubic inch of atmospheric air, at the same temperature, weighs .3121 grains, and the eightieth part of that quantity is .00390125 grains, which being corrected for the actual temperature of the air, 77°.2, becomes .0037602 grains, differing very little from the quantity given by the formula. In general, the coincidence of results is still more striking.

68. The method which Mr Leslie employed to determine the relation between the degrees denoted by his instrument, and the absolute quantity of moisture in the atmosphere, is very ingenious, though, on account of the necessity of employing logarithms, for the interpolation of the terms of the series in which that relation is expressed, it must often be attended with a good deal of trouble and inconveniency. By comparing the relative capacity of air for caloric, with the measure of heat requisite to convert a given portion of water into vapour, he concluded that atmospheric air, at the temperature of the moistened ball, would take up the 16,000th part of its weight for each degree marked by the hygrometer. He was led to this conclusion, by assuming, from several concurring observations, that the capacity of air for caloric was $\frac{3}{8}$ of that of water, being only a fifth part of what it is usually reckoned; and as the quantity of caloric necessary to convert water into steam is equal to 6000 degrees of his instrument, that measure of heat would suffice to raise an equal mass of air, 16000 millesimal degrees, or those 6000 degrees increased in the proportion of 8 to 3. But, according to the view taken by Mr Leslie at the state of equipoise, the portion of heat deposited by air in touching the moistened bulb, or the depression of temperature which it suffers by this contact, is equal to the opposite measure of heat abstracted by it, on dissolving its corresponding share of moisture. Wherefore, he concludes, at the temperature of the wet ball, atmospheric air would take up moisture amounting to the 16,000th part of its weight, for each degree marked by the hygrometer.

69. This view of the relation subsisting between the evaporating process, and the reduction of temperature which it induces, is somewhat different from the one we have taken in § 54. According to the explanation we have there given of that relation, the heat necessary for converting the moisture applied to the bulb into the state of vapour is derived immediately from the water itself, at the moment the vapour is disengaged from its surface. The water having thus lost a portion of its heat, instantly abstracts caloric from the bulb, and the bulb, in its turn, from the inclosed thermometrical fluid, until an equilibrium is established by the influx of heat from the air counterbalancing the dispersion of it by evaporation. The heat of the air is therefore imparted to the ball merely by absorption; and sets limits to the progress of refrigeration, by the increasing rate at which it flows into the cooling surface, as the temperature of that surface recedes from the temperature of the air. This view of the subject is equally applicable to vaporization, whether the process be carried on in the open air, or under an exhausted receiver; and it is finely illustrated by the result of an experiment which we have described under the article Evaporation, p. 220, and which demonstrates that the caloric necessary for the formation of vapour is derived almost entirely from the water itself, and scarcely at all from the contiguous bodies. In short, we cannot perceive how Mr Leslie's hypothesis can afford an explanation of the great reduction of temperature which is produced by evaporation under an exhausted receiver, where, according to his opinion, there is no solvent present to convert the water into vapour. He speaks, indeed, of air having its scale of watery solution extended by rarefaction; but this is merely a gratuitous accommodation of fact to theory, and does not at all explain why the greatest solution takes place, when the supposed solvent is most deficient in quantity, or entirely excluded. At the same time it must be admitted, that the results which he has deduced from the theoretical view he has taken of his hygrometer, accord remarkably well with the quantity of moisture in the air, as determined by actual experiment.

70. In a preceding part of this article, (§ 52.) we endeavoured to shew that the point of deposition for any place must, in general, coincide nearly with the minimum temperature for the season. The truth of this opinion is amply confirmed by applying our formula, for Leslie's hygrometer, to the very accurate observations made with that instrument by Mr Gordon, to which we formerly adverted. The point of deposition assigned by the formula will be found, in the following Table, to correspond almost exactly with the mean minimum temperature for each month, by actual observation. The coincidence is greatest, as might be expected, when the temperature of the season is declining, and least liable to sudden changes. The barometrical pressure was introduced into the formula.

1815.	Degrees of Leslie's Hygrom. by 3 daily observ.	Temper at time of observations.	Mean Height of Barom. by two daily observ.	Mean Minimum temp.	Point of Deposition by formula	Grains of moisture in a cubic inch of air.	Rain in Inches.
January	4.9	33	29.808	28.5	29.1	.001238	0.945
February	8.1	42	29.552	35.7	36.8	.001612	2.007
March	14.7	43	29.407	34.9	33.8	.001451	1.990
April	23.1	47	29.834	36.9	33.9	.001458	0.999
May	23.0	54	29.741	45.5	44.3	.002050	2.334
June	29.7	59	29.794	48.9	47.9	.002304	0.871
July	32.0	61	29.977	50.3	49.7	.002444	1.743
August	27.7	60	29.707	50.9	49.9	.002463	1.324
September	20.3	55	29.793	46.9	46.7	.002214	2.193
October	12.2	49	29.701	42.6	42.9	.001967	3.362
November	7.8	38	29.788	31.4	32.6	.001396	1.643
December	6.5	33	29.599	27.8	27.9	.001177	1.343
Annual Results	17.5	48	29.725	40	39.6	.001814	20.754

The difference between the point of deposition determined by the formula, and the mean minimum temperature for each month, of the particular year in which these observations were made, scarcely ever exceeds half a degree, except in April. The great difference in that month seems to be owing, partly to the copious discharge of moisture from the atmosphere, during the two preceding months, the rain for February and March amounting, by Mr Gordon's meteorological journal, to 3.997, or nearly 4 inches; and partly to the unusual depression of temperature, for the season, during the last of these months.

71. It may be proper to remark, in reference to the above results, that the indications of an hygrometer, of whatever kind, even when they are numerically the same, may imply very different portions of moisture in the air. Thus the hygrometer in April and May stood at 23, though the absolute quantities of moisture in the atmosphere, during these two months, were extremely different; a proof that the reports of hygrometrical observations only tend to mislead, when the temperature and pressure of the air at the time they were made, are omitted. Hence also we can perceive the reason why no hygrometer can have its scale accurately graduated by exposing it to a particular temperature, in order to obtain the point of extreme dryness.

72. If the researches of hygrometry were confined to the atmosphere, the methods which we have already described for detecting the quantity of moisture contained in a given portion of it, would be sufficient for all the purposes of meteorology; but these methods are scarcely applicable to small quantities of aerial fluids, the hygroscopic state of which it is often necessary to determine, in order to conduct with accuracy their chemical analysis. This branch of the subject is of considerable importance to the chemist; and indeed, without some knowledge of it, he cannot investigate with success the properties of aerial fluids, which demand much delicacy of research.

73. Saussure was perhaps the first person who endeavoured to ascertain, in a systematic and philosophical manner, the relation between the degrees of the hygrometer, and the quantity of moisture in determinate portions of air, at different temperatures; but though he prosecuted his inquiries with much ingenuity and care, the methods he employed to obtain a solution of the problem did not admit of the same degree of accuracy as those which were afterwards employed by Gay Lussac. The instrument, however, which he invented for these researches, was admirably adapted for the purpose, as the extreme tenuity of the substance used in the construction of it, rendered it peculiarly fit for being introduced into small portions of air, without affecting, in any sensible degree, the hygroscopic state of the surrounding medium, by the moisture it absorbed.

74. Having inclosed his hygrometer in a vessel containing air previously dried by caustic alkali, Saussure introduced under the receiver, at successive intervals, small quantities of water, by means of bits of moistened linen; and after allowing these to remain a sufficient length of time, he again withdrew them, and determined the loss they had sustained by evaporation, observing at the same time the progress of the hygrometer, for each additional portion of moisture. He performed this experiment at various temperatures, and found that at the same temperature the index uniformly stood at the same point, when the quantity of moisture evaporated was the same. Among other results, he found that a French cubic foot of air at 15°.16 Reaumur took up, in the form of vapour, 11.069 grains French of moisture, expanding at the same time $\frac{1}{34}$ of its original volume; and that the same quantity of air, at the temperature 6°.18 Reaumur, was able to hold in the vaporous state 5.65 grains French. If we reduce the same results to English measures, the former would be .0043391, and the later .0022123 grains in a cubic inch, for the respective temperatures 66°.11 and 45°.91 Fahrenheit; differing little from the results given by our formula in § 39, as is easily ascertained by comparing them with the quantities of moisture for the corresponding temperatures in the Table. In both cases, the hygrometer stood at 98°. The quantity of moisture answering to other divisions on the scale of the instrument were proportional to the numbers in the following Table, in which complete saturation for each temperature is expressed by unity.

Deg. of hygrometer.	Proportional quantity of moisture for temp. 45°. 91 Fahr.	Proportional quantity of moisture for temp. 66° 11 Fahr.
10	.045	.042
20	.112	.099
30	.191	.163
40	.271	.233
50	.370	.316
60	.480	.423
70	.597	.578
80	.720	.726
90	.871	.882
98	1.000	1.000

75. It appears by various experiments which have been made with the hygrometer of Saussure, that when the receiver in which it is inclosed contains air completely saturated with moisture, whatever be its temperature and density, the index always arrives at a fixed point in the scale, namely, that of extreme humidity; and hence it has been justly inferred, that the indications of this instrument, as well as the degrees marked by hygrometers in general, are to be regarded as having a reference to the relative, and not to the absolute quantity of moisture contained in the medium to which they are exposed; as expressing, in short, the relation of the quantity of moisture actually existing in that medium, to the whole quantity which could exist in it at the particular temperature when the observation is made. This view of the subject will receive considerable elucidation, by considering the hygroscopic substance as exerting an affinity for moisture; and, like other desiccatives, reducing the vapour to which it is exposed to the liquid or perhaps the solid state, until its affinity is counterbalanced by the increasing tendency of the moisture to maintain itself in the vaporous condition. In all cases of complete saturation, the smallest attraction for moisture must be sufficient to precipitate the vapour; and since the quantity of water absorbed by the hair is so very minute that it can produce no sensible change in the density of the vapour, it is easy to perceive, that when the medium in which the hygrometer is placed is completely charged with moisture, the hair must continue to abstract water, until its affinity for that fluid terminates in saturation. Whatever, therefore, be the temperature or the elasticity of the vapour, provided it be at its maximum quantity for that temperature, the hair must absorb the same portion of moisture, and consequently reach the same degree of elongation.

76. The result however must be very different, when the instrument is inclosed in a medium which contains vapour

possessing a tension less than that of the maximum for the temperature. In this case, the hair will only continue to absorb moisture, till its affinity is counterbalanced by a force proportional to $f—f'$, or the difference between the whole elastic force of vapour corresponding to complete saturation at the given temperature, and the elastic force of vapour at the same temperature corresponding to the actual quantity of moisture in the medium. The point at which an equipoise is established between these opposing forces, will depend upon the law by which the affinity of the hair for moisture is modified by temperature, and the quantity of water already absorbed. Saussure attempted to discover this law by experiment; but, though his researches were conducted with very great care, the results he has given can scarcely be regarded sufficiently accurate to authorise our application of them to circumstances greatly different from those in which they were obtained. The problem, however, has been solved by Gay Lussac in a manner so general and satisfactory, as to raise this branch of hygrometry from an empirical collection of facts to a subject of the most precise and rigid analysis.*

77. Having procured an hygrometer, on the accuracy of which he could sufficiently rely, Gay Lussac inclosed it in a receiver with a quantity of water, or a solution of some salt of a known specific gravity, and observed the degree marked by the instrument, corresponding to the saturation of the space with the vapour which was formed. He thus determined the degrees of the hygrometer answering to the observed tension of the liquid; and by making experiments, at the same temperature, for different tensions, between extreme dryness and complete saturation with the vapour of water, he procured as many terms of the correspondence as were deemed necessary. He obtained in this manner, at the temperature of 10° centigrade (50° Fahrenheit), the results laid down in the following Table, in which the tensions are expressed in decimal parts of the tension of water, the latter being denoted by unity:

Solutions.	Specific gravity at the temp. of 50° Fahr.	Tension of the solutions at the temp. 50°.	Degrees of the Hygrometer, corresponding to the different tensions.
Water, ...	1000	100.0	100.0
Muriate of soda.	1096	90.6	97.7
Do.	1163	82.3	92.2
Do.	1205	75.9	87.4
Muriate of lime.	1274	66.0	82.0
Do.	1343	50.5	71.0
Do.	1397	37.6	61.3
Sulphuric acid,	1493	18.1	33.1
Do.	1541	12.2	25.3
Do.	1702	2.4	6.1
Do.	1848	0.0	0.0

78. To form a general idea of the nature of these results, it will be found very convenient to represent by a diagram the tensions reckoned from a given point A (Fig. 3.) along the line AB for the abscissæ, and the corresponding degrees of the hygrometer as rectangular ordinates of the hygrometrical curve. If the former be represented by x, and the latter by y, then at the origin A of the line of abscissæ, $x = 0$, and $y = 0$; while at the opposite extremity (AB) $x = 100$, and (BC) $y = 100$, because 100 degrees of the instrument correspond to the tension denoted by 100.

By laying down from a scale of equal parts, the abscissæ and ordinates belonging to the intermediate results, Gay Lussac found that the line connecting the extremities of the ordinates was an hyperbola, concave towards the line of abscissæ, and having its axis BV inclined to the same line at an angle of 45°. The axis cuts the line of the abscissæ at the point where x is equal to 100; and as y is equal to 100 at the same point, the curve is symmetrically disposed, with regard to these two values of x and y.

79. To render the calculation more simple, the co-ordinates x and y are transformed into x' and y', which are also at right angles to each other, but immediately related to the axis of the hyperbola, and having their origin in some assumed point of it. Hence the new line of abscissæ will form an angle of $-45°$ with AB; and if X and Y be taken to represent the primitive co-ordinates of that line, corresponding to the point of new origin, we shall have

$$x = \mathrm{X} + \frac{1}{\sqrt{2}}(x' + y') \text{ or } \mathrm{X} + \mathrm{Cos.}\ 45° \ (x' + y')$$

$$y = \mathrm{Y} + \frac{1}{\sqrt{2}}(y' - x') \text{ or } \mathrm{Y} + \mathrm{Cos.}\ 45° \ (y' - x')$$

Before reducing these equations, it will be convenient, for the sake of operating with small numbers, to represent by unity, the abscissæ x corresponding to the tension 100: then, from the inclination of the axis of the hyperbola, the equation for the axis, in terms of x and y, will be $y = 1 - x$; and since the primitive co-ordinates of X and Y must be similarly related, $\mathrm{Y} - 1 = \mathrm{X}$. The general expressions for x and y, thus restricted, become

$$x = \mathrm{X} + \frac{1}{\sqrt{2}} \ (x' + y')$$

$$y = 1 - \mathrm{X} + \frac{1}{\sqrt{2}}(y' - x').$$

By adding together both sides of these equations, the quantity X is exterminated, and the following values of y and y' are obtained,

$$y = 1 - x + y'\sqrt{2}$$

$$y' = \frac{x + y - 1}{\sqrt{2}}.$$

80. If the values of x and y be submitted for these quantities, as determined by experiment, (taking for example the muriate of lime, whose specific gravity is 1397;) then $x = .376$; $y = .613$;

$$\text{And } y' = \frac{.376 + .613 - 1}{\sqrt{2}} = -.00777818.$$

The value of y' thus determined is so small, that the point in the curve to which its extremity refers nearly coincides with the axis, and might be taken, without any great error, for the vertex of the hyperbola; but to avoid the introduction of any unnecessary inaccuracy, it will be better to assume the origin of the abscissæ of x', at that point of the axis where the latter is intersected by y', and then X will be determined by adding to .876 the projection of y' on the axis, along which the abscissæ of x are reckoned, that is, Cos. 45° × .0077718 or .0055. We thus obtain $\mathrm{X} = .3815$, and $x' = (x - .3815)\sqrt{2} - y'$. When x and y are given, we obtain the value of y' by the equation $y' = \frac{x + y - 1}{\sqrt{2}}$, and that value being substituted for y', in the equation $x' = (x - .3815)\sqrt{2} - y'$, the value of x' is also determined.

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* The account in the text of the method of investigation employed by Gay Lussac, is extracted from the admirable work of M. Biot, lately published, entitled, *Traité de Physique Experimentale et Mathematique*, tom. ii. p. 199.

In this manner were found the following values of x' and y', from the corresponding values of x and y, as ascertained by observation.

Primitive Co-ordinates.		New Co-ordinates.	
x	y	x'	y'
000	.000	+.167584	—707107
.122	.253	+.074953	—.441942
.376	613	.000000	—.007778

81. These data are sufficient to determine completely the nature of the hyperbola; for since its axis coincides with the line of the abscissæ x', it must necessarily have an equation of the form,

$$y'^2 = a + 2\,b\,x' + c\,x'^2,$$

in which a, b, and c are three constant coefficients, the values of which may be determined by the several values of x' and y' given above. The solution of the resulting equations gives the following values:

$$a = .0000605$$
$$b = 1.149338$$
$$c = 4.08683$$

82. If the value of $(x - .3815)\sqrt{2}$ be represented by s, then $x' = s - y'$ and $y' = s - x'$. This value of y' being substituted for that quantity in the general equation of the hyperbola, we obtain,

$$(s - x')^2 = a + 2\,b\,x' + c\,x'^2$$

The solution of this quadratic gives,

$$x' = \frac{-(s+b) + \sqrt{(s^2 - a)(c-1) + (s+b)^2}}{c-1}$$

$$\text{And } y' = \frac{s\,c + b - \sqrt{(s^2 - a)(c-1) + (s+b)^2}}{c-1}$$

83. The value of y' being determined by the last formula, and substituted for it in the equation,

$$y = 1 - x + y'\sqrt{2}$$

will give the value of y in terms of x. By means of this formula, Biot calculated the following Table, which he found to accord almost exactly with actual observation:

Degrees of Saussure's Hygrom.	Tension of Vapour, the tension of complete saturation being unity.	Degrees of Saussure's Hygrom.	Tension of Vapour, the tension of complete saturation being unity.
0	.0000	19	.0895
1	.0045	20	.0945
2	.0090	21	.0997
3	.0135	22	.1049
4	.0180	23	.1101
5	.0225	24	.1153
6	.0271	25	.1205
7	.0318	26	.1259
8	.0364	27	.1314
9	.0410	28	.1369
10	.0457	29	.1423
11	.0505	30	.1478
12	.0552	31	.1536
13	.0600	32	.1594
14	.0648	33	.1652
15	.0696	34	.1710
16	.0746	35	.1768
17	.0795	36	.1830
18	.0845	37	.1892
38	.1954	70	.4719
39	.2016	71	.4851
40	.2078	72	.4982
41	.2145	73	.5114
42	.2212	74	.5245
43	.2279	75	.5376
44	.2346	76	.5525
45	.2413	77	.5674
46	.2486	78	.5824
47	.2559	79	.5973
48	.2632	80	.6122
49	.2706	81	.6289
50	.2779	82	.6457
51	.2858	83	.6624
52	.2938	84	.6792
53	.3017	85	.6959
54	.3097	86	.7149
55	.3176	87	.7339
56	.3266	88	.7529
57	.3357	89	.7719
58	.3447	90	.7909
59	.3537	91	.8109
60	.3628	92	.8308
61	.3731	93	.8508
62	.3834	94	.8707
63	.3936	95	.8906
64	.4039	96	.9125
65	.4142	97	.9344
66	.4258	98	.9563
67	.4373	99	.9781
68	.4489	100	1.0000
69	.4604		

This Table affords the means of knowing by inspection the relation between the degrees of Saussure's hygrometer, and the density of the vapour to which the instrument is exposed; and, consequently, it enables us to determine the absolute quantity of moisture contained in a given portion of air, the temperature of which is 50° Fahrenheit. All that is necessary for this purpose is, to multiply .00246714, the weight in grains of the moisture in a cubic inch of vapour at the temperature of 50°, by the relative tension opposite the degrees of the hygrometer, and the product will be the weight in grains of the moisture in a cubic inch of air. Thus, let it be required to determine the quantity of moisture in a cubic inch of air, when the barometer stands at 30 inches, the thermometer at 50°, and Saussure's hygrometer at 77°.

The tension corresponding to 77° being .5674, if we multiply .00246714 by this number, we obtain .00139985, as the weight in the fractional part of a grain of the moisture in a cubic inch of air, in the supposed state of things.

84. As the formulæ by which the preceding Table was constructed, are neither very easily deduced, nor capable of being applied without some degree of difficulty, it is natural to enquire how far the results obtained for the temperature of 50° are applicable to other temperatures. At first sight, one would be apt to conclude, that since, in all cases, the hygrometer stands at 100°, when it is exposed to vapour at the maximum tension for the temperature, whatever the temperature may be; at inferior tensions it would, in like

manner, always point to the same degree, when the tensions have the same relation to the maximum tension of their respective temperatures. This is certainly the most natural conclusion; and if it were well founded, it would be easy to determine, with the assistance of the Table, the absolute quantity of moisture in a given volume of air for any temperature, in the same manner as has already been done for the temperature of 50°. There is reason to suspect, however, that the affinity of the hair for moisture is somewhat modified by temperature; and that the hyperbola, which connects the tensions of the vapour with the degrees of the hygrometer, undergoes a corresponding change with regard to the relations of its co-ordinates. That something analogous to this takes place might have been inferred from the experiments of Saussure, described in § 74, by which it appears, that the indications of the instrument have a different relation, at different temperatures, to the relative densities of the vapour at these temperatures; and Biot mentions a fact which leads to the same conclusion.

The results of the Table, therefore, can only be extended to other temperatures by approximation; but until additional experiments shall have determined the necessary corrections, the tensions corresponding to the degrees of the hygrometric scale for the temperature of 50°, may be applied to other temperatures, without leading, we may presume, to any great error. To ascertain how far the results obtained by this extended use of the Table coincided with the quantity of moisture in the atmosphere, as determined by our formula in § 63, we made the following observations, which we have arranged in a tabular form, in order that the coincidence may be more distinctly perceived.

Temperature of the Air.	Temperature of a Thermometer. with moist. Bulb.	Barometrical Pressure.	Degrees of De Luc's Hygrometer.	Degrees of Saussure's Hygrometer.	Grains of Moisture in a cubic inch of Air.	
					By our Formula.	By Table.
53.75	47.50	30.400	37.0	75.2	.0016292	.0015037
54.40	47.54	30.156	38.0	76.2	.0015692	.0015775
60.00	51.50	30.400	35.0	73.0	.0018225	.0017327
62.55	52.45	30.154	34.7	72.4	.0018093	.0018476
68.20	56.00	30.106	33.1	71.4	.0021334	.0021309
70.00	63.80	29.748	51.0	86.6	.0034837	.0033529
72.00	67.00	29.748	53.2	87.8	.0039888	.0036753

The two last columns contain the weight in fractional parts of a grain of the moisture in a cubic inch of the air at time the observations were made; the first having been derived by our formula for a thermometer with a moistened bulb, and the last by Biot's table for Saussure's hygrometer. It is proper to remark, however, in reference to these results, that the degrees of Saussure's hygrometer were obtained, not by actual inspection, but by reducing the degrees of De Luc's whalebone hygrometer to the corresponding degrees of the former, by means of the comparative relations of the two instruments laid down in § 22. In making the observations, two whalebone hygrometers were employed, and the mean of the degrees which they indicated was taken. This was the more necessary, as they frequently exhibited a difference of 5°, though the scales of both had been recently adjusted. In these circumstances, the coincidence of result is greater perhaps than might have been expected; and as the best hair hygrometers often deviate several degrees from one another in the same humid medium, the results deduced from the Table at different temperatures, are probably within the limits of the aberrations of different instruments.

85. The preceding results furnish data sufficiently varied, to determine a general formula for De Luc's hygrometer, the indications of which are by far too anomalous to become the subject of rigid analysis. Without attempting, therefore, any thing like precise investigation, we shall be satisfied with an expression for this instrument, which may apply, with tolerable accuracy, to the ordinary hygroscopical state of the atmosphere. If the degrees of this hygrometer, reckoned from extreme dryness, and the same relation to the whole range of the scale, as the quantity of moisture in a given volume of the medium to which it was exposed, had to the whole quantity of moisture that could be maintained in the vaporous state at the temperature of that medium: then if g were the weight in grains of the moisture in a cubic inch, for the entire tension belonging to the temperature of the medium; g' the corresponding weight of moisture for the actual tension; and L the degrees of the instrument, we should evidently have an equation of the form,

$$g' = g\left(\frac{L}{100}\right)$$

The dilatation of the whalebone, however, is influenced by a law too complex and irregular to be expressed by this simple formula; and to trace it with sufficient precision, we must at least assume

$$g' = g\left(m\left(\frac{L}{100}\right) + n\left(\frac{L}{100}\right)^2\right)$$

the co-efficients m and n being two constant quantities to be determined by two equations, in which the values of g', g, and L are known.

86. If we employ in this investigation the data furnished by the 2d and 5th observations in § 84, we obtain for the first equation,

$$g' = .0015692$$
$$L = 38$$

and the quantity of moisture in a cubic inch for the entire tension of the temperature. 54.4 being (by § 39) .0028398 grains, we have also $g = .0028398$. In like manner, the data of the 5th observation give for the second equation,

$$g' = \overset{\text{grains.}}{.0021334},\ L = 33.1,\ \text{and}\ g = \overset{\text{grains.}}{.0043693}.$$

Hence the formula $g' = g\left(m\left(\frac{L}{100}\right) + n\left(\frac{L}{100}\right)^2\right)$

becomes $.0015692 = .0028398\,(.38\,m + .38^2 n)$,

and $.0021334 = .0043693\,(.331\,m + .331^2 n)$;

or,

$.55257 = .38\,m + .1444 n$,

and $.48827 = .331 m + .10956 n$.

By the solution of these equations, we obtain $m = 1.6$ and $n = -.4$ nearly; and these values of m and n being substituted in the equation

$$g' = g\left(m\left(\frac{L}{100}\right) + n\left(\frac{L^2}{100}\right)\right) \text{ we have}$$

$$g' = g\left(1.6\left(\frac{L}{100}\right) - .4\left(\frac{L^2}{100}\right)\right)$$

If $\frac{L}{100}$ be represented by l, this equation will assume the form

$$g' = g\,(1.6l - .4l^2)$$

$$\text{or } g' = \frac{2\,l}{5}(4 - l)g.$$

This formula being applied to the degrees of De Luc's hygrometer, in the third observation, in which l was .35; the temperature of the air 60°, and consequently (by § 39) g was .00338832, we obtain

$$g' = \frac{2\,l}{5}(4 - l)g = \frac{.70}{5} \times \overline{4 - 35} \times .00338832 =$$

$$= .14 \times 3.65 \times .00338832 = \overset{\text{grains.}}{.0017314}.$$

This result differs so little from the quantity of moisture in a cubic inch of the air, as deduced in the same circumstances, both by our formula for a thermometer with a moistened bulb, and by Biot's Table for Saussure's hygrometer, that we have no hesitation in adopting the formula, under the restrictions which we formerly mentioned. It is proper to add, that the point of extreme moisture was fixed, in the instruments with which the observations were made, by immersing them for six hours in pure water; and that the point of extreme dryness was determined by inclosing them for several days in a receiver at the temperature of 50°, with a considerable quantity of sulphuric acid, the specific gravity of which was 1.84435.

87. According to the formula which we have deduced for De Luc's hygrometer, the instrument ought to indicate extreme humidity in the gaseous medium to which it is exposed, before it reaches the point marked 100 on the scale; for if g, and g' be equal to each other, (which will be the case at complete saturation,) and if, at the same time, $\frac{2\,l}{5}(4 - l)$ be represented by unity, we shall have

$$l^2 - 4\,l = \frac{5}{2}.$$

Therefore $l = .7753$, and $L = 77.53$.

Hence we may infer, that the division marked 77.5. corresponds to the extreme range of the whalebone hygrometer, in so far as the expansions of the instrument are effected by mere vapour. This conclusion accords remarkably well with the observations of Saussure, who inferred, from numerous experiments with this instrument, that the 80th or 81st degree of De Luc's scale corresponds to the term of saturation, or extreme humidity; and that all the divisions above these points measured, not the quantity of moisture in the vaporous state, but the quantity of water which had combined with the whale-bone, after it had been condensed on its surface.

88. By substituting in the expression $\frac{2\,l}{5}(4 - l)$, the value of l for every 5° from zero to $77^\circ.5$, we obtain the relative tensions of vapour for the following divisions of De Luc's scale:

Degrees of De Luc's Hygr.	Relative tension of vapour.	Degrees of De Luc's Hygr.	Relative tension of vapour.
5	.079	45	.639
10	.156	50	.700
15	.231	55	.759
20	.304	60	.816
25	.375	65	.871
30	.444	70	.924
35	.511	75	.975
40	.576	77.5	1.000

This Table may be employed to calculate, by approximation, the number of grains in a cubic inch of air, when the degrees of De Luc's hygrometer, the temperature, and barometrical pressure are known. Thus, if we employ the data of the example in § 62, in which De Luc's hygrometer stood at 27°, the thermometer at 65°, and the barometer at 29.35″: The tension corresponding to 27° in the Table is found by taking a proportional part for the excess above 25° to be .403; and the weight of the moisture in a cubic inch of air, for the entire tension of the temperature being .00395897 grains, and corrected for barometrical pressure .00387319 grains, we thus obtain .00387319 ×.403, or .00156089 grains, as the weight of the moisture in a cubic inch of air in the given circumstances. This result coincides very nearly with the quantity of moisture deduced from the same data by the formula in § 62.

89. It must be sufficiently obvious, from all we have stated, that the degrees marked by hygrometers, of every description, are entirely relative; and that the absolute quantity of moisture held in the vaporous state, in any medium, cannot be accurately inferred from these instruments, unless the temperature and barometrical pressure be also taken into account. Though, in one respect, this property of indicating relative degrees of humidity, may be considered as an imperfection of hygrometers, it renders them more valuable for certain purposes, than if they pointed out, in a less indirect manner, the actual quantity of moisture in a given volume of the medium in which they are placed. By expressing, for instance, the relative condition of the atmosphere with regard to moisture, they shew at the same time its capacity for receiving an additional portion of vapour in admixture with it; or, what is of equal importance, its tendency to deposit, by a diminution of temperature, part of that which it already contains. Hence, for the ordinary purposes of meteorology, they are more useful than if they indicated absolute differences; and as the extent to which they are affected corresponds to the effects of moisture on other hygroscopic bodies, placed in similar circumstances, they may be used with equal advantage to point out the simultaneous condition with respect to humidity of various articles of commerce, such as corn, cotton, wool, silk, &c. the portion of water absorbed from the air by these substances being regulated, not by the absolute quantity of moisture existing in the atmosphere, in a vaporous state, but by the relation which the latter quantity bears to the whole moisture that could be maintained in that state, at the temperature. Thus, if the temperature of the air were 50°, and the point of deposition 40°, the whole quantity of moisture which could exist in a cubic inch of air at the former temperature being .0025476 grains, and at the latter .0017823, the relative moisture of the air would be expressed by the fraction $\frac{17823}{25476}$, or .6996, complete saturation being denoted by unity; in like manner, if the temperature of the air were 70°, and the point of deposition 58½°, the relative humi-

dity of the air would be also .6996. Now, in the state of things we have supposed, the actual quantities of moisture in the air would be to each other, as 17823 to 32296, or as 1 to 2 nearly, and yet the hygrometer of Saussure, or that of De Luc, would, in both cases, stand at the same points of their respective scales, the former at 85° and the latter at 50°. The quantity of moisture absorbed by hygroscopic substances would also be the same, or nearly the same, in the circumstances stated; so that hygrometers, though indicating merely relative differences, may nevertheless be employed for practcial purposes, to point out the extent to which such bodies are affected in their weight by humidity, after the relation subsisting between their increase of weight and the degrees of the instrument has been determined by experiment.

90. As the organs of living beings are relaxed by humidity, somewhat in the same manner as the fibres of inanimate substances, the indications of hygrometers serve to apprize us of the effects which the moisture of the atmosphere, such as it exists in that fluid, is calculated to produce on the general tone of the muscular frame; and that, too, in a way much more direct and immediate, than if the graduation of their scales had referred to absolute, instead of relative degrees of moisture. In proof of this assertion we need only remark, that the quantity of moisture in a warm apartment is generally greater than that contained, at the same time, in an equal volume of the external air; and yet if we were to judge either by our feelings, or the apparent indications of the hygrometer, we should be led to draw an opposite conclusion. The hygrometer, therefore, though it only announces relative degrees of humidity, conveys to us the species of information respecting the state of the air, in which we feel most interested; namely, the extent to which its hygroscopic condition will affect our personal comfort.

91. In this country, the mean height of De Luc's hygrometer, in the open air, is about 65°. Above this point, the degrees of the instrument may be considered as indicating the state of the air to be damp and unwholesome. In a room heated to the temperature of 60°, the index remains pretty steadily at 35°, which corresponds nearly to the air being half saturated with moisture.[*] A thermometer, with a moistened bulb, stands in the same circumstances, from 9° to 10° below the temperature of the room. Mr Leslie mentions, that on one occasion his hygrometer stood at Paris, in the month of September, at 120°, so that a thermometer with a moistened bulb would have remained, in the same circumstances, 21°.6 below the temperature of the air.

92. Having given a detailed view of the nature of hygrometric scales, both as they refer to absolute and relative degrees of humidity in the ambient medium, we shall devote the remainder of this article to the explanation of some important meteorological appearances more immediately connected with hygrometry. It appears by the principles which we have established, that water is maintained in the atmosphere, in a vaporous state, by the influence of heat alone; and that it is supported in the air, not in consequence of any chemical affinity for that fluid, but by its superior levity, its weight having been shewn (§ 34) to be to that of air, under the same temperature and pressure, as 5 to 8. This important fact was first stated in a philosophical manner by De Luc, who considered vapour to be an aeriform fluid, rendered elastic by the action of caloric, independent of the presence of air. The density which vapours can acquire, says he, (*Idées sur la Meteorologie*, tom. i. p. 26), or the degree of proximity which their particles can attain, without being precipitated, has a *maximum* which is determinate in the same temperature, but which changes with the temperature, and increases as it is more elevated. Beyond this maximum of density, vapours, he adds, are partially precipitated, till they are reduced within its limits. These views were afterwards more fully developed in a memoir which he published in the *Philosophical Transactions* for 1792. By his excellent experiments on the force of vapour at different temperatures, Mr Dalton gave to this theory a precision and a generality which it by no means possessed before he turned his attention to the subject; though, it must be admitted, that the opposite opinion, which ascribed the formation of vapour to the influence of chemical action, aided by temperature, could not be said to have been fully disproved till Gay Lussac took a part in the investigation, and demonstrated by a series of accurate experiments, which Biot[†] afterwards illustrated by the most rigid analysis, that vapour has the same mechanical properties, whether it exists in a pure unmixed state, or in combination with atmospheric air. As almost all the conclusions which we have deduced respecting the hygrometric state of the air are either founded upon this fact, or intimately connected with it, we were anxious not to quit the subject till we had ascertained, by direct experiment, how far the quantity of moisture in a given volume of air coincided with the results laid down in some of the preceding Tables; but the minuteness of the quantity of moisture maintained in a vaporous state, even in the largest receiver, together with the difficulty of abstracting the whole of it from its mechanical admixture with air, presented considerable obstacles to an accurate solution of this nice and delicate problem. The method employed by Saussure, mentioned in § 74, of introducing small bits of moistened linen under a receiver, containing a certain volume of dry air, is liable to many obvious objections; and after trying it on a large scale, without obtaining results sufficiently satisfactory, we abandoned it for the following mode of research, which, from the coincidence of the results it afforded in the same circumstances, is, we conceive, well calculated to determine, with the utmost precision, the object in view. The method alluded to, consisted in causing a large volume of air, saturated with moisture, to pass slowly in a small stream through a sufficient quantity of sulphuric acid, or dry muriate of lime, cut off from all communication with the atmosphere; and then observing the increase of weight which these substances acquired, in consequence of the air being transmitted through them. After briefly describing the apparatus we employed, we shall state the results which we obtained in several experiments performed with the utmost care, at temperatures considerably remote from each other. ABCD, Fig. 4. represents the gasometer, or air-vessel used in these experiments; its capacity was 11,320 cubic inches, and to preserve the air which it contained at an uniform temperature, it was enclosed in

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[*] It appears by the *Meteorological Journal* of the Royal Society, that the mean height of De Luc's hygrometer, at London, is about 68°. During a period of eleven years, from 1792 to 1803, the lowest height at which it was observed, was 30°.

[†] In alluding once more to the hygrometric researches of this distinguished mathematician and philosopher, we gladly embrace the opportunity of correcting a slight mistake which we committed, in giving an account (see § 77. of this article) of the labours of Gay Lussac to determine the relation between the tension of vapour, and the indications of Saussure's hygrometer. We have found, however, from re-examining M. Biot's works, that the discovery of that relation being expressible by the co-ordinates of an hyperbola, was made, not by Gay Lussac, as we have stated, but by Biot himself.

another vessel filled with water, the temperature of which was easily regulated. The air was expelled from the gasometer by pouring water of the same temperature into the funnel RS, the stop-cock E being previously turned; it thus passed along the bent tube EFG, one extremity of which G descended about one eight of an inch below the surface of a quantity of mercury in the bottom of the vessel FVTL. The bent syphon tube HIK contained a small portion of mercury, and served to indicate the pressure to which the air was subjected during the experiment. From the vessel FVTL, the air was conveyed by the tube LMN into the vessel MN, which was filled with concentrated sulphuric acid to the depth of four inches. Passing through a very small aperture at N, it ascended in a succession of bubbles through the acid, and at last made its escape at the extremity of the tube OP, which was inserted under the surface of mercury. The junctures at F H, L and O, having been luted so as to be air-tight, it is easy to see, that since all communication was thus cut off between the external air and the acid in MN, any addition of weight which the acid acquired must have been derived solely from the vapour in mixture with the air, which was urged through it from the gasometer. The acid, therefore, being carefully weighed before and after the experiment, with an excellent balance, which, when loaded with a pound, turned with the 500th part of a grain, the increase of weight which it received afforded an accurate test of the weight of the vapour which existed in mixture or combination with the air. To prevent any of the moisture from being deposited in the tubes, the temperature of the air on which the experiment was made, was kept by means of the water in the external vessel VWYX two or three degrees below the temperature of the surrounding air; and as the direct communication between the moist air in the gasometer, and the acid which absorbed the vapour, was cut off by the mercury in the bottom of the vessel FVTL, the quantity of moisture dissolved could not be affected by the diminished elasticity of the air arising from the incessant absorption of the vapour. Some of the experiments were repeated with muriate of lime instead of sulphuric acid, by diffusing a solution of it over an extended surface, by means of flannel, which was afterwards well dried, and then wrapped loosely round the tube, which descended to the bottom of the vessel MN. With this apparatus we obtained the following results:

Volume of air subjected to experiment in cubic inches.	Tem. in degrees of Fahrenheit.	Barometric Pressure.	Total quantity of moisture deposited in grains.	Grains of moisture in a Cubic inch.	
				By Experiment	By Table.
3194	49	29.625	7.550	.0023641	.00235916
10892	54	29.750	28.780	.0026424	.00278021
10814	59	30.000	35.545	.0032867	.00328366
3412	77	29.924	19.574	.0056880	.00568580
11240	83	29.848	75.840	.0067473	.00678455

In the above Table, the first column contains the quantity of air, in cubic inches, which was submitted to experiment, after making the necessary corrections for pressure, and expansion by the accession of vapour; the second column contains the temperature of the moist air, which, as we already remarked, was kept two or three degrees below the temperature of the apartments in which the experiments were performed; and the two last columns exhibit the quantities of moisture in a cubic inch of air, as determined by the Table in § 39, as well as by actual experiment. The coincidence between the results is sufficiently near to confirm in the most satisfactory manner, the extreme accuracy of both Mr Dalton's experiments on the force of vapour, and of Gay Lussac's researches into the relation subsisting between dry air, and the quantity of vapour contained in the space which it occupies. The greatest deviation occurs in the second experiment; but it is easily accounted for on the ground, that the air submitted to trial had only stood three hours over water; whereas, in all the other cases, it had been allowed to remain in that situation from ten to twenty-four hours. Hence we may safely conclude, that the Table in § 39, deduced from the experiments of Dalton and Gay Lussac, exhibits with a degree of accuracy, which cannot deviate more than the hundredth part of the whole from the truth, the quantity of moisture in a cubic inch, either of pure vapour, or air perfectly humid, at the various temperatures, from zero to 100° of Fahrenheit. It is, therefore, a valuable acquisition to hygrometry.

93. The quantity of moisture maintained in the vapourous condition having been thus demonstrated to be solely the effect of caloric modified by pressure, it follows, that the elevation of water in the atmosphere, in the state of vapour, and the subsequent deposition of it, under the various forms in which it again descends to the surface of the earth, must be ascribed chiefly to changes of temperature. Thus if a cubic inch, having in solution its maximum quantity of vapour at the temperature of 80°, were suddenly to be reduced to the temperature of 50°; since, in the former case, it is capable of holding in solution .00623919 grains of moisture, and the latter only .00246714 grains, it would deposit by the change of temperature .00377205 grains. Or, if a cubic inch of air in the same circumstances, at the temperature of 80°, should be intermixed with a cubic inch of air at the temperature of 50°, the mean temperature induced would be 65°, and the whole quantity of moisture in both, .01001633 grains, or .00500816 in a cubic inch; but at the temperature of 65°, a cubic inch is capable of holding in solution only .00395897 grains: therefore, by the intermixture of the two airs, .00209838 grains would be deposited in the liquid state. Nor is it necessary to suppose that the two airs, or, to speak more correctly, the spaces which they occupy, are completely saturated with moisture at their respective temperatures, or mixed together in equal quantities: thus, if we take two cubic inches of air at the temperature of 80°, whose point of deposition is 75°, and three cubic inches at 40°, whose point of deposition is 36°; the former will contain .01074452 grains, and the latter .00468468 grains of moisture; the intermixed airs, amounting to five cubic inches, would therefore have together .01542920 grains, or .00308580 grains to a cubic inch. The temperature induced by the mixture would be $\frac{2\times80+3\times40}{5}$ or 56; but at the temperature of 56°, a cubic inch can only hold in solution .00298729 grains; and consequently, in the case we have supposed, .00009851 grains of moisture would be deposited by each cubic inch.

94. The facts which we have stated are well calculated to elucidate the opinions of Dr Hutton respecting the cause of rain; but before we develope more fully the beautiful and simple theory, which that distinguished philosopher advanced to explain this very familiar, though hitherto the most perplexing of all meteorological phenomena, it may be proper, in the first place, to take a gene-

ral view of the hygrometric constitution of the atmosphere: this will both facilitate our researches, and give them a greater degree of precision and generality.

94. In a preceding part of this article, we endeavoured to shew, that the mean point of deposition for the globe in general, is about 6° below the mean temperature; and though this conclusion, we admit, was drawn by a very limited induction, it seems, as far as observation extends, to be sufficiently conformable to the actual state of things, to be received into the class of general facts. We have also shewn (§ 34.) that at the boiling point, the weight of air is to that of vapour under the same pressure, as .9454476 to .589481, or as 1 to .623537; and since both are affected in their bulk precisely in the same manner, by changes of temperature and pressure, this relation must hold in all cases, so long as the vapour retains the elastic state. Now, if we assume that the mean point of deposition, in the different strata of the atmosphere, has throughout the same relation to the temperature as we have attempted to shew it possesses on the surface of the earth, it will be easy, on this principle, to determine the absolute quantity of moisture in the atmospherical columns for the different latitudes, adapted to the standard pressure. All that is necessary for this purpose, is to take the elasticity of vapour for a temperature 6° below the mean temperature of the latitude; to multiply it by .623537, and then divide the product by 30; and lastly, to multiply the quotient by 407.4, the height in inches of a column of water, equal to the mean weight of a corresponding column of the atmosphere: the product will be the mean height in inches of a column of water, equal to the whole moisture contained in a column of the atmosphere having the same base.

By proceeding in this manner, we have deduced the following Table, which exhibits the quantity of moisture in the atmosphere, in its mean hygrometric state, from the equator to either pole.

Lat.	Mean Temp.	Column of Water equal to column of Vapour in inches.	Lat.	Mean Temp.	Column of Water equal to column of Vapour in Inches.
0	85	8.315	50	53 3	2.882
5	84.6	8.112	55	48 8	2.468
10	83.4	7.809	60	44.5	2.124
15	81.4	7.326	65	40.6	1.854
20	78.7	6.717	70	37.3	1.647
25	75.4	6.037	75	34 6	1 495
30	71.5	5.315	80	32.6	1.391
35	67.2	4.611	85	31.4	1.332
40	62.7	3.968	90	31.0	1.313
45	58.	3.385			

It appears by this Table, that if the atmospherical columns at the equator were to deposit the whole of their watery stores, the moisture precipitated would cover the surface of the earth only to the depth of 8.315 inches. As we advance towards the poles, the quantity of moisture held in solution gradually decreases, in a ratio which diminishes faster than the temperature, and which seems to have some relation to the mean quantity of rain in the different latitudes. The mean quantity of water existing in the vaporous state in a column of air, having a square inch for its base, and reaching to the summit of the atmosphere, may be reckoned by the Table equal to 4 cubic inches; and since the whole surface of the globe is about 790,000,000,000,000,000 square inches, the whole moisture in the atmosphere may be computed to be about 3,000,000,000,000,000,000 cubic inches, or 11,794 cubic miles of water.

96. Having thus formed a general estimate of the absolute quantity of moisture, existing at the same time in the atmospherical columns in the mean hygrometric state of the air, we shall now endeavour to determine the absolute humidity of the various strata of these columns, at different elevations, above the surface of the earth.

The observations which have been made on the hygrometric condition of the air, at considerable heights above the level of the sea, though they evidently prove that the quantity of moisture in the more elevated strata of the atmosphere is extremely small, yet as they generally have a reference to the state of the human body, such as great thirst, the parched state of the skin, and other effects of a similar kind, which might be produced either by absolute or relative degrees of dryness, we must be satisfied, in the absence of the more precise indications of the hygrometer, with the results deduced from the general principles we have already established, and still suppose that the same relative degree of humidity pervades the whole atmosphere, as we have endeavoured to shew, prevails near the surface of the ground. The supposition, taken in conjunction with that of an uniform decrease of temperature, amounting to 3°.7 for every thousand feet of ascent, (the rate at which the heat of the air diminishes according to the best observations,) will enable us to complete the humidity of the successive strata of the atmospherical columns, and explain the cause of the great dryness which is observable in very elevated situations.

97. That the mean relative humidity of the atmosphere is nearly the same at various elevations, is neither improbable nor inconsistent with the few hygrometric observations of which we are in possession. Thus in a range, which embraced about 7000 feet of difference of level among the Alps, it appears from some observations* recorded by De Luc, that his hygrometer differed no more than 10° at the upper and lower stations, though the absolute quantity of moisture in the same volume of air must have been thrice as much in the one case as in the other. The difference, which might have been occasioned by partial changes in the hygrometric state of the air, or even by the influence of temperature in modifying the affinity of the whalebone for moisture, would only have indicated, at the same temperature, a deviation of $\frac{1}{7}$th from the same relative degree of humidity. Hence the suppositions we have made cannot lead to results differing greatly from the truth. The following Table, constructed on the principles we have laid down, and adapted to the mean temperature of the parallel of 45° of latitude, exhibits the mean quantity of moisture in grains contained in a cubic inch of air for every 1000 feet of elevation, from the level of the sea to the height of 15,000 feet.

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* *Idées sur la Meteorologie*, tom. ii. p. 9.

Height in Feet.	Mean Temp.	Relative Tension of the vapour.	Quantity of Moisture in a Cubic Inch of Air, in Grains.
0	58.0	.827	.0026315
1000	54.3	.796	.0022533
2000	50.6	.766	.0019268
3000	46.9	.737	.0016448
4000	43.2	.709	.0014035
5000	39.5	.683	.0011976
6000	35.8	.657	.0010192
7000	32.1	.632	.0008665
8000	28.4	.608	.0007360
9000	24.7	.585	.0006246
10000	21.0	.563	.0005295
11000	17.3	.542	.0004488
12000	13.6	.522	.0003800
13000	9.9	.502	.0003210
14000	6.2	.483	.0002710
15000	2.5	.465	.0002287

The first column contains the altitude in feet, and the second the corresponding temperature; the numbers in the third column express the elasticity of the vapour, on the supposition that the point of deposition for the various strata is 6° below the temperature, the entire tension of vapour for the mean temperature of each stratum being denoted by unity; and the last column shews the weight in grains of the moisture in a cubic inch of air at the different heights. It appears by the Table, that the absolute quantity of moisture contained in a given volume of the air, at various heights, is reduced about one half for every 4500 feet of ascent. This great diminution of moisture is not detected immediately by hygrometers, for reasons which we have fully explained in § 89; but it is sensibly discovered by the extreme thirst and parched state of the skin which it occasions. Colonel Beaufoy describes the latter effects so well, in his account of his journey to the summit of Mont Blanc, that we shall make no apology for stating in his own words the feelings he experienced: "We had not proceeded far," says he, in giving an account of his ascent, "when the thirst, which, since our arrival in the upper regions of the air, had been always troublesome, now became intolerable. No sooner had I drank than the thirst returned, and in a few minutes my throat became perfectly dry. Again I had recourse to water, and again my throat was parched. The air itself was thirsty; its extreme dryness had robbed my body of its moisture. Though continually drinking, the quantity of my urine was almost nothing; and of the little there was, the colour was extremely deep. The guides were equally affected. Wine they would not taste; but the moment my back was turned, their mouths were eagerly applied to my cask of water." The cause of these effects will be distinctly perceived, by attending to the different circumstances in which a person is placed at the top and bottom of a lofty mountain. Near the leval of the sea, in the latitude of 45°, we shall suppose a person inhales air, which, in its mean hygrometric state, contains, according to the preceding Table, .0026315 grains in a cubic inch, and expels it again by the process of breathing, so charged with moisture that the point of deposition is 85°, as we have determined by experiment. Hence each cubic inch must carry off, at an average, .0072312 grains of moisture; but as a cubic inch of the air inhaled contained .0026315 grains, the actual loss of moisture by breathing is .0045997 grains for every cubic inch of air expelled. Now, a man usually makes about 12 inspirations in a minute; and since each inspiration requires about 25 cubic inches, he should thus lose by the process of breathing, in the circumstances we have supposed, nearly eight cubic inches of water daily. Again, at the height of 15,000 feet above the level of the sea, a cubic inch of air, in its mean hygrometric state, contains, according to the Table, only .0002287 grains of moisture; and therefore each expiration must carry off 17506 grains of water from the body. But if we suppose the number of inspirations to be inversely as the density of the air, a person in that elevated situation should make about 18 inspirations in a minute; and therefore lose by breathing about $\frac{3}{20}$ grains of moisture in the same time, or nearly 18 cubic inches of water daily. The quantity of moisture lost by breathing being more than double in the latter case of what it is in the former, accounts in a very satisfactory manner for the great thirst and parched state of the fauces, which all travellers have experienced at considerable heights in the atmosphere.

98. We shall conclude these general remarks on the hygrometric state of the atmosphere, by observing, that since the dryness of the air depends upon the excess of its temperature above the point of deposition, in winter, when the temperature of caves, cellars, &c. is greater than that of the air, these subterraneous places will always seem dry; whereas in summer, when their temperature is below the mean temperature of the air, the contrary should be found to hold, and they ought to appear damp. In this country, the daily mean *minimum* temperature of the season will be observed to coincide with the mean temperature of these situations about the middle of April, and to exceed it from that time till the middle of September. Hence caves, mines, &c. which have a free communication with the air, ought to be damp from April to September, and dry from September to April. The same remark is perhaps applicable to places situated near the sea, particularly in high latitudes.

99. The preceding investigations having conducted us to an accurate and precise knowledge of the constitution of the atmosphere with respect to humidity, we shall finish the subject of hygrometry with a concise view of the quantity of moisture which, under the various forms of dew, rain, hail, and snow, descends, during the annual round of the seasons, to the surface of the earth, in different latitudes. The principal and perhaps the only cause which occasions a precipitation of moisture, by making it pass from the vaporous to the liquid state, must be change of temperature; and since we already know the mean quantity of moisture which exists in the atmospherical columns for the different latitudes, it would not be difficult to determine what portion of it ought to be precipitated at some particular place, provided we also knew the extent of the change of temperature to which the superincumbent atmosphere was exposed. But though we can ascertain with tolerable accuracy the mean annual temperature of a place, in terms of the latitude, it would seem to defy the powers of calculation to anticipate, with sufficient precision, the temperature which the different strata of the atmosphere immediately over it will possess on some particular day; and therefore, all we can do in the present case is, to endeavour to form an estimate on general principles, and calculate the mean annual quantity of rain, for different situations, on the supposition that in the course of a year corresponding changes of temperature take place throughout the whole mass of the atmosphere. As these changes will give rise to depositions of moisture, which must be more or less copious, according to the mean quantity of vapour existing in the atmospherical columns over any place, it will be easy to determine, on the principles we have laid down, and with the assistance of

the Tables in § 51 and § 94, the mean quantity of rain for the different latitudes. For, since by the Table in § 51, the mean annual evaporation is 36.2 inches, and the mean quantity of moisture in the atmosphere at once 4.1 inches, for each of the atmospherical columns having a square inch for its base, it appears that the quantity of moisture evaporated annually is $8\frac{4}{5}$ times as great as the atmosphere retains in the state of vapour at a time. Hence if the numbers which express in inches the heights of the aqueous columns, equal to the columns of vapour existing in the atmosphere, for the mean temperature of the latitudes, as stated in the Table in § 94, be multiplied by 8.8, the products will give the mean annual quantity of rain, also in inches, for the several latitudes, at the interval of 5°. We thus obtain the numbers in the following Table, which will be found to coincide pretty accurately with the mean quantity of rain which falls in different places, as determined by observation.

Lat.	Depth of Rain, in inches.	Lat.	Depth of Rain, in inches.
0	73.17	50	25.36
5	71.39	55	21.72
10	68.72	60	18 69
15	64 47	65	16.32
20	59.11	70	14 49
25	53.12	75	13.16
30	46 77	80	12 24
35	40.58	85	11.72
40	34.92	90	11.55
45	29.79		

100. The limits prescribed for this article will not allow us to follow out this branch of the subject in detail; but we shall resume the consideration of it under the head of METEOROLOGY. In the mean time we may remark, that the change of temperature by which the deposition of moisture from the atmosphere is produced, will be of four descriptions: 1st, The annual change of temperature; 2d, The daily change of temperature; 3d, The change of temperature occasioned by the transference of the aerial columns from one parallel of latitude to another; and 4th, The change of temperature arising from the elevation or depression of the atmospherical strata, by the inequalities of the earth's surface. If all these circumstances be duly taken into account, they will explain, in the most satisfactory manner, every anomaly respecting the quantity of rain for places under the same parallel of latitude. (A)

HYPATE PRIMA, in music, is an interval, which M. Henfling has so denominated, its ratio being $\frac{2}{3} = 358\,\Sigma + 7\,f + 31\,m$, or the *Major* FIFTH; which see.

HYPATIA, a lady celebrated for her beauty and her mathematical knowledge, was the daughter of Theon of Alexandria, and was born about the end of the fourth century. Her public lectures on geometry and astronomy were numerously attended, and she ranked among her pupils many of the most distinguished individuals of the age. She was cruelly murdered in 415, in a popular commotion, which is said to have been excited by Cyril bishop of Alexandria, on account of her adherence to paganism. See Brucker's *History of Philosophy*; Beckmann's *History of Inventions*; and our article MATHEMATICS.

HYPERBOLA. See CONIC SECTIONS, vol. vii. p. 143.

HYPERBOLIC LOGARITHMS. In musical calculations, these express the decimal values or multiples of an interval, whose ratio is $\frac{1}{2.7182818}$, &c. $= 882.9718866\,\Sigma + 17\,f + 77\,m$, which answers to 1.0000000 of the hyperbolic logarithm tables; in the same manner as $\frac{1}{10} = 2033\,\Sigma + 40\,f + 176\,m$ answers to 1.0000000 (XXIV) of the COMMON *Logarithms*, (which see); $\frac{1}{2} = 612\,\Sigma + 12\,f + 53\,m$ to 1.0000000 (VIII) of Euler's or the BINARY *Logarithms*, (which see); $\frac{80}{81} = 11\,\Sigma + m$, to 1.00000000 (c) of major comma logarithms; and so of many other species of logarithms: every one of which species represents a particular scale of musical intervals. See LOGARITHMS.

HYPEROCHE, in music, is a name by which different musical writers have distinguished several small intervals of the scale, viz.

HYPEROCHE of Dr Busby, (*Mus. Dict.* art. *Hyp.*) δ — ε (♯c) has the ratio $\frac{2097152}{2109375}$, $= 5\,\Sigma + f$, and is the *Major* RESIDUAL (of Rameau,) which see.

HYPEROCHE of Dr Callcott, (Overend MS. II. 42, 83,) has the ratio $\frac{16.677,181.699,666,569}{16,777,216,000,000,000}$, $= 5\,\Sigma + 2\,f$, and is the *Greater* RESIDUAL (R) of Overend, which see.

HYPEROCHE *Major*, of Overend, Dr Busby? and others, (π) has the ratio $\frac{3072}{3125}$, $= 15\,\Sigma + f + m$. See the Table in Plate XXX. of Vol. II.

HYPEROCHE *Medius*, of Farey, (D), has the ratio $\frac{19683}{20000}$, $= 14\,\Sigma + f + m$, which has already been fully described in our article DIEZE *Minime*.

HYPEROCHE *Minor*, of Farey (φ), has the ratio $\frac{36,472.996,377.170,786.403}{36,893,488,147,419,103.232}$, $= 10\,\Sigma + f + m$, and is called PRISMA, in the Table above referred to. See that article.

HYPEROCHE of Ptolemy, has the ratio $\frac{128}{129}$, which therefore is not a diatonic interval, because involving the large prime 43 in its ratio: it is the sharp temperament of the false trumpet 4th $(\frac{32}{45})$; is $= 6.8586\,\Sigma + m. = 6\,89592\,\Sigma$, $= .6264543 \times c$, $= .01122725 \times$ VIII; and its common log. is .9966202,5935. &c. (ϱ)

HYPOCHONDRIASIS. See MEDICINE.

HYPOTHENUSE. See GEOMETRY.

HYPOTHESIS, from the Greek ὑποθεσις, from ὑπο and τιθημι, is a term used in physics to denote a system of one or more facts gratuitously assumed, for the purpose of giving an explanation of a particular class of phenomena. If all, or nearly all, the phenomena are well explained by the fact assumed, or if the truth of this fact is rendered probable by evidence independent of the phenomena which it is intended to explain; it is then called a *theory*. A theory therefore differs from a hypothesis, principally in the degree of probability which attaches to the system. The two terms are however used by the best authors without much discrimination. Every person agrees in calling the Cartesian system of vortices a hypothesis, and the Newtonian system of gravitation a theory; for, independent of the positive objections to the explanations derived from the vortices, there is not the slightest probability of their existence, while the doctrine of the mutual attraction of matter is rendered highly probable from considerations independent of astronomy. The system by which Æpinus has explained the phenomena of electricity and magnetism, is properly an hypothesis, from there being no evidence whatever of the existence of a magnetical and electrical fluid;

but from the admirable explanation which it affords, (when in a slight degree modified, by the substitution of two fluids instead of one) of all the phenomena, it is almost universally denominated a *theory*.

HYRCANIA is the name of a country of ancient Asia, to the south of the eastern part of the Caspian Sea. It was bounded by Margiana on the east, Parthia on the south, and Media on the west, and was covered with mountains and forests. Hyrcania was the capital, and its principal towns were Barange, Adrapsa, Casape, Aberbina, Amarusa, Sinica, Sale or Sacæ. Asmura and Mausoca.

HYSSOP. See HORTICULUTRE, vol. xi. p. 282.

HYSTERIA. See MEDICINE.

HYTHE, is the name of a market town of England in Kent, and one of the principal Cinque Forts. It consists principally of one long street parallel to the beach, and crossed by two or three smaller streets. The church, which stands on the side of the hill above the town, is built in the form of a cross, with a tower at the west end. The court hall and market place stand in the middle of the principal street, and the theatre, which is a small one, is situated in one of the streets which runs towards the sea. The coast is here defended by martello towers, and by several small forts. Ranges of barracks for infantry were erected on the heights above the town, with numerous mud-wall cottages for the accommodation of the wives and families of soldiers. In 1811 the town and parish contained

Inhabited houses	268
Number of families	458
Do. in trade	167
Males	995
Females	1323
Total population	2318

See Hasted's *History of Kent*, vol. iii. and the *Beauties of England and Wales*, vol. viii.

I & J.

JACCATRA. See JAVA.

JACK, is a word used by practical mechanics to denote any simple or trifling piece of mechanism.

Jacks and *Jack Sinkers*, are parts of a stocking-frame, see CHAIN-WORK; and lace machines are also provided with parts called jacks. A harpsichord has a jack at every key. Brewers have a large vat which they call jack back. Masons employ a hand jack, screw jack, or jack in a box. Carpenters use a jack plane. Jack towels and roasting-jacks are to be found in every kitchen.

We shall here give a description of the roasting-jack and the hand-jack, both of which are complete machines in themselves; whereas most of the other kinds of jacks are only small parts of other machines.

Hand Jack, or *Jack in a Box*, is a simple and portable mechanical power for assisting the hand in heaving up or moving heavy bodies to a small distance, as for instance, to raise the end of a large block of stone or piece of timber sufficiently to put rollers beneath to remove it, to turn a stone or tree over, or to put a chain round it, to repair buildings, and to lift up an angle of a wall to undermine the foundation. Many other purposes to which a machine of this description is applicable are too obvious. The simple lever, or wedge, will, in many instances, perform all that is desired from a hand jack; but the lever will not retain the load at the height to which it is raised, and the drawing of wedges is a tedious operation. The power of the common or simple hand jack, is obtained by a rack and pinion. See Plate CCXCIX. Fig. 6. A block of wood about 2 feet 6 inches long, 10 inches broad, and 6 inches wide, is perforated with a square hole or mortice through it lengthwise, for the reception of an iron rack B. This rack is formed with a double claw or horn at its upper end. A small pinion C is made to engage in the teeth of the rack. The axis of the pinion is supported in iron plates bolted to each side of the block, and one end of the axis projects through the side plate, with a square to receive a winch or handle, which, being turned round, the pinion elevates the rack B in the mortice, and raises the claw or horn up to the load to which it is applied. To prevent the weight of the load running the pinion back, the handle is detained by a hook or link *a* fastened to the outside of the block. When a greater power is required than the simple rack and pinion are capable of exerting, a combination of wheel-work is used, as shewn in the same Figure, where AA is the block of wood, which in this case is made sufficiently wide to contain the cog-wheel F, fixed to the pinion C, which acts in the teeth of the rack B. G is a second pinion of four leaves, working in the wheel F; and the axis of this pinion projects through the side of the block for the winch H to be fixed on it. The block AA is made in two halves, and the recess for the wheel F and pinion G is cut out in one of the halves; the other, being laid flat against it, supports the front pivots of the wheel and pinions. The two halves are bound together by strong iron hoops *b*, *b*, driven over the outside. The rack has a claw N at its lower end, projecting out sidewise through an opening or slit cut through, in the front half of the block. This claw can be introduced beneath a stone which lies nearly flat upon the ground, and which consequently could not be acted upon by the claw on the top of the rack. To prevent the rack descending when it has a load upon it, the small click *a* drops into its teeth, but clears it in going up; when it is not required to detain the rack, this click can be turned out of the way sidewise.

Fig. 7. is a screw-jack. The block of wood AA is perforated nearly its whole length with a hole sufficiently large to allow the screw B to move up and down without touching. The screw passes through a nut *n*, fixed firm into the top of the block A; and if the screw is turned round, it must rise up through the nut, and elevate the claw F. This claw is fitted on the top of the screw with a round collar, which allows the screw to turn round without turning the claw; and the claw N, which projects through a groove or opening made in the side of the block, is fitted to the screw with a smaller collar. The bottom of the block has four short points to prevent the machine slipping when used upon hard ground. To give motion to the screw, the lower half of it is formed into a square, and a worm-wheel C is fitted upon the square. The teeth of of this wheel are engaged by a worm on the axis of the winch H, and plates of iron *a*, *b*, are bolted on each side of the block, near the middle of its height, to carry the ends of the axis of the winch, and of the worm which is concealed behind the worm-wheel C. When the winch is turned round, it causes the wheel C to revolve by the action of the worm in its teeth; and as the wheel is fitted on the square part of the screw, it compels it to turn with it, but at the same time allows the screw to move up and down.

The friction of this kind of screw-jack is very considerable; nor is its strength so great as the screw-jack shewn in Figs. 8. and 9. In this the screw is not made to turn round, but only to rise and fall; and the worm-wheel C, being placed very near the top of the block A, has a nut, for the screw B to pass through, cut in its centre. By this means the nut is turned round instead of the screw, and it requires no collar either at the top or bottom of the screw. The axis of the worm, like the former screw-jack, is supported by two iron plates *a*, *b*, and the end which projects through the plate *a*, is made square to apply the winch H. The worm-wheel is shewn dotted in Fig. 9. The circular part D is a part of the wheel C, and forms a collar for the wheel, and gives also a greater depth of nut for the screw to work in.

Fig. 10. shews a jack on the hydrostatic principle discovered by Pascal, and applied to practice by the late Mr Bramah to presses, cranes, and various other purposes. It is the most powerful of any machine whatever, and very commodious. A is a large block of wood, bolted together in two halves around a cast-iron cylinder, which resembles a mortar or cannon. It is closed at its lower end, and furnished with a piston B, which is turned truly cylindrical, and embraced by a collar of leather in the head of the cylinder *a*; which will prevent any water from leaking out of the cylinder by the side of the piston; a small copper pipe *b* is connected with the cylinder near its top; the other extremity of this pipe is carried to a small injecting pump C, standing in the cistern R, and actuated by the lever H. At each stroke of the pump a small quantity of water is forced or injected into the large cylinder, and this causes the piston B to rise through the collar of leather a very small quantity each time. This quantity will bear the same proportion to the motion given to the piston of the pump C, as the area of that piston bears to that of the large piston B. The force applied to the small pump, and that exerted by the great cylinder, will be in the inverse proportion of these areas.*

The pump rod is confined to a perpendicular motion by an iron frame P, through which it passes.

The top or head of the large cylinder is made larger than the lower part, as shewn by the dotted lines, and the shoulder which rests on the top of the block to sustain the cylinder. When the weight or burden is to be lowered down, it is done by opening a discharge valve in the pump, the handle of which is seen at *p*: this allows the water to return by the small copper pipe *b*, and escape from the cylinder *a* into the pump cistern R. When the power of the lever H is not found sufficient to perform its work, it can be augmented, by taking out the centre pin *r*, which forms the fulcrum of the lever, and inserting it into another hole which is nearer the centre of the pump.

Roasting Jack, is a machine for turning round meat when placed before the fire, so as to expose every part of the surface to the heat. These jacks are constructed in different ways; and are either put in motion by dogs, by the smoke which ascends the chimney, by a weight, or by a spring.

When a dog is employed, the spit on which the meat is placed is mounted before the fire, and put in motion by a wheel, in which the dog walks in the same manner as men turn the walking wheel crane; this kind of jack is now out of use.

A smoke jack is represented in Fig. 5. where AA is the brickwork of the chimney, which is contracted to a circular figure at AA; B is a strong iron bar, placed upon an arch of brickwork over the fire place, to form a support for the wheel-work of the jack; C is a horizontal wheel placed in the circular funnel AA; it is made of iron plate, with a number of vanes radiating from the centre, each being placed at an angle of about 30° to the plane of the wheel; the heated air which ascends the chimney will strike the vanes and turn the wheel; the lower end of the spindle D, on which the wheel is fixed, has a pinion E fixed on it, and turns a contrate or crown wheel F on the horizontal spindle G; on the other end of this spindle is a pulley H, for an endless chain, which descends to the spit on which the meat is placed; the pulley pinned on the end of the spit is laid in the loop formed by the endless chain, so that this chain at the same time suspends one end of the spit, and gives motion to it; the upper pivot of the spindle D is supported in an iron bracket *m*, projecting from the inside of the chimney, and the lower pivot rests on the top of a standard *n*, which also carries one end of the horizontal spindle G; when the chimney requires to be swept, the wheel C is lifted out of its centre, to allow a boy to pass; these jacks are always in motion when the fire is kept up.

A roasting jack to be turned by the descending power of a weight, is shewn in Fig. 3. A is the barrel on which the cord for the weight winds. The barrel is not fixed upon the main axis, which is shewn by dotted lines: It slips round upon it quite freely in the direction proper for winding up the weight; but is prevented from turning in the other direction, by a ratchet concealed within the barrel near the cog wheel B. The cog wheel B is fixed fast on the main arbor, and its teeth turn a pinion *b* on one end of the arbor C; the other end of this carries a worm wheel, which cannot be seen in the drawing, but its teeth act in the worm cut on the vertical spindle T. On the top of the spindle is the fly-wheel D, which regulates the motion of the jack, and prevents the main arbor from turning too fast by the power of the weight. A wooden pulley E is fixed on the main arbor on the outside of the frame, for the endless chain *e*, which gives motion to the spit, and the pulley has several grooves to receive chains for two or more spits at the same time. Two legs or standards I, K are rivetted to the frame G, to fix the jack against the wall over the fire place.

The weight for giving motion to the jacks is generally suspended by a pair of blocks, with two or three sheaves. The end of the line, or fall from the pulleys, is wound on the barrel A; and the weight is usually placed outside the house, and contained in a sort of a chimney, to defend the lines of the pulleys from the weather. When pulleys are used, the jack will continue its motion longer without winding, but the weight must be much heavier than if it was simply suspended to the end of the cord.

When the weight is run down, a handle is applied to the square part *s* of the arbor of the barrel A, which projects through the frame H. By turning the handle round, the barrel goes with it and winds the rope upon its circumference; but as the barrel slips round on the main arbor when the barrel is turned in that direction, the wheel B continues to revolve and carry the spit by the momentum of the fly-wheel D as long as is requisite to wind up the weight.

A spring Jack is shewn in Fig. 4. From the figure of the external case of this kind of jack it is called a bottle jack. No spit is used with this jack, but the meat is suspended before the fire, and the jack keeps it constantly in motion, by turning it round, first in one direction, and then back again; for this purpose the jack is hung upon an arm, projecting from the arch over the fire-place by the loop *q*, at the upper end of the bottle, and the meat is suspended to the hook fixed to a small axis L *m*, which is kept in constant motion by the wheel-work within the bottle, and the motion is governed by the fly-wheel O.

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* See the article Hydrodynamics volume, x. p. 823.

The spiral spring is coiled up into a box, which is marked A in the Figure, and is fastened to the frame. The interior end of the spiral spring is connected with the main arbor B, which is supported by the plates R, S. On this arbor the wheel C with its ratchet-wheel Z is fixed, and turns the small pinion D on the second arbor E; at the end of this arbor, the contrate or escape-wheel F is fixed; and G is a vertical arbor with two pallets *a* and *b* projecting from it, the one engaging in the teeth on the upper side of the contrate-wheel, and when the pallet *a* is not in action, the pallet *b* intercepts the lower teeth of the wheel. This is a crown-wheel escapement, such as is used in common watches, and gives motion to the arbor G alternately in a backwards and forwards direction. On the lower end of the arbor G a sector C is fixed, and is cut into teeth at its circumference, to form a segment or portion of a wheel. It gives motion to the pinionH on the short vertical arbor *d*; and the wheel I is fixed on the same arbor, to give motion to the pinion L, in the centre of the jack, which is fixed on the vertical arbor *m*, that passes through the bottom plate of the bottle, and has the fly-wheel O fixed to it, with the hook P for suspending the meat. The arms of the sector *c* are sufficiently extended to admit the arbor *m* between them. The arbor is sustained by the fixed cock *i*, and is also suspended by a number of small catgut strings going up through the centre of the jack to the top of the neck of the bottle, and attached to the cross pin *r*. These strings take off part of the weight of the meat which is suspended on the hook P, and diminish the friction on its collar. This effect is also partly produced by a small spiral wire spring *s*, coiled round the arbor, and bearing on the cock *i*.

The spring jack is wound up by the key Q, when applied to the square part *s* of the main arbor; and in the act of winding, the great wheel C is not turned round by the ratchet wheel *z*, because the click fixed to the great wheel slips over the sloping side of the teeth. To prevent the spring from breaking, a pinion *n* is fixed on the end of of the main arbor; beyond the plate it works into the wheel *o*, which turns upon a pin fixed into the side plate S of the frame. When the main arbor has made a sufficient number of revolutions to wind up the spring, the leaves of the pinion *n* come in contact with a part of the wheel *o*, which has no space in it, and this prevents the arbor being turned any further, so as to endanger the breaking of the spring. The maintaining power of the spring, when wound up, gives motion, by the wheel C and pinion E, to the escape wheel F, the upper tooth of which meets with the pallet *a*, and carries it along with it, turning the vertical arbor round upon its pivots. This motion is communicated by means of the sector C to the pinion H, and its wheel I, and thence to the sector pinion L, and the fly wheel, and consequently to the meat. The use of the wheel-work CHL is to make the meat turn round several times before the tooth of the wheel escapes the pallet *a*, and then the tooth on the under side of the escape wheel meets with the pallet *b*, and turns the vertical arbor G and the fly wheel back again, in a contrary direction to that in which it was before turned by the pallet *a*, because the underside of the escapement wheel is going in a contrary direction to the upper side, when the under tooth of the wheel escapes from pallet *b*, the pallet *a* comes into action again, and thus continuous motion is kept up, first in one direction for a few turns, then in the opposite direction, and so on, till the maintaining power of the spring becomes exhausted, when it must be wound up again by the key Q. The tube resembling the neck of the bottle is to give length to the catgut strings before mentioned, and which, by their twisting and untwisting, perform nearly the same office as the pendulum spring in a watch, and make the fly wheel return back readily. The bottom V of the bottle is screwed to a flaunch or projecting rim round the bottom of the bottle; by removing these screws, and taking out the cross pin *r* in the top of the neck, which hold the strings, the frame containing the wheelwork may be withdrawn from the case *x x*, to be repaired or oiled as occasion may require. (J. F.)

JACKSON, PORT. See BOTANY BAY and *New* HOLLAND.

JAEN is a town of Spain, and the capital of the ancient province of the same name, which is now under the government of Andalusia. Jaen is supposed by some to be the *Oningi* of Pliny, the *Oringi* of Livy, and the *Mentessa* of the Romans. The city, which is situated at the foot of a mountain of mixed marble, is surrounded by walls flanked with towers. The town is of a middle size, and has some squares, one of which is spacious. The water, with which the town is well supplied, is distributed in the squares, streets, and houses. Jaen is the see of a bishop, suffragan of the archbishop of Toledo, formerly fixed at Bäeza. The diocese contains two cathedral chapters, one at Bäeza, and the other at Jaen; two collegiate chapters, one at Bäeza, and the other at Ubeda; seven archpriests, and 438 parish churches. The principal public buildings are the cathedral and parish churches, and a great number of monasteries, nunneries, and two hospitals. The cathedral is a noble piece of architecture. The eastern front, flanked with two fine towers, is adorned with eight Corinthian columns, and has three doors embellished with bas reliefs. The chapel of the Sacrario is esteemed a fine piece of architecture. The parish church of St Claire contains an exquisite painting of the Virgin and our Saviour. The convent church of the nuns of St Clair is a handsome building, and the principal altar is adorned with some excellent paintings by Angel Nardi. Jaen was formerly a rich and commercial town, but its silk manufactories failed about the end of the 16th century. About the middle of the 18th century, 5000 tape looms, 1200 ribbon looms, and several silk ones, were set to work, but they did not succeed, and few of them remain at preseut. The country around Jaen is rich and beautiful; the silk-worm is reared, but not in great quantities. Population 30,000. See Laborde's *View of Spain*, vol. ii. p. 117.

JAFFA, is a seaport town of Palestine, situated upon the declivity of a hill on the eastern shore of the Mediterranean. It has a good wharf, but the harbour, which seems to have been of considerable size formerly, is now small, and is only frequented by coasting vessels making the voyage to Syria. By clearing it out, it has been conceived capable of receiving 20 vessels of 300 tons, such as are now obliged to anchor in the roads, where they are always ready to slip their cables, from the frequency of sudden storms. On all the coast of Syria there is scarcely a safe harbour. The declivity upon which the town of Jaffa stands is so unequal, that the streets are paved in steps. The whole is surrounded by walls, fortified with tolerable regularity, and capable of defence, though commanded by a height. On the southern side, it has one large bastion, with several towers crowned with artillery, which flank the line of walls; but these are said not to be of sufficient strength. There were recently two principal gates, and a third of a smaller size; but one of the former was shut up. The houses are neatly built of stone; and being distributed on the declivity, rise above each other like the seats of an amphitheatre, and there is a tower or citadel on the summit. There are three small convents here of Christians, Greeks, and Roman Catholics, whose numbers are probably much smaller since pilgrimages to the Holy Land have become less frequent. In 1807, there were but four Roman Catholics in their monastery, and they were all Spaniards. Only a few Jews are in the town, the population consisting of a mixed race, among whom is a numerous garrison of Turkish and Maugrabin soldiers; the total amounting to abaut 6000 or 7000. Water is scarce in Jaffa, notwithstanding the vicinity of a small river: It may be obtained, however, by digging for it on the coast; and it is said, that one of its governors who engaged to remedy this inconvenience, was strangled by order of Djezzar, Pacha of Acre. The climate seems to have a tendency to insalubrity, which has been attempted to be corrected by draining extensive marshes. Soap is the principal manufacture of this town, as it is of several considerable towns of Syria, from all of which it is sold under the name of Joppa soap, and is exported for supplying Egypt. Oil of olives was one of its chief ingredients; but the groves of olive trees which covered the neighbouring country, and also those of oranges, lemons, and other fruits which adorned the town, were destroyed by the Mamelukes during the sieges of Ali Bey and his successor. Spun cotton is exported in small boats to Acre, whence it is shipped for other places, and also the provisions, the produce of the country. Jaffa is governed by an officer, who is said to be appointed by the Kislar-Aga or chief of the Black Eunuchs in the Turkish emperor's service, but the regulations under which the military subsist are not explained. The governor pays a small tribute to the Porte, which he levies in customs from merchandize and taxes on the town and villages dependant on him: his authority seems to have been very low about thirty years ago, but events more recent have rendered Jaffa of greater importance. The town subsists by its commerce, and the resort of pilgrims to the Holy Land, who find a reception in some of the monasteries: part of the money paid by them for this privilege, however, is diverted into a different channel. Jaffa is celebrated as the Joppa of Scripture: the spot where the Roman Catholic monastery stands is said to have the site of the house of Simon the tanner: and on a rising ground, about a mile east of the town, are some ruins, called those of the house of Tabitha, who was raised from the dead by St Peter, and where Pococke supposes there was a church dedicated to her, as the Greeks resort hither to perform their religious rites on the day of her festival. In profane history it is equally celebrated; for here Perseus is believed to have rescued Andromeda from danger; and Jerome affirms that in his time the rock to which she had been bound was still pointed out. Jaffa was destroyed by the Sultan Saladin in 1191, after which it was rebuilt and fortified by the Christians.

During the arduous contest which subsisted for so many years among the principal European powers towards the close of the eighteenth century, a French army invaded Egypt. A force of 12,428 men commanded by Bonaparte was detached to act against Syria in February 1799, principally, it is said, with the view of reducing Acre, in retaliation for the capture of the fort of El Arisch by Djezzar. This army succeeded in taking every place on the route with facility, and at length reached the walls of Jaffa on the 7th of March of the same year. With regard to the consequences of the ensuing siege, the keenest controversies have been agitated by our contemporaries: on the one hand it has been said, that the French exercised unheard of enormities on the captured garrison: on the other, these have been as strenuously denied.

The Turks, believing themselves invincible behind their walls, cut off the head of a messenger who carried a summons from Bonaparte to surrender, and did not answer it. But the French batteries being completed in three days, the fire of twelve-pounders opened at seven in the morning of the 7th, the summons having been sent at day-break, and was directed against a kind of square tower where the wall seemed weakest, on the south-west of the town. The breach appearing practicable by three o'clock, the signal was given for storming, amidst a fire well sustained by the garrison. The French advanced boldly; but no sooner had they penetrated the streets, than they gave themselves up to the fury sanctioned by an assault, massacring whoever ventured to oppose them. "All the horrors which accompany a storm are seen in every street, and repeated in every house. Here are heard the screams of some youthful female, the victim of violation, vainly imploring succour from her outraged mother, or calling on the name of her father, who is mercilessly murdered. No asylum is respected: streams of blood are flowing: and at each footstep appears a being groaning in the agonies of death." General Berthier ordered an officer, M. Miot, to take a detachment, and carry the wounded off the breach; on arriving at the spot, he found that his whole detachment had forsaken him. Thus disappointed, he entered the city. "What a spectacle," he exclaims, "was there! the pallid hue of the inhabitants; their terror; the shouts of the soldiers; women wandering about despoiled of their veils, recognizing their dead or dying relatives among the disfigured bodies. The ground was overspread with dresses and furniture, and the soldiers selecting the richest from among the pestiferous garments." While all this was going on, a considerable portion of the garrison had retired into one of the forts, where they laid down their arms, and were conducted to bivouac before the tents of the general's staff. The Egyptians were selected from among them, and removed: and the remainder, consisting of between 2000 and 3000, Sir Robert Wilson seems specifically to affirm 3800, Turkish artillerymen, Maugrabins and Arnauts, were put under the guard of a strong detachment. Next day they were sparingly supplied with biscuit, and parties of them were carried to get water in some vessels with which they had been furnished.

Meantime Bonaparte, elated with his conquest, issued proclamations to the inhabitants of the various towns of Palestine, giving them an option of peace or war, declaring that he was merciful to the troops surrendering at discretion, but those were treated with severity who had infringed the rights of war. He also solicited the friendship of Djezzar, and his hostility towards the Mamelukes and the English.

It does not appear how these overtures were received, or what time was allowed for an answer; but on the 10th of March, a little after mid-day, the prisoners of Jaffa were put in motion, surrounded by a vast square battalion formed by the French division of General Bon. Suspicions arising in the French army regarding their disposal, induced many not appointed for that duty to accompany the columns of Turks, who marched in profound silence. At length, having reached the sandy downs, about a mile south-west of Jaffa, they were halted near a marsh containing turbid water, when the commanding officer of the French directed that the whole should be partitioned into small groups. The order being accomplished, the victims were conducted to different points, and inhumanly butchered in cold blood: an atrocity unexampled in the modern history of civilized nations. Notwithstanding the number of troops employed in it, the execution of this horrible sacrifice required a long time, and it is affirmed that it was only with extreme repugnance that the soldiers fulfilled the duty imposed upon them. All the prisoners suffered with the most heroic fortitude, with the exception of a single youth, who made a fruitless appeal to the humanity of his merciless conquerors. Those who could accomplish it, with uncommon resignation performed that ablution which their religion enjoins, by means of the stagnant water, and then bid each other adieu; but none ever attempted to escape. In narrating these events, M. Miot observes, "I saw a respectable looking old man, whose manner and appearance denoted superior rank, I saw him coolly cause a hole be dug in the sand at his feet, deep enough to admit of his being buried alive —Doubtless, he wished to perish by his own hands. He stretched himself on his back in this melancholy tomb, which now afforded him protection, while his comrades, offering supplicatory prayers to heaven, soon covered him up with sand. Then they stamped on the earth thus enshrouding him, as if to give a more speedy termination to his sufferings. This spectacle made my heart palpitate within me. It took place while the groups scattered on the downs were massacred. At last, of all the prisoners none remained but those who were beside the marsh. The cartridges of our soldiers were now expended; and it was necessary to dispatch them with swords and bayonets. I could no longer support this horrible butchery. I fled from it pale and ready to sink; but several officers told me in the evening, that some of those miserable beings, yielding to that irresistible impulse which prompts mankind to avoid destruction, leapt on each other, and thus received in their limbs the blow which was aimed at their hearts. If the truth must be disclosed, a frightful pyramid was reared of the dead and dying, streaming with blood; and it became necessary to remove those who had expired, in order to murder others who, sheltered by this terrific rampart, had not yet been struck." Their bones are said to have lain long in heaps, and to have been shewn to travellers; but Dr Clarke could not find any traces of them, nor even obtain the most distant information that such a massacre had ever taken place.

In regard to the inducements which led to an event so noted in the history of Jaffa, the French affirm, that these were unconnected with the thirst of revenge, or the love of cruelty. Their army, already reduced by the sieges of El Arisch and this unfortunate town, daily became still more enfeebled by the ravages of disease. Great difficulty of subsistence was experienced, and the soldier rarely received his ration complete. The scarcity was increased by the hostile disposition of the inhabitants of Syria and Palestine towards the French. "To maintain the prisoners," they pleaded, "by keeping them along with us, was not only augmenting our necessities, but would have been a constant restraint on our motions. Confining them in Jaffa was admitting the possibility of revolt, considering the slender guard that could be left to watch them, without removing the former inconvenience. Sending them back to Egypt would have required a considerable detachment, and reduced our troops greatly. To liberate them on their parole was, notwithstanding all engagements, hazarding an addition to the number of our enemies, and particularly to the garrison of Acre. Thus there remained only one universal measure of conciliation; it was frightful, but it was judged the result of necessity."

The exact number of the Turkish garrison thus massacred by the French is not exactly ascertained. Sir Robert Wilson states it at 3800: M. Miot, a spectator of the victims, thinks there were not quite so many. But possibly Bonaparte's manifesto to the Egyptians may be considered an ingredient of evidence, wherein he says, "he found at Jaffa about 5000 of the troops of Djezzar. He destroyed them all; very few saved themselves by flight." Such is a brief account of this memorable tragedy, the truth of which has been so keenly controverted in Europe.

The French have been charged with another atrocity in poisoning 580 of their own sick and wounded in the hospitals at Jaffa; but happily it has not yet received the same confirmation we believe as the former. In their retreat from Acre in May 1799, they seized on all the stores found in Jaffa, and blew up the fortifications, which have since been repaired. Distance from Acre 40 miles South. Lat. 32° 2′ N. Long. 34° 53′ E.

JAGAS. See Congo.

JAGGERNAUT. See Juggernaut.

JAGO, St. See Cuba.

JAGO, St. One of the *Cape de* Verde *Islands*, which see

JAGO, St de Compostella. See Compostella.

JALAP. See Materia Medica.

JAMAICA.

JAMAICA, the most considerable as well as by far the most valuable of the British West India islands, is situated in the Atlantic Ocean, among what are called by geographers the Greater Antilles, in 18° 12′ of North Latitude, and 76° 45′ West Longitude from London. The latitude of Kingston, the principal town, is 18° north; the latitude of Morant point east is 17° 56′, and its longitude 76° 5′; and the latitude of South Negril Point west is 18° 16′, and its longitude 78° 32′. Jamaica is nearly of an oval form; 140 English miles in length, and in its broadest part about 50. It is the third in size of the islands of the Archipelago. It is bounded on the east by the island of St Domingo, from which it is separated by the channel called by English seamen the Windward passage; by Cuba on the north; by the Bay of Honduras on the west; and by Carthagena in New Spain on the south.

Jamaica is divided into three counties; Middlesex Surry, and Cornwall. The county of Middlesex is divided into eight parishes, which contain one town and thirteen villages. The town is called St Jago de la Vega, or Spanish Town; and as this is the residence of the governor, it is accounted the capital of the island The county of Surry contains seven parishes, in which there are two towns and ten villages. The chief of these is the town and parish of Kingston. Port Royal is also in this county, and likewise the villages of Port Morant and Morant Bay, the latter of which is a place of considerable importance, on account of its shipping. The parish of Portland in this county contains the village of Port Antonio, the harbour of which is one of the most commodious and secure in the island. The parish of St George contains Annotto Bay, a shipping place. The county of Cornwall contains five parishes, in which are situated two towns and eight villages. The towns are Savannah le Mar, which being destroyed by the hurricane in 1780, consists at present only of sixty or seventy houses; and Montego Bay Town on the north coast. The villages of Jamaica are generally small hamlets on the bays, where the produce is shipped in the *droggers*, to be conveyed to the ports of clearance. The few other places worthy of mention are, Falmouth on the north coast, on the south side of Martha Brea harbour; Lucca harbour, also on the north coast; Bluefield Bay on the south coast, three leagues east of Savannah le Mar, the usual rendezvous of the homeward bound fleets; and Carlisle Bay, also on the south coast. The chief headlands of the island are Point Morant, more generally known to seamen by the name of the East End of Jamaica, and dreaded by them for its thunder and lightning squalls. Nepil by North and Nepil by South are two promontories on the west end of the island. The islands deserving mention near Jamaica are, the Pedea Keys and Portland Rock, on a large bank south of the island, and Morant Keys, eight leagues south-east of Morant Point.

The island is crossed longitudinally by an elevated ridge, called the Blue Mountains. What is called the Blue Mountain Peak, rises 7431 feet above the level of the sea. The precipices are interspersed with beautiful savannahs, and are clothed with vast forests of mahogany, lignum vitæ, iron wood, logwood, brazilletto, &c. On the north of the island, at a small distance from the sea, the land rises in small round topped hills, which are covered with spontaneous groves of pimento. Under the shade of these is a beautiful and rich turf. This side of the island is also well watered, every valley having its rivulet, many of which tumble from overhanging cliffs into the sea. The back ground in this prospect, consisting of a vast amphitheatre of forests, melting gradually into the distant Blue Mountains, is very striking. On the south coast the face of the country is different; it is more sublime, but not so pleasing. The mountains here approach the sea in immense ridges; but there are even here cultivated spots on the sides of the hills, and in many parts vast savannahs, covered with sugar canes, stretching from the sea to the foot of the mountains, relieve and soften the savage grandeur of the prospect.

The soil of Jamaica is, in many places, deep and fertile. On the north side, chiefly in the parish of Trelawney, there is a particular kind of soil of a red colour, the shades of it is varying from a deep chocolate to a rich scarlet. In some places it approaches a bright yellow; but it is every where remarkable, when first turned up, for a glossy shining surface; and for staining the finger like paint, when it is wetted. It seems to be a chalky marl, evidently containing a large portion of calcareous matter, from the circumstance of its holding water, when formed into ponds, like the stiffest clay. What is called the *brick mould* in Jamaica, is a deep, warm, mellow, hazle mould, with an under stratum so retentive, as to retain a considerable degree of moisture even in the driest season. This is the best soil in the West India islands for sugar canes, next to the ashy loam of St Christophers, and is followed by the deep black mould of Barbadoes. On the whole, however, the cultivated soil of Jamaica is not remarkably fertile.

The island has upwards of one hundred rivers, rising in the mountains, and running with great rapidity to the sea on both sides. This rapidity, as well as the obstructions from rocks, renders them unnavigable except by canoes. The deepest is the Black River on the south coast, which flows gently through a considerable tract of level country, and is navigable by flat boats for thirty miles. There are some medicinal springs, warm, sulphureous, and chalybeate. The most remarkable of these is in the eastern parish of St Thomas, in the neighbourhood of which a village called Bath has been built. The heat of this spring raises the thermometer to 123 degrees. It is said that the Spanish settlers once wrought mines both of copper and silver; and one of lead was opened a short time since in the parish of St Andrew, but it was soon abandoned.

The climate of Jamaica, even on the coast, is temperate, the medium heat at Kingston, throughout the year, being 80, and the least 70. In ascending towards the mountains, the temperature quickly alters with the elevation; eight miles from Kingston, the maximum is only 70; at the distance of fourteen miles from this town, where the elevation is 4200 feet, the average range of the thermometer is from 55 to 65, and the minimum in winter 44. On the summit of Blue Mountain Peak, 7431 feet above the sea, the range in the summer is from 47 at sun-rise to 58 at noon; and the minimum in winter is 42. The year may be divided into four seasons; the first commencing with the vernal or moderate rains in April or May, which usually last six weeks; the second season includes June, July, and August, and is hot and dry; the third includes September, October, and November, or the hurricane and rainy months; and the fourth December, January, February, and March, which are the most serene and the coolest months.

Besides the staple exports of Jamaica, consisting of sugar, indigo, coffee, and cotton; the cultivated vegetables are, maize, Guinea corn, and calavances for the food of the negroes, and almost all the kitchen vegetables of Europe, besides many indigenous ones, as the sweet potatoe, yam, eddar root, callaloo, a kind of spinach, and the commonest substitute for greens, cassara, okasy, &c. Few of the northern European fruits thrive, but the indigenous ones are numerous and delicious; the principal are the plantain, cocoa-nut, guava, sour-sop, sweet-sop, papaw, custard apple, cashew apple, granidella, prickly pear, pine apple, &c. The orange, lime, lemon, mango, and grape, have been naturalized, as well as the cinnamon tree, of which there are now considerable plantations. The bread-fruit tree, with other useful plants, has been introduced by the exertions of Sir Joseph Banks. This island abounds in various grasses of an excellent quality. Of the native grass, good hay is made, but in no great quantity; but there are two exotic grasses that are extremely valuable, and yield an abundance of food for cattle; the first is an aquatic plant called Scots grass, from a single acre of which five horses may be maintained for a whole year. The seed of the other kind, called Guinea grass, was introduced into the island, about seventy years ago, as food for some birds brought from the coast of Guinea. Cattle are remarkably fond of this grass, and thrive wonderfully upon it. The greater part of the grazing and breeding pens throughout the island are supported chiefly by means of this invaluable herbage. The principal forest trees have been already mentioned; many of them rise to a prodigious height, as the papaw and the palmeto royal, the latter of which is frequently found 140 feet high; the trunks of the ceiba, or wild cotton-tree, and the fig-tree also, often measure 90 feet from the base to the limbs; the former, when hollowed out, has been known to form a boat capable of holding one hundred persons. Of softer kinds of wood for boards and shingles, there is a great variety of species; and there are many well adapted for cabinet work, such as the bread-nut, the wild lemon, &c. In mentioning the vegetable productions of this island, the wild pine ought not to be omitted; it is a plant that commonly takes root in the great forks of the branches of the wild cotton-tree; by the conformation of its leaves it catches and retains the rain-water, each leaf resembling a spout, and forming at its base a natural reservoir, which will hold about a quart of water.

When Jamaica was discovered, it contained eight species of quadrupeds, the agouti, the pecare, the armadillo, the opossum, the racoon, the musk-rat, the alco, and the monkey. Of these only the agouti and the monkey remain. There are many varieties of the lizard, some of them very beautiful. The most delicious of the wild fowl are the ring-dove, and the rice-bird of South Carolina; the latter, after fattening upon the rice plantations in that district, visit Jamaica in prodigious numbers in October, to feed on the seeds of the Guinea grass. Parrots are still found in the groves, but the flamingo is no longer to be seen.

Few cattle are bred here, the asses and mules being imported from the Spanish Main, and the horses from England and America; the latter are in general excellent, and sell at from 100*l.* to 140*l.* currency. The black cattle are of a large size. There are also asses and sheep; the mutton is well tasted, but the wool is hairy and coarse. There are likewise goats and hogs in great plenty; sea and river fish; wild, tame, and water fowl. Near the coast there are salt ponds, from which formerly the inhabitants supplied their own consumption.

The commercial productions of the island are sugar, rum, molasses, coffee, cocoa, cotton, indigo, pimento, and ginger.

In the year 1673, the chief productions of Jamaica were cocoa, indigo, and hides. The cultivation of sugar had just commenced. It appears from the following statement, that the increase in the growth of this staple article of the island has been very gradual.

In the year	1722 . .	11,000 hhds. were exported.
	1739 . .	33 155
	1744 . .	35 761
	1768 . .	55 000
	1774 . .	78,304
	1790 . .	105,400
	1802 . .	140,000

A new species of sugar-cane, far more valuable than that formerly in use, has lately been introduced into Jamaica. It was first imported into the French islands of Guadaloupe and Martinique, from the islands of Bourbon and Mauritius, and is called the Bourbon or Otaheite cane. It is much higher, and four times as large as the cane formerly grown exclusively. It will grow on boggy land, and yields one-third more sugar than the old cane; but the sugar is not of such a compact grain. The average expence of the cultivation of sugar is 20s. 10d. per cwt. independent of the interest of capital and the produce of rum. The works necessary for making 200 hogsheads of sugar annually cost 10,000*l.* Jamaica currency; and an estate producing such a quantity, requires 40,000*l.* to establish it, viz. 250 negroes at 70*l.* sterling each, amounting to 17,500*l.*; 180 cattle and mules at 30*l.* each, amounting to 5400*l.*; buildings for the manufacture, and houses for negroes and owners, 7000*l.*; and land, 10,100*l.* The value of the buildings and machinery on the sugar plantations varies from 4000*l.* to 25,000*l.* sterling. The greatest crop of sugar on an estate with one set of works ever known, was 1050 hogsheads, of 18 cwt. each; but estates in general, with one set of works, make from 100 to 300 hogsheads. Estates containing 1300 negroes and a due proportion of whites, require about 10,000*l.* sterling of supplies annually of British manufactures and provisions. One hundred barrels of herrings are required for 250 negroes in the course of the year.

The following table, extracted from the Report of the Committee of the House of Commons in the year 1807, on the commercial state of the West Indies, exhibits the outgoings, and the produce of a sugar estate in 1806, which was cultivated by 519 negroes, and 434 head of stock.

OUTGOINGS.

British and Irish Supplies.

Lead, mill-work, and ironmongery utensils .	*L.* 671
Medicines, oil, tallow, grain, wine, &c. .	306
Osnaburghs, negro clothing, hats	516
Wood-hooks, ox-bows, rope, stationery, pottery, &c.	231
Convoy-duty, custom-house entries, and shipping charges	481
Provisions, and herrings, with charges . .	667
Coals and fire-bricks, with charges . . .	843

Expences in the Island.

American lumber, salt-fish, flour . . .	1492
Cattle purchased in the island	603
Fresh beef, medical attendance, wharfage, tradesmen, &c.	1367
Hired labour	184
Taxes	566
Attornies' commissions, overseers and book-keepers' salaries	961
Total	*L.*8888

PRODUCE.

	Hhds.	Tierces.
Sugar .	472 .	. 81
	Puncheons.	
Rum .	164	

Formerly it was calculated, that where two hogsheads of sugar were made, there was at least one puncheon of rum; but latterly the proportion has been greater; the average annual quantity of rum being nearly 54,000 puncheons.

Coffee was little cultivated in Jamaica till the year 1788. The coffee plantations are generally situated in the hilly regions, of which nearly two-thirds of the island consist, and which are, from their soil, climate, and situation, unfit for sugar plantations. The increase of coffee plantations may be seen from the following facts, taken from the report already referred to. In the four years ending the 30th September 1791, the average exportation of coffee was 1,603,066lbs.; in 1804, it amounted to 22 million pounds; and during three years ending 30th September 1807, the average exportation was more than 28½ millions, which, at 6*l.* per cwt. its cost in Jamaica, produced more than 1,700,000*l.* It is calculated that 20.000,000*l.* is invested in coffee estates. Cotton is not cultivated to any very great extent: it was attempted to cultivate it on ground worn out by sugar; but it was found that such soil would not grow either cotton or coffee, and would produce only very inferior grass. Indigo is now very little cultivated, and, in all probability, will never again become a staple commodity. Blome, who published a short account of Jamaica, in the year 1672, mentions that there existed at that time, about sixty cocoa walks: at present, there is scarcely a single plantation in the whole island. Ginger is little cultivated. All the produce of the arnotto plant, which is at present exported from Jamaica, is gathered from the trees that grow spontaneously. The pimento trees also grow spontaneously, and in great abundance, especially in the hilly regions of the North. The returns from a pimento walk, in a favourable season, are very great: a single tree has been known to yield 150 lbs. of the raw fruit, or 100 lbs. of the dried spice.

The following Tables will further illustrate the value, and produce, and expence, of cultivating Jamaica estates at different periods.

Common Valuation of an Estate.

	Sterling.
Cane land, the canes upon it valued separately	*L*.22 per acre
Plants	22 do.
Cane land in ratoons and young plants .	15 do.
Pasture land	8 do.
Wood land . . . . , . .	4 do.
Provisions	14 do.
Negroes	57 do.
Mules	22 do.
Steers	10 do.
Breeding cattle, &c.	5 do.
Works, water, carts, &c. from .	7000*l*. to 10,000*l*.

View of the Property and chief Produce of the whole Island in 1786.

Counties.	Sugar estates.	Other settlements	Slaves.	Produce of sugar. Hhds.	Cattle.
Middlesex . .	323	917	87,100	31,500	75.000
Surry . . .	350	540	75,600	34,900	80,000
Cornwall . . .	368	561	90,000	39.000	69,500
Total . . .	1061	2018	255,700	105,400	224,500

To this produce should be added about 53,000 puncheons of rum.

Comparative View between the Years 1768 *and* 1786.

	Middlesex in 1768.	Middlesex in 1786.	Surry in 1768.	Surry in 1786.	Cornwall in 1768.	Cornwall in 1786.	Total in 1768.	Total in 1786.	Amount of increase.
Sugar estates .	239	323	146	350	266	388	651	1,061	410
Sugar hogsheads	24.050	31,500	15,010	34,900	29,100	39,000	68,160	105,400	37 240
Negroes . . .	66,744	87,100	39.542	75,600	60.614	93,000	166.900	255,700	88.800
Cattle	59,510	75,000	21,465	80,000	54,775	69,500	135,750	224,500	88,750

Rates of Contingent Charges on Jamaica Estates from 1763 *to* 1806, *taken from the Report of the Committee of the House of Commons.*

	1763 to 1773.	1773 to 1783	1783 to 1789	1789 to 1794.	1794 to 1799.	1799 to 1806.
Head Overseer's salary, ...	*L*.70 to *L*.100	*L*.70 to *L*.100	*L*.100 to *L*.120	*L*.100 to *L*.150	*L*.120 to *L*.180	*L*.150 to *L*.215
1st Bookkeeper's and Distiller's, . .	*L*.21 to *L* 28	*L*.28 to *L*.35	*L*.35 to *L*.43	*L*.43 to *L*.45	*L*.45 to *L*.50	*L*.50 to *L*.60
Junior Bookkeeper,	*L*.17 to *L*.20	*L*.20	*L*.20 to *L*.22	*L*.22 to *L*.25	*L*.25 to *L*.35	*L* 35 to *L*.50
Red oak staves per 1000, ...	*L*.6 to *L*.8	*L* 8 to *L*.11	*L*.7 to *L*.10	*L*.8 to *L*.15	*L*.15 to *L*.33	*L*.22 to *L* 30
White ditto, . . .	*L*.7 to *L* 10	*L* 7 to *L* 21	*L*.9 to *L*.12	*L*.9 to *L*.22	*L*.22 to *L*.36	*L*.28 to *L*.32
Mules, ...	*L* 19 to *L* 21	*L*.19 to *L*.28	*L*.18 to *L*.22	*L* 22	*L*.22 to *L*.36	*L* 36
Steers, ...	*L*.7 to *L*.10	*L*.9 to *L*.14	*L*.9 to *L*.11	*L*.8, 10s. to *L*.14	*L*.14 to *L*.29	*L*.29

Provisions and Lumber, for the Plantations, imported into Jamaica in 1805, taken from the same Report.

	From the United Kingdom.		British America		United States.		Other Countries.
Corn, bushels,	15.972		1450		82,043		
Bread, flour, and meal, cwts.	84[illegible]5		381		142 350		
Rice, barrels,	16				4094		
Beef and pork, barrels,	32.231		1262		9567		
	Bar.	Quint	Bar.	Quint.	Bar.	Quint.	
Fish, dry,	186	478	0	17,408	0	25.039	
Do. pickled, barrels,	48,838		29,416		30,834		
Cows and oxen,	8						684
Sheep and hogs,					662		136
Oak and pine boards, and timber in feet,			753.588		9.501.734		
Shingles, No.			208.235		17.621.756		
Staves, do.			249.760		12.395.732		

The annual value of the lumber and provisions formerly imported into Jamaica from the United States, amounted to above 1.000,000*l.*, in return for which, the Americans were allowed to take only rum and molasses. Of the former, they used to take annually 30,000 puncheons; but since they began to distil spirituous liquors themselves, they seldom take more than 5000 puncheons.

The following Table exhibits the importation and exportation of slaves for four years, previous to the abolition of the slave trade.

Years.	Vessels from Africa.	Tonnage.	Crew.	Slaves imported.	Slaves exported again.
1802	32	10069	1004	8933	2712
1803	21	6799	476	6391	2092
1804 till 5th July	8	2258	245	2034	1665
1804 10th of October, to 1805 ditto	21	6513		5684	

Of which, 160 were exported to the Danish colonies, 270 to the Spanish colonies, and 85 to Honduras; in all 515.

The official value of the imports from Jamaica into Britain, and the exports to the island, were, in

	Imports.	Exports.
1809	*L.*4,068,897	*L.*3,033 234
1810	4,303,337	2.303,179

The following Table exhibits the total amount of exports of the chief produce of Jamaica for the years undermentioned.

Years.	Sugar.			Rum.		Ginger.		Pimento.		Cotton.	Coffee
	Hhds.	Tierces	Barrels.	Puncheons.	Hhds.	Casks.	Bags.	Casks.	Bags.	Bags.	Hhds
1793	77 575	6.722	612	34 756	879	62	8.605	420	9,148	13 029	3,983.576
1794	89 532	11.158	1,224	39 843	1,570	121	10,305	554	22,153	16,842	4.911.549
1795	88 851	9 537	1.225	37 684	1.475	426	14.861	957	20,431	17.766	6.318,812
1796	89,219	10 700	858	40,810	1.364	690	20,275	136	9.820	9,903	7.203 539
1797	78.373	9,963	753	28,314	1,463	259	29,098	328	2,935	——	7.931.621
1798	87.896	11.725	1,163	40.823	2.234	119	18 454	1.181	8 961	2.859	7.894.306
1799	101,457	13,538	1, 21	37,022	1.981	221	10 358	1.766	28 273	30,693	11.745 425
1800	96.347	13 549	1,631	37 166	1.350	444	3 580	610	12 759	——	11.116,474
1801	123 251	18,704	2,692	48,879	1 514	12	239	648	14.084	——	13.401.468
1802	129,544	15 405	2 403	45 632	2,073	23	2.079	591	7,793	——	17.961 923

The principal articles of export were, in

Years	Coffee Cwt.	Sugar. Cwt	Rum. Gallons	Pimento lbs.	Cotton. lbs.
1809	214 415	1.1 4.612	3 470 25[illegible]	2 2 9 367	886 748
1810	252.808	1,611,422	3,428,452	2.372.964	1.798,172

Gallons of rum imported into Great Britain, in the year ending 5th January 1812, 4,604,771; and in 1813, 3,763 281. Sugar imported in the year ending 5th January 1813, 1,455,954 cwt.

Ships belonging to Jamaica.

Years.	Ports.	Ships.	Tonnage.
1792	Antonio.	4	431
1805	Ditto.	2	58
1792	Kingston.	125	61[illegible]9
1805	Ditto.	44	3952
1792	Montego Bay.	48	3602
1805	Ditto.	44	1343
1792	St. Lucea.	3	3[illegible]3
1805	Ditto.	4	131
1792	Savannah le Mar.	7	221
1805	Ditto.	3	78

In the year 1807, the number of vessels that cleared out from the island, was—

	Vessels.	Tonnage.	Seamen.
For Great Britain . . .	242	63 471	7 748
For Ireland	10	1,231	91
For British America . .	66	6 133	449
For the United States .	133	13 041	4[illegible]3
For the Foreign West Indies	22	1.903	155
For Africa	1	109	8
Total	474	85 888	9.344

Progressive Population of Jamaica.

Years.	Whites.	Free People of Colour.	Slaves.
1658	4.500	—	1,400
1670	7 500	—	8 000
1734	7.644	—	86 146
1746	10 000	—	112 428
1758	17 947	—	176,914
1775	18,500	3 700	190 914
1787	30,000	10.000	250 000
1805	—	—	280.000

In the papers relative to the West Indies, ordered by the house of Commons to be printed, 12th July, 1815, there is much important information respecting the statistics of several of the parishes of Jamaica, in the year 1812, the substance of which we shall give, as we shall thus exhibit the latest official statement on this subject.

In Kingston parish, the number of slaves assessed was 6840; but it was supposed there were considerably more: the free blacks of colour amounted to 8000: the extent of the city and parish from east to west is six miles; from north to south one and a half.

In Vere parish, the number of whites was 359; of free people of colour 260; of slaves 14.359; and the number of acres 128.597.

In Westmoreland parish, the number of white men was 432, women 129, boys 70, girls 57—in all 688: persons of colour, men 158, women 266, boys 175, girls 191—in all 790; free blacks, men 47, women 65, boys 1, girls 6—in all 119. The number of slaves was 21,019; of stock 20.575; and of acres 185,113½. In this parish, the increase of slaves in 1809 was, males 181, females 174—total 355; and the decrease, males 226, females 195—total 421; making the actual diminution of males 45, and of females 21—total 66. In the year 1810, the actual diminution was, males 28, females 16—total 44.

In the parish of St Thomas, the number of white males was 369, females 49, children 16; of slaves 26.341. The births of slaves in the December quarter of 1807 was 176, the deaths 543. The number of free persons in 1812 was, males 207, females 142, children 114; the number of acres 143.475.

In the parish of St George, the number of slaves was 13 233; their increase by births above deaths from 1800 to 1807, both years inclusive, was 196. Of free persons of colour, there were, in 1812, adult males 63, females 97; male children 103, female 80; in all 343. Free blacks, males 4, females 28. The number of acres in this parish is 92.927¾. The number of negroes returned in the parish of St Anne, was 23 261. In Portland parish there were 7651. of which 3949 were males, and 3702 females. The white population amounted to 415, of which there were males 217, females 96; boys 53, and girls 49. The free persons of colour amount to 180, of which there were, males 73, females 58; boys 23, and girls 26. The extent of this parish is nearly 20 miles. In 1810, the births of slaves were 94, the deaths 89; increase 5.

In the parish of St David's, the white population amounted to 131, of which there were, males 116, females 10, and children 5. The free persons amounted to 29, of which there were, males 5, females 11, and children 13. The number of slaves was 7203. The births of slaves in the December quarter of 1806 were 58, the deaths 56; increase 2. The number of acres in this parish is 46,619.

The following Table exhibits the number of slaves, stock, and cultivated acres in all the parishes of Jamaica, in the year 1812, according to the return laid before parliament. The reader will observe that there is some difference, with respect to acres, between this Table and the previous statements, though both are taken from the same parliamentary papers.

Parishes.	Slaves.	Stock.	Acres.
St Andrew's	16 [illegible]70	5 181	83 427
St Anne	23,702	24 537	230.224
St Catherine	8 479	6,868	68.281
Clarendon	20,228	9 564	221,847
St David	7,203	2,208	50.834
St Dorothy	5.130	2 958	36 743
St Elizabeth	22,280	23 237	276.838
St George	13,400	3 710	93.100
Hanover	23,167	72[illegible]1	105.198
St James	24,970	6 628	127.743
St John	6,690	1.133	65,795
Kingston	5,370	6[illegible]4	1,786
St Mary	25 781	16.010	122,557
Portland	7.440	1,640	50,263
Port Royal	7.980	223	29.126
St Thomas in the East	26.291	5.374	143.475
Ditto in the Vale . .	11 973	2.5[illegible]3	78 029
Trelawney	27 950	6.380	173 768
Vere	14 359	4 691	109 946
Westmoreland . . .	21,109	12.769	85 413
	319 912	143 419	2.254,387

As the whole island is calculated to contain upwards of 4,000,000 acres, it appears from this Table that there is little more than half of it cultivated. Of the acres in cultivation, about 700,000 are under sugar lands, and nearly the same quantity in pasture.

The governor of Jamaica is appointed by the king, and can be recalled at pleasure; there is besides a council, and a house of assembly. The former is generally chosen by the crown from amongst the most respectable inhabitants; the members are twelve; they are *ex officio* justices of the peace, and form a privy council to the governor. The house of assembly consists of forty three members, who are chosen by the freeholders; every parish sends two members, except Spanish Town, Kingston, and Port Royal, which send three each. The electors must be white, of age, and possess a freehold of ten pounds per annum in the parish. The representative must possess a freehold of 300*l.* per annum in any part of the island, or a personal estate of 3000*l.* The supreme court of judicature, called the grand court, and combining the jurisdiction of the courts of king's bench, common pleas, and exchequer in England, is held in Spanish Town on the last Tuesday of February, May, and November. Assize courts are held every three months in Kingston for the county of Surrey, and in Savannah la Mar for the county of Cornwall.

The revenues of the island are perpetual and annual. The former were imposed by the revenue law of 1782; they amount to about 12,000*l.* per annum; the latter are occasional grants of the legislature. The principal taxes consist of a duty on negroes imported; an excise on rum, &c. a poll tax on slaves and stock; and a rate on rents and wheel carriages. The revenue generally amounts to about 300,000*l.* Jamaica currency.

There are nineteen beneficed clergymen in the island, each of whom receives 420*l.* per annum, subject to a deduction of 10 per cent for a widows' fund. Besides this stipend, there are surplus fees, which in Kingston, Spanish Town, and St Andrews, are very great; the last has also considerable glebe lands annexed to the living.

All white males, from the age of fifteen to sixty, are obliged by law to provide themselves with their own accoutrements, and to enlist either in the cavalry or infantry of the militia.

Besides the Spanish and Portuguese coins, which are current in the island, there is a small silver coin called a *bit*, of the value of 7½d. currency. One hundred pounds sterling amounts to one hundred and forty pounds currency.

Jamaica was discovered by Columbus in 1494; in 1509, it received a Spanish colony from Hispaniola; in 1655, all the establishments were abandoned, except St Jago de la Vega. This year it was conquered by the English under Penn and Venables. The first British colonists were 3000 soldiers, disbanded from the parliamentary army. These were soon followed by 1500 royalists. Till the restoration, the government was entirely military. On the surrender of the island to the English, the negro slaves of the Spaniards fled to the mountains; their descendants, called Maroons, committed great depredations till 1738, when a treaty was concluded with them, by which their freedom was secured, and 1500 acres of land granted to them. They remained peaceable till the year 1795, when a new Maroon war broke out; at first they were rather successful, but at last, by a more vigorous system of hostilities, and the introduction of bloodhounds from Cuba, with which they were threatened, though not actually attacked, they were driven to the mountains, and ultimately obliged to submit, on condition that their lives were spared. Soon afterwards, 600 of them were conveyed to Nova Scotia, where lands were granted to them.

See Beckford's *Descriptive Account of Jamaica*; Edwards' *History of the West Indies*, 2d edit. vol. i. Dallas' *History of the Maroon War*; Renny's *History of Jamaica*; Tuckey's *Maritime Geography*, vol. iv.; and *Parliamentary Reports and Papers on the West Indies.* 1807 and 1815. (J. S.)

IAMBIC Verse. See Prosody.

JAMES I. II. III. IV. V. VI. See the *History of* Scotland.

JANIZARIES. See Turkey.

Jan Seilan, or Junk Ceylon, is an island of Asia in the Bay of Bengal, situated on the west side of the Malay peninsula. It is separated from the continent by a narrow sandy isthmus, about a mile long and half a mile in breadth, which is covered at high water, and whereon spring tides rise 9 or 10 feet. This island is between 40 and 50 miles in length, about 15 in breadth, with good anchorage around its whole circuit, and it has an excellent harbour on the north, called Popra, besides others. Its name, Jan Seilan, is of uncertain etymology, and it is frequently called Junk Ceylon by Europeans.

The climate here is particularly agreeable, for the heat is moderate. Rains begin to fall gently in July, and continue until November, with frequent intermissions of fine weather, attended with cool north-east winds at night. There is no considerable river in the island, both from its size, and the hills being low; but several streams run through flat marshes of mangroves into the sea.

A great quantity of tin is obtained in this island, of which about 500 tons are exported yearly. The produce was greater formerly; but it seems to have been reduced by restrictions on the miner, who was obliged to carry all his ore to a Chinese smelter farming this privilege from the government. Besides paying 12 per cent. for smelting, the miner could only obtain the metal on having delivered a certain quantity of ore, though the extract exceeded what he received, and after all a duty of 25 per cent. was payable previous to exportation.

The interior of the island contains large plains of rice well cultivated, and hither the inhabitants can come up the creeks in their small vessels; but the skirts are kept in a state of nature, for the purpose, it is supposed, of obstructing the access of an enemy. Rice is the staple product; and of other vegetables there are oranges, limes, and most of the tropical fruits and roots. The wild animals are deer and hogs: the domesticated ones are elephants, and a few goats; but the islanders have neither horses, sheep, dogs, nor cats, and their common poultry is not numerous.

The population of the whole island has been calculated at 12 000. This number, however, must be dependent on a state of peace or warfare, and during the latter it is probably lower. The features of the people resemble those of the Malays, intermixed with a good deal of the Chinese aspect. They are well made, but rather slender; they speak the Siamese language, and in general understand the Malay tongue; and, like Europeans, they write from left to right. Unrestrained polygamy is practised, as every man marries as many women as he can afford to maintain; but it is the privilege of the first wife to rule the household. No woman is permitted to leave the country.

The inhabitants are distributed in towns and villages, of which 16 are named, but all of them are inconsiderable. Terowa, the chief town, situated on a creek, where a strong current runs, consists only of about 80 houses. A wooden pagoda, covered with palm leaves, stands here, which is served by about 20 talapoins or monks, who live in a state of celibacy, and dwell in small apartments adjoining to it. Their heads are shaved and uncovered: they wear a yellow garment, and carry a white rod in their hands, but it appears that they can resign their monastic vocation at pleasure. The governor of Jan Seilan has also a dwelling at Terowa, and another eight miles inland.

Tin is the principal export of the island, which formerly carried on considerable commerce with several Asiatic ports; but this has greatly decreased since the establishment of a British colony on Penang. Its exports, besides that metal, are elephants' teeth, biche demer, and sayhan. The imports are principally opium, a contraband article, for which there was a great demand about the middle of the preceding century; and after being carried in British vessels from Bengal, it was sold to the Malays and Buggess prows for the tin of the island. Hindostan piece goods, brass utensils of Java, European cloth and cutlery, were likewise among the imports. Commerce is injured, from a practice not unusual in the East, of the government or its officers being the principal dealers. Hence the king's merchant sometimes purchases a whole cargo on the arrival of a vessel, and immediately upon its being landed, retails it at a great profit. This impolitic interference restrains the competition and consequent advantages of unfettered commerce. The currency of the island consists of conic frustums of tin, of two or three pounds weight, with correspondent halves and quarters, which cannot be exported without payment of duty. Spanish dollars are the most acceptable money, but all kinds of Indian coinage pass current.

When the French had much interest at the court of Siam, one of the most powerful and brilliant of the East towards the latter part of the seventeenth century, they proposed to make a settlement in Jan Seilan. It is probable, that the benefit which would result from the presence of a commercial nation could be appreciated by a native of the Ionian islands, then prime minister of Siam, who was well acquainted with the trade and manufactures of Europe. But the history of this settlement, which we believe commenced in 1688 is not preserved; and it most probably terminated soon after the fall of that minister in 1689.

As this island is too small to maintain its independence, it must necessarily be controuled by the continental powers. It was long in the possession of the kingdom of Siam, and when visited by Captain Forest, in 1784, it was governed by a viceroy from that country, who had three associates or counsellors. Each of these officers had about sixty military retainers, armed with a musket and bayonet, sword and dagger, who, receiving little pay, lived in some respects on the community. The inhabitants being then dissatisfied with the imposts upon them, particularly with that which was laid upon their staple commodity, wished to shake off the yoke of Siam; but it is not known that they adopted any active proceedings. In the following year, 1785, the Birmans, who had for some time been extending their dominions, had gained so much territory on the continent, that, with the possession of Jan Seilan, they could have prevented the Siamese from any other channel of communication with India than the gulf of Siam. In order, therefore, to effect its conquest, they fitted out eleven ships of war at Rangoon for the conveyance of troops and warlike stores, while an army of 8000 men marched to Mergui, a port on the peninsula, for the purpose of co-operation. Having made a movement against the island in March, they attacked and carried the fort, which is situated on the east side, and found in it much valuable booty. But the governor, who had retired to the interior, rallied his forces, and compelled the enemy to retreat, after sustaining great loss. The Birmans, nevertheless, did not abandon their object, and after a long interval returned in 1810, when they effected the total conquest of Jan Seilan, and consigned the whole inhabitants to slavery in Pegu: At a still later period it continued to be the subject of contest between them and the Siamese. East Long. 94° 18′. North Lat. from 7° 46′ to 8° 9′. (*c*)

JAPAN.

The Japanese islands lie near the coast of Corea, on the eastern side of Asia, in the north Pacific Ocean, between 31° and 41° of N. Lat. and 129° and 142° E. Long.

The Empire of Japan is composed of an extensive cluster of islands, by much the largest and most important of which is called Niphon or Jepuen. This island is of a triangular form, and is upwards of 700 miles long, but does not exceed 80 miles in breadth. Adjoining to the south-west point of Niphon are Kiusiu or Saikoff, 140 miles long by 90 broad, and Sikoff, 95 miles long by 45 in breadth. The island of Jesso or Matzumay, on the north of Niphon, from which it is separated by the straits of Sangar, about nine miles in breadth, was conquered from its original inhabitants, the Ainos, and is now also included in the Japanese dominions; but, though larger than the two last, its dimensions are not mentioned by geographers. These are environed by other islands of inconsiderable size and note.

The discovery of this extensive insular power, abounding in natural and artificial resources, and of an overflowing population, does not reach farther back than the middle of the 16th century. It appears that we are indebted to the travellers Rubruquis and Marco Polo for the first mention of the existence of this country. Fernando Mendez Pinto, sailing in a Chinese junk from Macao to the Likeo islands, was wrecked on the Japanese coast, in 1542, and he accordingly has the merit of being the first European discoverer of Japan. Three other Portuguese dispute with Pinto this honour, pretending that they touched on the coast of Satzuma the same year; but luckily neither the year of discovery, nor the nation of the discoverer, is affected by this dispute. Japan was soon after visited by the Spaniards, and (what is a singular circumstance) their first visit, like the original discovery of the island, was owing to a shipwreck. The governor of Manilla, on his voyage from New Spain, being wrecked, in 1609, on the Japanese coast, was sent with his attendants by the Emperor of Japan to Acapulco. An embassy, withrich presents from the Spaniards to the emperor, followed in 1611. But all Christians being extirpated from his dominions, both Spaniards and Portuguese were excluded; nor has an intercourse been again attempted, although, from the vicinity of the Philippine islands, a commerce mutually advantageous might be expected. The Dutch, from their enterprizing spirit of trade, could not fail to regard Japan with a longing eye; and as no Europeans had acquired a permanent footing there, they were eager to push their commercial interests in that quarter. An accident favoured their views. In 1600 a squadron of five ships, which sailed from the Texel for the East Indies, was lost in the straits of Magellan, with the exception of one Dutch ship, steered by an Englishman of the name of William Adams, which reached the harbour of Bungo in Lat. 35° 30′. Adams was fortunate enough to ingratiate himself with the Emperor of Japan, who loaded him with presents, but would not consent to his returning home. The accounts he sent to Batavia, with the prospects he held out of a beneficial commerce between the two countries, induced the Dutch East India Company to dispatch a ship thither in 1609; and thus, through the intervention of an individual, are the Dutch indebted for their establishment at Japan. They are the only people that have contrived to retain the favour of the Japanese, who, under humiliating restrictions, permit them to carry on a trade, limited to the dispatch of two small ships anually from Batavia to Japan. Nearly about the same time, the English also, by means of their countryman Adams, had permission to build a factory on the island of Firando; but though they were well received, and allowed to traffic on advantageous terms, the trade was abandoned for reasons hitherto unexplained. The Dutch thus remained the only European merchants in Japan. In conformity with their policy, they endeavour to throw a veil of secrecy over the scene of their commercial pursuits, being probably apprehensive lest their transactions should be viewed in too strong a light. Notwithstanding this prohibition of intelligence, we have been furnished with full and pretty accurate details concerning the state of the Japanese islands. In addition to the corrected accounts transmitted us by Kæmpfer and Thunberg, Captain Krusenstern, who was selected by the present Emperor of Russia to carry the Russian flag for the first time round the world, and on board whose ship an embassy was conveyed to Japan, has given us valuable information about the Japanese coasts and harbours.

Although it appears that Japan has been visited for upwards of two centuries by different European nations, and the harbour of Nangasaky, one of the best in the world, has been annually frequented, yet no plan of it has been taken, nor have even the latitude and longitude been correctly ascertained, until it was explored by Krusenstern in 1804. The entrance of the harbour of Nangasaky is in 32° 43′ 45″ N. Lat. and 230° 15′ W. Long. in the middle of the bay of Kiusiu, which is formed by Cape Nomo to the south, and Cape Seurote to the north. The entrance bears 51 miles E. by N. from Cape Gotto in 32° 34′ 50″. It is necessary to ascertain correctly the true entrance; for, by steering on Cape Nomo, there is danger of being becalmed, or driven by the tides on the rocks, and of mistaking another entrance in Lat. 32° 40′, which has not been explored. The safest course is to keep midway between the Gotto islands and Kiusiu, steering N. E. until the parallel of the entrance, and then due east. The harbour contains three roads, all perfectly secure. The outermost is to the west of the island of Papenberg, the second in the middle to the eastward of the same, and the inner road at the bottom of the harbour in front of the city. The outer road is well defended from every wind but the N. W. and W. N. W. which, however, never blow very strong. The anchorage is excellent, over a bottom of fine grey sand, in depths varying from 33 to 18 fathoms. The middle road is surrounded on all sides by the land, and has better anchoring ground than the inner, but not so good as the outer road. From the middle to the inner road the course lies N. E. 40°, and the distance is about two miles and one-third, the depth of water decreasing gradually from 18 to 5 fathoms. About half way, where the channel narrows to 400 fathoms, are placed the imperial batteries, or Emperor's guard, as they are styled, a number of buildings without a single cannon. From the narrowness of the approach, the city of Nangasaky, if well fortified, could defy any assault; in its present state it would fall before a single ship of force. The anchorage here is not equal to either of the other roads, the bottom being a thin clay, and the S. W. channel open to the sea. Krusenstern was the only person, except La Perouse, who navigated the western coast between Niphon and the Corea; and although the state of the weather was unfavourable to his making observations, yet he appears to have reached the northern point of Jesso, the extreme limit of the Japanese empire, without much difficulty. Of the Japanese coasts it may be observed generally, that they are in most places rocky and precipitous, presenting a chain of bold promontories, deep bays, and rugged peninsulas, abounding with shoals and islets; the whole invested with a turbulent sea, whence the navigation is intricate and dangerous.

The climate of Japan is variable throughout the year. The heat of summer would be insupportable, were it not moderated by the sea breezes. The rainy months begin at midsummer, when abundance of rain falls, and to which is to be ascribed the fertility of the country. In winter, the wind blowing from the Arctic Ocean makes the cold severe. Snow falls in quantities, and is followed by intense frost. Hurricanes and earthquakes are not uncommon, and thunder storms also frequently occur. At Nangasaky, the thermometer was never in August higher than 98°, nor in January lower than 35°.

As the geography of Japan has not been fully illustrated, we can give but an imperfect account of the rivers, lakes, and mountains of this country. The largest river is said to be the Jodo, or Yodo, which rises from the great central lake of Oitz, and pursues a south-west course. The Ujin, Aska, and Oomi, figure in Japanese history. This last is said to have burst from the ground in one night. Over the Nogofa and Jedogawa are projected cedar bridges from 300 to 360 feet long. There are various other rivers, of which we know little except the name. The above mentioned lake of Oitz sends forth two rivers, and is said to be 50 Japanese leagues in length, but of inconsiderable breadth. Among the mountains are volcanoes, and in the province of Figo one constantly emits flame. The principal mountain is Fusi, which is covered with snow the greatest part of the year. But the courses of the different ranges have not been traced. Near the lake of Oitz is the sacred mountain of Jesan, said to be decorated with 3000 temples!

The Japanese islands are divided into provinces and districts, like other civilized countries. The face of the country of Japan is agreeably diversified by mountains, hills, and vallies, and is well watered with rivers and lakes, the general aspect presenting a soil cultivated with industry and freedom. Even mountains and hills form no obstacle to cultivation. Agriculture being in high estimation in Japan, it meets with the greatest encouragement from the government.* The chief produce is rice, barley and wheat being little used. A kind of potatoe is common, and several sorts of beans and peas, turnips and cabbage, abound. The rice is sown in April and gathered in November. The sides of the hills present a singular spectacle to the stranger, from the mode of cultivation which is adopted. Stone walls support level platforms sown with rice or roots; and thousands of these are scattered over the mountains, affording a favourable picture of the ingenuity and industry of the inhabitants. Though the space should not exceed two square feet, a stone wall is raised at the bottom, the inclosure filled with earth, and

* The farmer pays a considerable part of the produce as rent to his feudal chief, and is restricted only to one condition, viz. to have all his land in cultivation. Should he leave any part of his fields untilled, he forfeits the possession of that portion, which is occupied by another husbandman.

carefully sown with rice, or planted with esculent roots. As may be easily supposed from this sate of general cultivation, few forests are suffered to grow: these are confined to the sides of such mountains, probably, as can be subdued by neither agricultural labour nor skill.

There are no fences used in dividing the cultivated grounds in this country; and the fields often resemble kitchen gardens divided into narrow beds, which are separated from each other by a deep trench, nearly as broad as the divisions which are under crop. After a certain interval the trenches are filled up with earth, so as to be converted in their turn into beds, and give the soil a rest from constant bearing. In these beds the corn is sown sometimes lengthwise, but more commonly across; and after the crop is cut down, another kind of grain is sown in the same season, between the stubble of the old crop, so as to make the same field produce twice in one year. The greatest care is bestowed upon manuring and cleaning the ground. Every kind of substance which can be converted into manure is carefully collected; and, together with urine and foul water from the kitchen, is mixed up in a liquid state. It is then carried in large pails to the fields, and, by means of a ladle, it is poured upon the plant after it is about six inches in height. Irrigation also is much practised, wherever water can be procured in the vicinity of the fields. The weeds are so completely cleared away, that "the most quick-sighted botanist," says Thunberg, "would scarcely be able to discover a single plant of another species among the corn." The grain is frequently separated from the straw merely by beating the sheaves against a post or barrel; but is commonly threshed on straw mats in the open air by means of flails with three swingles. There are no pasture grounds among the cultivated tracts; and the few cattle used in the country are all fed in the farm-yards. Thunberg affirms, that the soil throughout Japan is naturally barren, and has been rendered so remarkably productive only by the labour and skill of the husbandman.

Japan abounds in rare and beautiful plants; and as there is a great similarity in the vegetable productions of China and this kingdom, no doubt from the vicinity of the two countries, they are mutually indebted to each other for an interchange of useful vegetables. The ginger, soy bean, black pepper, sugar, the cotton and indigo plant, though not indigenous, are cultivated with scccess, and in abundance, in Japan. Two sorts of mulberry grow; one which feeds the silk worm, and the other is manufactured into paper. It is said that the beautiful black varnish is produced from a gum which exudes from the bark of the rhus vernix. The citrus japonica, a species of orange peculiar to this country, is found in a wild state. But as the botany of Japan has been treated at length by Kæmpfer and Thunberg, our botanical readers are referred to them for particulars on this subject.

Gold, silver, and especially copper, are found in abundance in Japan, large quantities of which have been exported at various times by the Portuguese and Dutch. No mine can be opened without the permission of the emperor, who claims two-thirds of the produce, leaving only one-third to the proprietor for his expences. Iron is scarcer than other metals, and the Japanese will not allow it to be exported.

Sulphur is found in sufficient abundance, particularly in a certain island near Satsuma; and pit-coal is not uncommon in the northern provinces. Red agate, asbestos, porcelain clay, flesh-coloured steatite, pumice stone and white marble are also found in Japan; and there are several warm mineral waters, especially at Obamma and the mountain of Omfen, which are used by the natives in the cure of various diseases.

It is singular, that neither sheep nor goats are propagated in the Japanese dominions. The latter, and swine, are deemed destructive of cultivation. Horses are rare, and cattle still more so, these last being reserved solely for agricultural purposes. Buffaloes with a bunch on their backs are sometimes seen employed in drawing carts. The cows are very small in size, and are used rather for draught than for their milk or their flesh. Dogs are common in the domestic state, and are said to be kept from superstitious motives. Cats of various colours are to be seen in every house, and are said to be the general favourites of the ladies. The wolf is found in the northern parts, and foxes in different districts, but are regarded with peculiar detestation, as demons incarnate. Hares of a grey colour, and rats as in other countries, have been seen by travellers in Japan; and, in the least inhabited tracts, bears, monkeys, deer, &c. are reported to be found. The common kinds of poultry are reared in considerable abundance; and great numbers of wild geese frequent the waters between the islands, and other places at a distance from the towns or villages. Herons are seen following the ploughman in the fields; and the Chinese teal, the quail, the crow, pigeon, and bulfinch, were all observed by Thunberg. Serpents are said by the natives to be occasionally seen; but few of the amphibia are met with in the country. Fish, which are an important object to the Japanese, and a principal part of their subsistence, are very numerous around the coasts, especially salmon, perch, eels, shrimps, oysters, crabs; and the flesh of the whales, which are killed by harpoons, is sold in the markets as an ordinary article of food among the poorer people. Many curious shells, especially those that were of a small size and elegant shape, are collected by the Japanese, fixed with rice-glue upon carded cotton, and sold to the Dutch traders.

The original population of Japan has been little illustrated. The present Japanese seem to be a kindred race with the Chinese, having at the same time, according to Kæmpfer, a language radically distinct. Perhaps, in the earlier stages of society, as is observed by Pinkerton, the Japanese may have emigrated from China, and their complete insular separation may have given birth to a language rendered peculiar by the progress of a distinct civilization. The people of this nation are described by Thunberg to be well made, active, free and easy in their motions, and stout limbed, though yielding in strength to the northern inhabitants of Europe. The men are middle sized, and in general not corpulent, all over of a yellowish colour; in some brown, in others white predominates. The lower classes, from exposure to the sun, are brown, but ladies of distinction, who seldom go abroad uncovered, are perfectly white. The discriminating mark of the Japanese, as of the Chinese, is the eye. This organ wants its characteristic rotundity, being oblong, small, and sunk deep in the head, whence these people have the appearance of being pink-eyed. The colour of their eyes, however, is dark brown, or rather black; and the eyelid forming a deep furrow, makes the Japanese look sharpsighted. Their head is in general large, their neck short, and their hair black, thick, and shining from the use of oils.

They are said to be an intelligent and provident people, inquisitive and ingenious, frugal and sober, friendly and courteous, frank and good humoured, upright and honest, brave and unyielding, capable of concealing and controlling their feelings in an extraordinary degree; but distrustful, proud, unforgiving, and revengeful.

The usual dress of the Japanese is a short upper garment with wide sleeves, and a complete gown underneath, fastened round the neck, and reaching quite down to the feet; the dress much resembling that of European females, except in being more confined from the hips downwards, which produces great embarrassment in walking. But this exercise is seldom resorted to by a Japanese, except from compulsion. The rich are clothed in silks, the poor in coarse woollen stuffs. The upper garment is generally black, the under dress is of mixed colours. Every one has his family arms, about the size of a half dollar, wrought into his clothes in different places, a practice common to both sexes. Thus persons of a particular family may be easily recognized. A young lady wears her father's arms till after marriage, when she assumes those of her husband. The greatest honour a prince or governor can confer is, to present a cloak with his arms upon it; and the person who is thus honoured puts his own arms upon some under part of his dress. In winter they wear five or six dresses over each other; but though the weather is bad in January and February, they use neither cloth nor furs in their apparel. Instead of shoes they have soles merely of straw, fastened to the great toe by a loop, and these are taken off when they enter a room. Although they have their heads half shorn, they are regardless of a burning sun, or piercing cold. They do not use parasols in sunshine, nor umbrellas in rainy weather; but in travelling, conical caps, fans, umbrellas, and cloaks of oiled paper, are very commonly used. The toilets of the Japanese must occupy a considerable share of attention, as they are very particular in anointing and dressing their hair, which is collected in a tuft on the crown of the head. Small pincers are employed to pluck out the hairs on their chin, and these, with a small metal looking mirror, are found in the possession of every Japanese. They cannot be denied, Krusenstern observes, to study great cleanliness of person, although they make no use of linen; and this appears a governing propensity of the Japanese of every rank. Hence, in almost every house, a bath forms an essential part of domestic arrangement and comfort. But in one respect their customs are extremely offensive. The privies, which are also indispensable in every house, are all built towards the street or road, and open outwards, exhibiting large jars sunk in the earth, to receive every kind of ordure and refuse. Hence the stench is insupportable, and the putrid exhalations, as Thunberg affirms, injurious to the eyes of the natives.

In Japan the houses are of wood, never exceeding two stories, the upper one consisting chiefly of garrets and lumber rooms. Though the house is commodious, it consists in general of one room, capable, by moveable partitions and screens, of being divided into apartments. Neither tables nor chairs are used, the people sitting squat on straw mats, in which position they eat their food.

The diet of the Japanese is composed of a greater variety of articles than that of any other people in the world. Not contented with the numerous kinds of wholesome and nutritive food supplied by the produce of their lands and waters, they contrive, by their modes of preparing their victuals, to render the less valuable, and even the poisonous parts of animal and vegetable substances useful, or at least harmless articles of subsistence. Their meats are cut into small pieces, thoroughly stewed or boiled, and always highly seasoned with strong spices and sauces. At their meals, the company are seated on the floor-mats, with a small square table before each person, whose portion is served up in neat vessels of porcelain, or of japanned wood, which are tolerably large basins, always furnished with lids. The guests salute each other with a low bow before they begin to eat; and, like the Chinese, take up the food by means of two small pieces of wood, held between the fingers of the right hand, and used with great dexterity, so as to pick up the smallest grain of rice. Between each dish they drink warm sacki, or rice beer, out of shallow saucers, and at the same time occasionally take a bit of a hard boiled egg. Some of the most common dishes are fish boiled with onions and a kind of small beans, or dressed with oil; fowls, stewed and prepared in numerous modes; and boiled rice, which supplies the place of bread for all their provisions. Oils, mushrooms, carrots, and various bulbous roots, are used in making up their dishes. Tea and rice beer are the only liquors used by the Japanese; and it is with difficulty that they can be persuaded to taste wines or spirits. The sacki, or rice beer, heats and inebriates when taken to any extent, but the intoxication which it produces passes off speedily. Tea, which is always ready, is the usual beverage for quenching thirst. It is customary to eat three times a day; at eight o'clock in the morning, two in the afternoon, and eight in the evening. The women eat by themselves, apart from the men. The practice of smoking tobacco, which is supposed to have been introduced into Japan by the Portuguese, is very common with both sexes. Their pipes are very short, seldom more than six inches in length, and scarcely contain half a thimble full of tobacco. The stem is made of lackered bamboo, and the mouth-piece and bowl of copper. They are smoked out by a very few whiffs, and require to be repeatedly filled. The apparatus used by persons of distinction consists of an oblong box, about eighteen inches in length and a foot in breadth, of a brown or black colour, which contains, besides pipes and tobacco, three cups; one, which is lined with brass, for holding a live coal to light the pipe, another to receive the ashes of the tobacco, and a third to serve as a spit-box. At visits, this apparatus is the first thing that is placed before the guests, and is sometimes carried by a servant to places where tobacco is not expected to be presented. The poorer classes have their tobacco pouch and pipe slung to their girdle by a silken cord.

Polygamy is allowed in Japan, as in other Asiatic countries; though, in general, all but one female, who is acknowledged a wife, are merely regarded as concubines. This, of course, applies to the higher classes; the poor can only maintain one woman. The husband here, as in all eastern countries, exerts a complete despotism, but the wives are not so closely shut up as in China. Married women distinguish themselves in some places by painting their teeth black, and in others by pulling out the hair of their eye-brows. They are known also by wearing the knot of their girdle before, while others have it behind. Marriages are solemnized in the open air, in the presence of the priests and relations of the parties, without much pomp or solemnity. The bridegroom and bride advance together to an altar, erected for the purpose, with a torch in their hands, and while the priest reads a form of prayer, the latter having lighted her torch at a burning lamp, holds it out to the bridegroom, who lights his torch from hers. The guests then congratulate the new married couple, and the ceremony is concluded. The suitor makes a present to the father-in-law before obtaining his daughter; so that the more daughters a man has, and the handsomer their persons, so much the richer is he esteemed. The women often paint their lips with a violet colour; and are described by Thunberg as not remarkable for modesty. Nor are they the less esteemed for having served in the public brothels, establishments which are found in every town and village.

The bodies of persons of distinction are burned, while others are interred. The funeral pile is erected in a small house of stone fitted for the purpose, and provided with a chimney. The body is brought thither, accompanied by men and women, and attended by a numerous train of priests, who are continually occupied in singing. Upon reaching the place for burning, one of the priests sings the eulogy of the deceased, and having thrice waved a lighted torch over the body, throws it away. It is then picked up by one of the children, or other relatives of the deceased, and applied to the funeral pile. The ashes are carried away in a costly vessel, and preserved for some time in the house, but afterwards are buried in the earth. Those who are not burned are inclosed in a wooden chest, and let down into a grave in the customary manner. Fragrant spices are cast into the grave, and flowers planted on the earth which covers it. The surviving relatives visit the tombs of their friends for many years after their death, and sometimes during the whole of their lives, besides observing, as in China, the feast of lanthorns in honour of the dead.

In every superstitious country, we find the celebration of festivals attended by a relaxation of public morals, but in Japan a salutary check is imposed upon an abandonment to licentiousness by a wise regulation, prohibiting the celebration of national feasts for days successively. In conformity with this law, the feast called Kermes is held on the 11th, 13th, and 15th days of October. Krusenstern mentions a feast celebrated on the 1st of April called Mussume Matzury, on which occasion parents present dolls to their children. Trifling as the object of this festival appears, the Japanese seem to regard it otherwise, as they gravely requested the suspension of the work of the ship carpenters ashore during its celebration, which consists in dances, dramatic representations, and magnificent processions. The usual holidays in Japan are the first day of every month, when they rise early, dress in their best clothes, and visit their superiors or friends to wish them joy of the new moon; the fifteenth day, when the moon is at the full; and the twenty-eighth day, or the day before the new month. Besides these monthly festivals, they celebrate five others which happen only once in the year, namely, the first day of the new year; the third day of the third month; the fifth day of the fifth month; the seventh day of the seventh month; and the ninth day of the ninth month. These, which are all uneven numbers, are regarded by the Japanese as unlucky days; and, therefore, laying aside all business, they are dedicated to mirth and mutual congratulations. On some of these days, in preference to ordinary days, they choose to celebrate their nuptials, and to give their entertainments. Their amusements on these occasions consist chiefly in dramatic representations and dances. In their theatres, the spectators sit on benches fronting the stage, which is a little elevated, but so small and narrow as seldom to allow room for more than one or two actors at a time. They generally represent some great exploit or love story of their divinities and heroes, which are frequently composed in verse, and sometimes accompanied with music. No machinery or decorations are brought forward; but the chief part of the amusement seems to consist in the frightful dresses and uncouth contortions of the actors. The dances at private entertainments are performed by young women and boys hired for the purpose, who exhibit a variety of pantomimical gestures and evolutions, expressive of some heroic action or love intrigue, regulating their steps at the same time by the music.

The most prevalent religious sects in Japan are those of Sinto and Budsdo. That of Sinto, which is the most ancient, though its adherents are now least numerous, is conceived to have originated from Babylonian emigrants, and to have been originally very simple and pure in its tenets. Its followers acknowledge a Supreme Being, who inhabits the highest heavens, and who is far too great to require their worship; but they admit a multitude of inferior divinities, who exercise dominion over the earth, water, air, &c. and have great power in promoting the happiness or misery of the human race. They have some conception of the soul's immortality, and believe that a happy abode immediately under heaven is assigned to the spirits of the virtuous, while those of the wicked shall be doomed to wander to and fro under the firmament. Their practical precepts are directed to inculcate a virtuous life, and obedience to the laws of the sovereign. They abstain from animal food, and are reluctant to shed blood, or even to touch a dead body. Their churches contain no visible idols, nor any representation of the Supreme Being, but sometimes a small image is kept in a box, to represent some inferior divinity, to whom the temple is consecrated. In the centre of the temple is frequently placed a large mirror, made of well polished cast metal, which is designed to remind the worshippers, that in like manner as their personal blemishes are therein displayed, so are their secret evil thoughts exposed to the all-searching eyes of the immortal gods. The worshippers approach these temples with great devotion of manner, and with the most scrupulous attention to cleanliness of person and apparel. Advancing reverently to the mirror, they bow themselves to the ground, prefer their prayers, present their offerings, and then repair to their amusements. The Kubo professes himself to belong to this sect, and is bound to make a visit annually in person, or by an ambassador, to one of their temples, to perform his devotion, and present gifts.

Budsdo's doctrine was brought originally from the coast of Malabar, and is considered the same with that of Budha in Hindostan. Passing from China into Japan, it became blended with that of Sinto, and gave birth to a monstrous mixture of superstitions. Its peculiar tenets are, that the souls of men and of beasts are equally immortal, and that the souls of the wicked are condemned to undergo punishment and purification, by passing after death into the bodies of the lower animals. There are many other sects, very opposite in their tenets and observances; but they are said to live together in great harmony, or rather to share in all their mutual superstitions. The Dairi, or ecclesiastical sovereign, seems to be the general head of all those different sects, and appoints the principal priests throughout the country. Every sect has its respective church and peculiar idols, which are commonly remarkable for their uncouth and hideous form. Thunberg mentions one colossal wooden image, which measures ten yards across the shoulders, and affords room for six men to sit upon its wrist. The inferior divinities are innumerable, as almost every trade has its tutelar god; and in one temple not less than 33,333 are said to be ranged around the supreme deity. The temples are commonly built in the suburbs of the town, on the most elevated and suitable spots, to which are frequently attached beautiful avenues of cypress trees, with handsome gates. The idols are usually exhibited upon an altar surrounded with flowers, incense, and other decorations. They are filled with the lower or secular priests, who attend to keep them clean, to light the lamps and fires, to present the flowers and incense, and to admit worshippers at all times of the day. Even strangers are allowed to enter, and sometimes to lodge in the temples. To some of the more noted churches it is common to perform pilgrimages, especially to the temple of Tsie, the most ancient in the empire, and almost completely decayed with age, notwithstanding the utmost care to preserve its ruins. Its sole ornaments are a mirror, denoting that nothing can be hid from the supreme being, and slips of white paper hung round the walls, to signify that nothing but what is pure should approach his presence. To this place the emperor must send an ambassador on the first day of every month, and every individual must make a visit, at least once in the course of his life. Such a pilgrimage, besides its general merit, is rewarded with an indulgence, or remission of sins for a whole year. There are also in Japan orders of monks or nuns; one of which consists of blind persons, a kind of beggars dispersed over the empire, and another, called monks of the mountain, are a species of fortune tellers and quack-doctors, who are bound to live on roots and herbs, to practise constant ablutions, and to traverse deserts and mountains once in the year. There are likewise several philosophical sects in the country, who disclaim all external worship; one of the most celebrated of which adopts the tenets of the Chinese Confucius, and resembles in its general principles the ancient school of Epicurus. Its followers acknowledge a kind of *anima mundi*, but limit the existence of man to the present life; and inculcate the general practice of virtue, but allow and even applaud the commission of suicide. Almost immediately after the discovery of Japan by the Portuguese, the Christian religion was introduced into the country by the Jesuit missionaries in the year 1549; and made such rapid progress, that several princes of the empire were soon ranked among its converts, and about the year 1582, a public embassy was sent from the Japanese court with letters and valuable presents to the Roman pontiff. But the Portuguese who had settled in great numbers in Japan, intoxicated by the extent of their commerce, and the success of their religion, became so obnoxious to the natives by their avaricious and domineering conduct, that the representations of the heathen priests became at length sufficiently powerful to procure a prohibition from the emperor against the new religion, which threatened to overturn all the ancient institutions of the country. A violent persecution was commenced against the Christians, of whom 20,000 are said to have been put to death in the year 1590. Still did the number of proselytes continue to increase, and in 1591 and 1592, twelve thousand were converted and baptized. One of the emperors, named Kubo Fide Jori, with his whole court and army, embraced the Christian name; and had the Portuguese settlers in the country acted with ordinary prudence and gentleness, their cause must have triumphed; but the insolence of some of their prelates to some prince of the blood became so insupportable, that a new persecution arose in the year 1596, which was carried on without intermission for the space of 40 years, and ended in the year 1638 with the total extermination of the Christians, and the banishment of the Portuguese from the country. The Japanese government, considering the unwarrantable conduct of these settlers to be inseparable from their principles as Christians, have persevered in the enforcement of the most efficacious measures to prevent their re-introduction into the country; and in order to detect any concealed adherent of these proscribed sentiments, all persons are required to prove their freedom from such heresy, by publicly trampling, at the festival of the new year, upon the images of the Catholic saints.

The form of government at present in Japan is pure despotism, to the exclusion of pontifical interference in the executive part. But as the Dairis, or spiritual monarchs, reigned through a long period of hereditary succession, we can only account for the ascendency of the secular princes, by supposing that the former, resigning themselves to the more congenial and pleasing cares of religion, held the reins of government with a feeble hand. This change was effected not without bloodshed and commotion. The veneration with which the Dairi are still regarded resembles the honours paid to the gods themselves. His person is considered as too sacred to be exposed to the air and sun, and still less to the view of any human creature. He never passes beyond the precincts of his court; and if he is at any time under an absolute necessity of going out of his palace, he is generally borne on men's shoulders that he may not touch the earth. His hair, nails, and beard, are never suffered to be cut or cleaned, unless by stealth, and while he is asleep. He never eats twice from the same plate, and all the vessels once used in his meals, which are purposely of an inferior kind of porcelain, are usually broken to pieces, that they may not be profaned by unhallowed hands. His attendants are, with few exceptions, selected from his own kindred; and beyond the precincts of his court few persons know even his name till long after his death. Since the retrenchment of his power he derives his revenues from the town and district of Miaco, from an allowance out of the Kubo's treasury, and from the large sums which he acquires by conferring titles of honour. This ecclesiastical court is likewise the principal seat of literature, and may be considered as the only university in the empire. The students are maintained and instructed at his expence in the history of the country, mathematics, poetry, music, &c. The Kubos, or secular emperors, now reign in hereditary succession. Each province of the empire is governed by a prince, who is responsible to the emperor for his administration. He enjoys the revenues of his government, keeps his court, and defrays all the civil expences. Such an order of things appears to us only safe against turbulence and faction by powerful checks. Perhaps it is secured in Japan by mutual jealousy, and the impressions of unlimited submission to the emperor, a feature of character peculiarly Asiatic.

Thunberg informs us, that the laws of Japan are few, but rigidly enforced, without regard to persons. We have little acquaintance, however, with the Japanese code. We are told that most crimes are punished with death, and that none may incur this from ignorance, a brief code in large characters is posted up in every town and village, and regularly read in the temples. This, however, respects rather the crimes prohibited than the penalties annexed, which are said to be in some cases purposely kept unknown, and this uncertainty they affirm to have a salutary effect in deterring offenders.

The Japanese have been celebrated for their proficiency in the arts and sciences. Perhaps the safest standard of comparison, in this respect, will be their neighbours the Chinese. They excel in manufactures of silk and cotton. Their swords are of curious workmanship. Their varnish is well known as inimitable, but for this they are chiefly indebted to the vegetable from which it is made. The Japanese cultivate music, painting, drawing, geography, astronomy, and history. They are totally unacquainted with anatomy, and have no farther knowledge of natural philosophy and chemistry than a few notions gathered from European physicians. Their surgery consists almost entirely in burning pellets of moxa (or the leaves of mugwort rubbed soft like cotton) upon the place which is supposed to be the seat of disease; and thus forming an issue, which is kept open for some time. They also puncture with a silver needle where pains are felt. Krusenstern mentions that one of the talks, (or interpreters of the Dutch language) knew that Teneriffe belonged to the Canary Islands, and St Catharines to Brazil, from which we may conclude that they are no despicable geographers for Asiatics. Their drawings, we suspect, may challenge competition with those of China, like them, bidding defiance to perspective; and so scrupulous are they in copying from originals, that ugliness meets with no flattery from their portrait painters. Though we are not acquainted with the exact extent of their astronomical knowledge, we know that there is a set of people, called Issis, inhabiting temples near Jeddo, who foretel eclipses of the sun and moon. Their predictions are inserted in calendars, of which two sorts are published annually at Jeddo, one complete for the rich, and another abbreviated for the poor. Their art of printing is confined to the use of blocks, with which they impress only one side of the paper. Schools generally abound, and corporal punishment, it is said, is not introduced into their system of education. Their children are stimulated to emulation, and worthy achievements, by the recital of songs in praise of their deceased heroes. A few of the more studious acquire the Chinese language, and some of the physicians are able to understand the Dutch, and even the Latin. They have some knowledge of engraving; and are tolerably versed in the practical part of surveying, so as to possess pretty accurate maps of their own country and its towns. Their artificers work very skilfully in iron and copper, and in a mixture of gold and copper, called sowas, which they have the art of staining black or blue by means of their ink. They excel in the fabrication of steel instruments, and their swords are of incomparable proof. They are acquainted with the art of making glass, and grinding it for telescopes; with the construction of watches, which they learned from their European visitors; and with the manufacture of paper from the bark of the mulberry tree. Their silk and cotton stuffs are equal, and often superior to similar productions of other eastern countries; and their laquering or varnishing in wood surpasses all the attempts which have ever been made in that department by any other people in the world. This varnish is made from the juice of the rhus vernix, which, upon its first exuding from the tree, is of a lightish colour, and of the consistence of cream; but the surface exposed to the air immediately becomes black. It is of so transparent a nature, that when it is laid unmixed upon boxes, and other articles of furniture, every vein of the wood may be clearly seen. But they make it of various colours, especially black or red, by mixing it with powdered substances of these colours. They apply it with a brush; and with as smooth a surface as possible; and when well dried in the sun it becomes harder than the board on which it is laid. It is then rubbed with a smooth stone and water, till completely polished, when it is covered with a mixture of turpentine oil. This varnish flies and cracks like glass when struck with a hard substance; but is capable of being exposed to boiling water without receiving any damage.

Jeddo, the capital city, is situated in a bay on the south-east side of the island of Niphon. As Europeans have little freedom here, no accurate idea can be formed of its extent. A large river runs through it. The emperor's palace and its appendages compose of themselves a town. It may be included among metropolitan cities of the first class, in point of size. Miaco, the second city of the empire, stands inland about 160 miles south-west of Jeddo. It is the first commercial and manufacturing city in these dominions. Here is fixed the Dairi's palace and court, whence Miaco may be considered the seat of the arts and sciences. Its population has been rated at about 400,000 souls, and that of the capital at half a million. We do not vouch for the accuracy of this computation. There are from 30 to 40 other cities, of which the greatest part are flourishing, and of considerable extent.

The imperial palace, and edifices of the nobility, seem almost to rival in splendour those of China. The saloon of the hundred mats is 600 feet long by 300 broad. Cedar, camphor, and other precious woods, are employed in the pillars and ceilings.

The public roads are constructed and kept with great care. They are made very broad, with a ditch on each side to carry off the water; and are frequently bordered with hedges, which sometimes are formed of the tea-shrub. Posts are regularly erected to indicate the miles, which are all measured from the capital, and also to direct the traveller at every cross road. At the time when the princes of the country make their annual journey to the court, the roads are freed from every kind of dirt, sprinkled with water in hot weather, and sometimes even swept with brooms. In travelling on these roads, it is the rule for all who are going towards the capital to keep to the left, and for those who move in an opposite direction to take the right; or rather for each passenger to keep always to the side on his left hand. The roads are more easily preserved in so good a state, as no wheel-carriages are used in the country for travelling, except a few carts near the capital, which are confined to one side of the highway; and the horses are commonly provided with straw covers to their feet, instead of iron shoes. The poorer class travel on foot, and others either on horseback or in palankeens. Several persons, and sometimes a whole family, are mounted on one horse. In such cases, the man sits on the saddle with his legs extended forwards on each side of the horse's neck, and the rest of the party are carried in baskets on each side, while a person walks before to lead the animal. The palankeens, or Kangoes and Norimons, as they are called in Japan, are of various sizes; but the better kind are so large, that the traveller may lie down, or sit at his ease, on stuffed mattrasses and cushions. There are windows in the sides, and various conveniences within these vehicles. The pole by which they are carried passes along the roof, and is borne on the shoulders of the bearers, who generally keep time by a song, and travel at the rate of a league in the hour, or ten leagues in the day. When any of the grandees is going to court through the streets of the capital, it is the fashion for his bearers to carry the pole aloft on their hands, and to move at the utmost speed in their power.

As we have no certain data on which to estimate the population of the Japanese, empire, we feel more at a loss on this branch of our subject than any other. Some hold China to be a fair standard of reference for Japan, and accordingly assign 30,000,000 as the proportionate amount. Others are content to rate the population at little more than half of this estimate; yet, as all travellers agree in stating that an overflowing population is seen moving about the streets and highways, we must reckon Japan one of the most populous countries, in proportion to the extent of surface, in the world. The same difficulty occurs in stating the military force of the kingdom. Some compute the army at 400,000 men, we know not how correctly. According to our ideas of a navy, the Japanese may be said to have none! The arms of the military consists of bows and arrows, scymitars and halberts. Their bows are large, and the arrows of great length; and the soldier, in discharging them, places himself with one knee upon the ground. The scymitar is their chief weapon, and is worn by all except the peasantry. The blade is about a yard in length, and slightly curved; so excellently tempered, that they are said to cut a large iron nail asunder, without their edge being turned, and are considered by the Japanese as the most valuable part of their property. They make little use of fire-arms, and the few muskets seen in the contrary appear to be chiefly employed in salutes. Of military tactics they are entirely ignorant; but courage, fortitude, and love of their country, have hitherto sufficed to preserve their independence, and to repel more than one foreign invasion of their territories.

The revenues yielded by the different provinces are stated to amount to 2834 tons of gold, or (at 10,000*l.* sterling per ton), to 28,340,000*l.* sterling. The emperor, however, only benefits by the revenue of the five provinces of his own fief or government. But, as before mentioned, he is entitled to two-thirds of each mine that is opened; and he is said to possess a large treasure, disposed in chests containing each 1000 taels.

From the genius of their government, and jealousy of foreign interference, it does not appear that the Japanese have any external political relations. Their most natural allies would be the Chinese; yet it is certain that they do not treat even the Chinese merchants, who frequent the harbour of Nangasaky, with much ceremony and respect; and the Dutch at Japan seem to be reconciled to mortification, without gaining any adequate compensation by traffic. Though these last have been established at Japan about two centuries, their trade has declined, instead of having increased; and as we have no right to infer want of vigilance on the part of the Dutch in watching over their commercial interests, we must suppose, either that they have nothing to offer the Japanese worth their acceptance, or that these latter are not to be seduced, by any means, to make an inconsiderate surrender, or depart from their maxims of state. When we reflect how often the independence of nations is sacrificed to commercial toleration, we must give the Japanese rulers credit for great prudence in their councils. The chief articles which the Dutch carry to Japan are bullion, European cloths, silks, spices, printed linens, sugar, sapan wood, tin, ivory, tortoise-shell, horns of the sea unicorn, which last is highly valued by the Japanese as a medicine. But, as before stated, they are restricted to the dispatch of two ships annually from Batavia. The cargoes of 13 ships between 1784 and 1793 inclusive, amounted to 3,534,521 florins. The returns made from Batavia to Japan during the same period, which consisted principally of copper and camphor, amounted to 2,764,879 florins.

The Chinese send annually 12 ships from Ningpo, (or Simfo, as it is called by the Japanese,) five of which arrive in June and sail in October; the other seven arrive in December, and sail in March or April. They import chiefly sugar, ivory, tin plates, lead, silk stuffs, &c. They export copper, camphor, japanned wares, gold thread, buffalo horns, sowaas (an artificial metal) painted and coloured paper, umbrellas, and particularly the dye-fish, used as a medicine in China. Besides these, a kind of sea plant, and large dried mussels, called *awaby*, considered a great delicacy. Each Chinese vessel, or junk, being about equal to a ship of 400 tons, it would appear that their cargoes must be very considerable; yet Krusenstern remarks, that two ships of 500 tons each might stow away what is conveyed in all the twelve.

Kæmpfer has divided the Japanese history into three epochs, the fabulous, the doubtful, and the certain. The first reaching beyond the Mosaic æra of the creation, our acquaintance with it must be particularly unprofitable. The second, being mixed with the Chinese history, and from the admission of Chinese symbols, demonstrates that Japan, in the earlier stages of society, was connected with China, and tends to fix a common origin. The certain period begins with the hereditary succession of the Dairis from 660 years before the Christian æra, to the year of our Lord 1585. In the reign of Gonda, the 90th Dairi, Japan was menaced by a great invasion from the Monguls, the invading fleet and army, amounting to 240,000 men, being dispersed and almost annihilated by a furious tempest, the Japanese piously ascribed their deliverance to the interposition of the gods. In 1585, the generals of the crown, or Kubos, assumed the supreme power, and these continue to reign uncontrolled, the Dairi having his separate court at Miaco, and presiding over the religious and literary concerns of the empire.

We shall present our readers with some account, (for which we are indebted to Krusenstern,) of the reception of the Russian embassy by the Japanese; this relation may serve both to amuse the reader, and to illustrate the national character. Notwithstanding the national character for jealousy of the arrival of strangers on its coast, yet the Russian ambassador seems to have expected a favourable result to his mission. From the extent and contiguity of the Russian dominions, his excellency seems to have flattered himself that the offer and assurance of friendship of a powerful monarch would meet with a distinguished reception. But we cannot blame the policy, which viewed with jealousy and distrust the interference of so formidable a power as Russia in commercial pursuits. Whatever the arguments and motives of the Japanese politicians were, the Russian mission failed completely in its object, and even the permission formerly obtained, of sending a ship annually to Nangasaky, was recalled. Krusenstern is pretty liberal of abuse and sarcasm on the closeness of Dutch policy at Japan. It was not to be expected that the Dutch would favour the views of the Russian ambassador, or assist in opening a door of commercial competition to his nation. His excellency the counsellor of state and chamberlain Resanoff, the Russian ambassador, and an adequate suite, arrived in the ship Nadeshda, in the harbour of Nangasaky, in October 1804. On the arrival of the Nadeshda, the first step resorted to by the Japanese was, the depriving the ship of its powder and fire arms, even to the officers fowling-pieces. This measure was defended on the principle of national etiquette, the subjects of a foreign power not being allowed to go about armed in his Japanese majesty's dominions. But whatever the mortification and feelings of the ambassador were, their situation appears to have been particularly irksome to Krusenstern and his crew. At first they were prohibited from going ashore, and even from rowing about.

At length, after six weeks negociation, and on the plea of the ambassador's health, a spot was assigned as a walk, not exceeding 100 paces in length and 40 in breadth, in the immediate vicinity of which were two watch-towers. A debarkation of a single boat was attended by a fleet of 10 or 15 vessels surrounding it; in the same manner the boat was escorted back to the ship. So strict were the Japanese, that the Nadeshda was debarred intercourse with the Dutch ships, and letters were not even allowed to be sent by them to Batavia. The ambassador alone was permitted to transmit a report to the Emperor of Russia, translated by the interpreters into Dutch with such scrupulous accuracy, that every line of the translation terminated with the same letter as the lines of the original. This copy was deposited with the governor. On the departure of two Dutch vessels, Krusenstern having wished the captains a happy voyage, and made enquiries after their health, received in reply a sign with their speaking trumpet. For this silence, the chief of the Dutch factory apologised by letter to the ambassador, on the grounds that the captains had been forbidden to utter a word. Here our author breaks forth into a violent philippic against the Dutch, for their mean and servile compliance with Japanese prejudices yielded in the true spirit of gain;

and though Krusenstern may write under the influence of pique, we do not dissent from the justice of his observation, that such conduct is unworthy of the character of an enlightened and great nation. The important point being at length settled, of the ambassador having permission to land, a considerable building, called Megasaky, was appointed for his residence, and watched with as much care as the seven towers of Constantinople. The situation of his excellency's quarters appears to have been selected with a remarkable regard to security. The building was placed on a neck of land, so near the sea, that at high water the tide came close to the walls. The windows were armed with double lattice work, and consisted of spaces about a foot wide, calculated to admit a very moderate allowance of light. The whole habitation was secured by a bamboo fence, even on the sea side, the waves being deemed but an insufficient barrier by the Japanese. Large gates, with double locks, at which were stationed porters to take charge of the keys, and who seem to have executed their trust with troublesome fidelity, were placed on the land and sea sides. Besides, guards watched the spot, who did not slumber on their posts. Though our author expatiates on this barbarous intolerance of the Japanese, yet he does them the justice to admit, that such materials as he required for the repair of the ship were readily granted. The supply of provisions was also liberal to the ship's company. The landing of the Russian ambassador on the 17th December, was attended with circumstances of considerable pomp and ceremony. The Prince of Fisen's boat, a barge surpassing in size and magnificence every thing of the sort, (being 120 feet long,) was destined for the reception of his excellency. The walls and ceilings of the numerous cabins were varnished in the handsomest manner, and the stairs of red wood so highly polished, as to have the appearance of lacquer. On the decks were spread mats and the most costly carpets; and the whole boat was hung round with double rows of various coloured silk. On the ambassador stepping on board, the Russian imperial standard waved with the flag of the Prince of Fisen, whose guard took their station close to the standard. The Japanese fortresses were decorated with new flags and curtains, and manned by troops in their best dress. An innumerable fleet of boats accompanied the ambassador to the town of Nangasaky. So far his excellency was ushered into his Japanese majesty's dominions in a manner suitable to the representative of a powerful monarch. But he had no sooner landed and entered into his dwelling, than he was locked up like a state criminal, and the keys were sent to the governor. The day after the ambassador left the ship, two Banjos, accompanied with a great number of boats, came on board to receive the presents. Two boats lashed together, with a platform of strong planks laid across, covered with red cloth, were appointed to receive the large mirror. All attempts to persuade them to remove this valuable covering were ineffectual, as the respect with which every thing was attended destined as a present to the emperor required to be scrupulously enforced, and rejected all paltry consideration of economy. A guard instantly jumped into the boat for the honour of the mirror. One of the interpreters being asked how it would reach Jeddo, replied, it would be carried there. An objection being raised on the ground of the distance and number of men required to carry it, the interpreter gravely answered, that nothing was impossible to the emperor of Japan; and that a live elephant, a present from the emperor of China, had been so transported. We are furnished with another trait of Japanese character by the same author, which shews with what exactness the emperor's orders are executed. A Chinese junk was drievn ashore on the east coast of Japan in a gale of wind, and lost her masts and rudder. According to an ancient regulation, every ship touching on the Japanese coast, by whatever accident, must be brought to Nangasaky. Accordingly, this junk must find its way there. This could only be effected by a process of towing; and the great probability was, that during the voyage, which lasted 14 months, the towing-fleet, consisting of 100 boats and 600 men, with the said junk, would all go to the bottom. But neither the intricacy of the navigation, nor perils by storm frequent on this coast, nor the length of the voyage, nor the inadequate compensation of so much toil by the object being attained, weighed for a moment, when placed in competition with established custom and the emperor's orders. On the 19th February 1805, the Russian ambassador received intimation that the emperor of Japan had sent a person, attended by eight nobles, with full powers to treat with him. The person deputed was said to be of the highest rank, and one who was permitted to view the emperor's feet, though not to elevate his look higher.

The Japanese plenipotentiary having arrived, much altercation took place on both sides in adjusting the ceremonies to be observed at the audience. It was settled that the ambassador should pay the plenipotentiary an European, and not a Japanese compliment. This last is said to be so very degrading, that not even the lowest European would submit to it. The ambassador, however, was to appear without his sword or shoes, nor would they allow him a chair, or any kind of European seat. He was to sit with his feet tucked under him, in front of the governor and plenipotentiary. A norimon, or sedan chair, was allowed the ambassador, but the officers of his suite were to walk. The arrangements being finally made, the 4th of April was appointed for his first audience. The ambassador and his suite, consisting of five persons, and a serjeant to carry the standard of Russia, were conveyed in a barge adorned with flags and curtains, and landed at a place called Mussul Trap. On an occasion, for which such preparations were made, and expectation raised, merely an exchange of compliments took place, and a few insignificant questions were put. The second audience was of the same nature, and here ended the matter. An order was delivered to the ambassador, prohibiting any Russian ship from again visiting Japan. The presents, and even the letters from the Emperor of Russia, were refused. It was enjoined, that any Japanese cast upon the coast of Russia should be delivered over to the Dutch, who would send them by way of Batavia to Nangasaky. Finally, the Russians were prohibited from offering presents and making purchases, and from visiting or receiving the visits of the Dutch factor. The repair of the ship, and the supply of provisions, were declared to be taken into the imperial account. And it was notified, that the Emperor of Japan had sent 2000 sacks of salt, and 100 of rice, besides 2000 pieces of cassock or silk wadding, the former as a present for the crew, and the latter for the officers. The reason assigned for refusing the presents was, that the Emperor of Japan would be obliged to make a suitable return to the Emperor of Russia, and to send an ambassador to St Petersburgh: and that it was contrary to the laws of the empire for any Japanese to quit his country. Such was the result of an embassy of which such sanguine hopes had been formed in Russia. Not only were no new advantages gained, but the written permission granted to the Russians to visit Nangasaky was revoked. All communication is now suspended between Russia and Japan, nor is it expected that it will be again opened until some great change takes place in the Japanese government. Nor, perhaps, is such a change very remote. At the very moment of our writing this article, we find it mentioned, among continental intelligence, that the Dairi of Japan has been intriguing in secular affairs, and endeavouring, by means of his priests and adherents, to gain the people to his cause. Whence the supremacy of the Kubo is threatened, and a popular insurrection apprehended.

We shall conclude this article, by offering to our readers a description, from Krusenstern, of the Ainos, a race of people but little known in Europe. As this author's account has simplicity of narrative, and the appearance of truth to recommend it, we shall make no apology to our readers for presenting it in his own words. We shall only premise, that the island of Jesso was wrested from the Ainos, its original inhabitants, by the Japanese; the former are now confined to a small space, which alone retains the name of Jesso, the rest of the island being called Matzumary, from the principal Japanese settlement here. The Japanese discipline exists in full force in the most northerly part of the island, the farthest limit of their empire

" The Ainos," Krusenstern observes, " are rather below the middle stature being at the most five feet two or four inches high, of a dark, nearly black, complexion, with a thick bushy beard, black rough hair hanging straight down, and, excepting in the beard, they have the appearance of the Kamtschadales, only that their countenance is much more regular. The women are sufficiently ugly: their colour, which is equally dark, their coal black hair combed over their faces, blue painted lips, and tattooed hands, added to no remarkable cleanliness in their clothing, do not give them any great pretensions to loveliness; this at least was the case with those we had an opportunity of seeing on the north side of Jesso. We perceived, indeed, in Aniwa bay, some who were younger, whose eyes had not lost their brightness, and who on this account were not quite so ugly; but I confess that the impression even these made upon me was equally unfavourable. They are modest, however, in the highest degree, and in this point form the completest contrast with the women of Nukahiwa and of Otaheite. Their modesty even amounted to bashfulness, occasioned perhaps by the jealousy of their husbands, and the watchfulness of their parents; they never quitted for a moment, while we were on shore, the huts in which they had assembled, and were extremely distressed when Dr. Telesius made drawings of them.

The characteristic quality of an Aino is goodness of heart, which is expressed in the strongest manner in his countenance; and so far as we were enabled to observe their actions, they fully answered this expression. These, as well as their looks, evinced something simple, but noble. Avarice, or rather rapacity, the common fault of all the wild inhabitants of the southern islands in the eastern ocean, they are entirely strangers to: in Romanzoff bay they brought fish on board, which they immediately left to us, without demanding the least thing in return; and much as they were delighted with the presents made to them, they would not admit them as their property, until they had been frequently assured by signs of their being intended for them.

"The dress of the Ainos consists chiefly of the skins of tame dogs and seals; but I have seen some in a very different attire, which resembled the parkis of the Kamtschadales, and is, properly speaking, a white shirt worn over their other clothes. In Aniwa bay they were all clad in furs; their boots were made of seal skins, and in these likewise the women were invariably clothed. In Romanzoff bay, on the contrary, we saw only two fur dresses, one of which was a bear's skin, the other made of dogs' skins; and the rest of the people were dressed in a coarse yellow stuff, made of the bark of a tree, (as we ascertained in their houses,) which a few wore, bordered with blue cloth. Under this dress they had another of a fine cotton stuff, that they probably purchase of the Japanese. Here we saw no boots such as were worn by every one in Aniwa bay; but instead of them, they used Japanese straw slippers. A few of them covered their legs with a kind of half stockings stitched together, of the same coarse stuff as their upper garments. This difference in the dress of the Ainos of Jesso and Sachalin seems to prove a much greater degree of wealth in the latter island, and the men here appeared to wear a more cheerful aspect; but whether this is owing to their superior wealth in fish and furs, which find a certain market with the Japanese, or to their little dependence on these latter, I cannot pretend to decide, though I am inclined to believe the former. The greatest part of them went with their heads uncovered; others wore a straw hat pointed in the middle. I fancy it is not the custom of the country to shave the hair, though I saw several of them with their heads half shorn, prabably only in imitation of the Japanese. The women, even the youngest, use no ornaments on their heads; but, as I have already mentioned, they invariably paint their lips blue,—a practice which, to an European accustomed to the rose colour, appears extremely ugly. On the contrary, many of the male sex wore ear rings, which were commonly merely a brass ring. I purchased a pair of a young man, made of silver, with large false pearls suspended from them. The possessor seemed to set great value on these ornaments, being very unwilling to part with them; and twice he repented of his bargain, took them back again, and demanded a higher price. An old coat, two cotton cloths, and a piece of flat white metal, were the treasures for which he at last exchanged them. Buttons and old clothes were the articles the Ainos most sought after, and for which they gave their pipes and other trifles.

" The huts we saw in Aniwa bay were, as I have already said, probably newly built, and served only for their summer residence. In Romansoff bay they appeared to be their constant abode both in winter and summer. The two we visited, and near to which were balagans for drying fish, consisted of a single large room, which, with a small division at one end, occupied the whole interior of the house. Their construction did not seem to me to be very solid, and, unless the houses are entirely covered with snow, as in Kamtschatka, I cannot conceive how they are able to bear the cold, which must be intense here in the winter; since, even in the month of May, the thermometer only shewed three degrees of warmth. In the middle of the room was a large hearth, around which the whole family, consisting of eight or ten persons, was seated. The furniture consisted of a large bed, over which a Japanese mat was spread, and several boxes and barrels. All their utensils were of Japanese manufacture, and mostly lacquered. It appeared from the interior of the house, that the inhabitants possessed a degree of affluence such as is not found among the Kamtschadales, still less among the Aleuti, and the unfortunate inhabitants of Kodiack. The great provision of dried fish bore indeed rather a disgusting appearance; but no objection can be taken to this when we reflect, that their existence depends upon them, fish being probably their only nourishment, and their houses on this account being chiefly scattered along the shore. We perceived no symptoms of cultivation, not even any plantations of vegetables; nor did we see any tame fowls or domestic animals, except dogs, which they had in great abundance; and Lieutenant Golowatscheff found in Mordwinoff bay, on the west coast of Patience bay, above fifty in one place. In all probability they use them for their journeys in the winter; for we saw in Aniwa bay a sledge, which bore a perfect resemblance to a Kamtschadale narte. Dog skins, also, are here an important article of dress. We were struck, on perceiving that snow-water was the common beverage of the people on the north side of Jesso, although that of the river, which flowed into the bay, was extremely good. Perhaps the fear of cold in the winter, as they would have to fetch their water from the river, which is not very near to their houses, has so accustomed them to snow water, that they prefer it to that of the river so long as they are able to procure it. It seemed also the custom here (at least, it was so in all the houses which either I or any of my officers visited,) to bring up a young bear in the house, to which a place was assigned in one of the corners of the room, and which was decidedly the most restless of any of its inhabitants. One of our officers was desirous of purchasing one of these bears, and offered his great coat in exchange for it; but he could not persuade the proprietor, although cloth is of great value in the eyes of the Ainos, as the Japanese are unable to supply them with it, to part with his young elève.

"It would be presuming too much to enter into any detail upon the form of government and the religion of the Ainos, as our stay here was much too circumscribed for us to have instituted any inquiries into these subjects; but, with their limited population, it is not easy to imagine any other than a patriarchal constitution. During our visit to one of their houses in Romanzoff bay, we observed in the family, which consisted of ten persons, the happiest state of harmony, or rather a perfect equality. We continued there some hours, and were scarcely able to distinguish the head of the family, so little assuming were even the oldest toward sits youngest members. Accordingly, in dividing a few presents among them, I preserved a most perfect equality, which they all appeared pleased with no one, not even the oldest, remarking that I had given him too little in proportion to the others; on the contrary, they called my attention to a little girl, about eight years old, whom I had overlooked, and who now obtained her share. This unanimity and the silence which reigns among them, awake the most favourable feelings towards them. Here was no loud talking, no immoderate laughter, and still less any disputing. The satisfaction that appeared in all their countenances as they spread the mats round the hearth for us; their readiness, when we were going away, to launch their canoes and carry us across the shallows to our boat, when they perceived that our boatmen were stripping themselves for this purpose: but, still more than all this, their modesty never to demand any thing, and even to accept with hesitation whatever was offered to them, wherein they differ very much from the inhabitants of the west of Sachalin, whose diffidence La Perouse could not speak of with praise; all these uncommon qualities, for which they are not indebted to any polished education, but which are merely the marks of their natural character, make me consider the Ainos as the best of all the people that I have hitherto been acquainted with.

"I have already mentioned their inconsiderable numbers, particularly in Jesso. On the north of this island we counted only eight dwelling-houses, and if we admit ten as the number of each family, this makes that of the inhabitants of this district only eighty. Farther inland they probably have no establishments; for as their whole nourishment consists of fish, they only settle on the sea shores. In Salmon Bay, and Tamary Aniwa, the Ainos probably amount to three hundred; but we were there at the time of the fishery, and it is chiefly from hence that the Japanese procure this article, for which they are obliged to have recourse to the inhabitants of the neighbouring bays, who settle here at such times, in order to prepare so large a quantity. Not only the recently built houses of the Ainos in the vicinity of the Japanese factory is a proof of this, but also the number of houses provided with furniture but destitute of inhabitants in Mordwinoff Bay, where Lieut. Golowatscheff, who visited that part, found but a few persons, and these not merely to guard the property, for they seemed to consider it as their own.

"According to the most ancient accounts we have of this island, its inhabitants are said to be covered with hair. The Chinese describe it as a large country full of wild people, whose whole body is covered with hair, and with suchenormous beards, that they are forced to raise them up in order to drink. The Dutch in the well known expedition in 1643, under the command of Captain Vries, and the Russians under Spanberg in 1739, confirmed this decription. Although so many concurring accounts seem to testify the fact of the natives of Jesso being overgrown with hair, nevertheless I am disposed, from our experience, to declare this report to be fabulous. The Jesuit Hieronymus de Angelis, the first European who, in 1620, visited Jesso, merely mentions their bushy beards, but says not a word of their hairy bodies; and as he resided for some time amongst them, he certainly had a better opportunity of examining their personal qualities than could be found in the short visits of the Dutch, the Russians, or the Chinese, and he would not have failed to make known so striking a circumstance. On the north of Jesso we examined some people, but found that, except their bushy beard and the hair on their faces, there was not the least thing to give probability to such a story. In Aniwa I got several of them to uncover their breasts, arms, and legs, and we were here convinced to a certainty, that the greater part of the Ainos have no more hair upon their bodies than is to be found upon those of many Europeans. Lieut. Golowatscheff found indeed in Mordwinoff Bay a child of eight years old whose body was entirely covered with hair; but he immediately examined its parents and several other grown up persons, and found them all in that respect like Europeans. I will not flatly contradict the report of older and modern navigators, whose credibility I do not argue against; but I believe that they have exaggerated this story respecting the Ainos, or, what is the same thing, the natives of the southern Kuriles; at least it is not equally true with regard to all. Perhaps the impression which the Dutch received from their bushy beard, hairy face, and lank locks, added to the uncleanliness of their persons, left an idea that their bodies must be as much covered as their faces; and as they did not wait to examine whether this were really the case, this gave rise to a story, which has been ever since repeated as a fact."

The following notices respecting Japan, communicated in a discouse to the Literary and Scientific Socity at Java by the Honourable Govenor Raffles, and drawn from the information of Dr Ainslie, who had resided four months in Nangasaky, may be considered as the most recent intelligence on the subject of this article.

Every imformation obtained by that gentleman tends to confirm the accuracy, ability, and impartiality of Kæmpfer, whose account of Japan is represented as one of the most complete works of the kind that was ever produced in the same circumstances. The Japanese acknowledge that from this book they know their own country; and their first enquiry to the English Commissioners was for a copy of Kæmpfer. In expressing the estimation in which his writings were held among them, they literally observed, that "he had drawn out their heart from them, and laid it palpitating before us, with all the movements of their government, and the actions of their men!" The natives are represented by Dr Ainslie as a nervous, vigorous people, whose bodily and mental powers assimilate much nearer to those of Europe, than what are usually attributed to Asiatics; as possessed of masculine features perfectly European, except the small lengthened Tartar eye, which almost universally prevails; as perfectly fair and even blooming in their complexion; and actually exhibiting among females of the higher class more of the hue of health than is usually found in Europe. He describes their proficiency in the sciences, especially in metaphysics and judicial astrology, as sufficient to evince a vigorous intellect; and their skill in the arts as by no means resembling the stationary mediocrity of the Chinese, but as the effect of an ardent and progressive principle of improvement. Nothing, he tells us, is so offensive to the feelings of a Japenese, as to be compared, in any one respect, with the Chinese; and the only occasion on which he ever saw the habitual politeness of a native surprised into a burst of passion, was when, upon a similarity between the two nations being unguardedly asserted, the latter laid his hand upon his sword. They have at least none of that uniformity of character which the artificial system of government has produced in China; and their women, particularly, associate among themselves like the ladies of Europe. Dr Ainslie was present at frequent entertainments among the natives; and on one of these occasions, particularly,a lady from the court of Jeddo performed the honours of the table with an ease, elegance, and address, that would have graced a Parisian. The usual dress of the Japanese women, even of the middle rank, is remarkably costly; and its value might supply the wardrobe of an European lady of the same rank for twenty years. The Japanese, with an apparent coldness, derived from that system of espionage and principle of disunion dictated by the government, are eager for novelty, and warm in their attachments, strongly inclined to foreign intercourse, notwithstanding the prohibitory political institutions of their country, and apparently ready to throw themselves into the hands of any nation of superior intelligence; but at the same time full of contempt for every thing below their own standard of morals and habits. The failure of the embassy from Russia in 1814, which might seem to contradict this remark, Dr Ainslie considers as attributable to particular circumstances, which however are not sufficiently detailed, but are intimated as originating in the influence of the interested competitor at the head of the Dutch establishment. The warehouse in which the Russian mission had been lodged was pointed out to Dr Ainslie, who observes, that, " as the rats were let out, the count and his suit were let in, where they remained for six long months with scarce room to turn, the mark of obloquy to the Japanese, and the laughing stock of the European factory." So lively was the impression of the occurrence, that the chief Japanese officer asked the English commissioner, " if he too would condescend to play the part of the Russian count?"---the officer answering to his own question, " No, I trust not." Even the illiberality of the Japanese, on the subject of religion, is affirmed by no means to correspond with the representations hitherto made of their character; and the annual test of trampling on crucifixes and other Catholic images, is said to be denied, and derided as a foolish story by the native priests. Upon visiting the great temple on the hills of Nangasaky, the English commissioner was received with marked respect, and sumptuously entertained by the patriarch of the northern provinces, a man eighty years of age; and when one of the English officers present heedlessly exclaimed, in surprise, Jasus Christus! the patriarch, turning half round with a placid smile, bowed significantly, expressive of a hint to avoid that subject in that place, and took leave with a hearty shake of the hand. It is mentioned as an extraordinary fact, that, for seven years past, since the visit of Captain Pellew, notwithstanding the determination of the court not to enter into foreign commerce, the English language has, in obedience to an edict of the Emperor, been cultivated with considerable success by the younger members of the college of interpreters, who were found very eager in their inquiries after English books. While the commissioner was at Nangasaky, there arrived a large detachment of officers of rank, who had been employed nearly four years in making an actual survey of every foot of the empire and the dependent isles, one fourth part of which they had not yet completed. The survey appeared to be conducted on a scientific principle, to be most minute and accurate in its execution, and to have for its object the completion of a regular geographical and statistical description of the country. The Japanese, in short, are wonderfully inquisitive in all points of science, and are anxious to receive information, without inquiring from what quarter it comes; and, in the opinion of Dr Ainslie, are a people with whom the European world might hold intercourse without compromise of character. The result of all that the commisioners observed is said to be, an impression on the minds of those who are most competent both to judge and act in the matter, that a commercial intercourse between Great Britain and Japan might easily be opened. See Kæmpfer's *History of Japan*; Thunberg's *Travels*, vols. iii. and iv.; Krusenstern's *Voyage round the World*; and the *Transactions of the Literary and Scientific Society at Java*.

JAPANNING, is a mode of ornamenting various articles with a hard varnish, which bears a good polish, and can be made of brilliant colours and ornaments.

The natives of Japan and China practise this art in great perfection. They have a decided advantage over the European japanner in their materials. They use a kind of resin called lac, which is the sap or juice of a tree. The Japanese make incisions in the lower part of the trunk, and receive the lac, which flows in pots set beneath the incisions; this lac is at first of the colour and consistence of cream, but it becomes black on the surface when it is exposed to the air. The whole mass is required to become black before it is used, and for this purpose it is put into very shallow bowls, and continually stirred with an iron rod during twenty-four hours, so as to expose every part to the action of the air; this makes it thicker than before, and of a fine black colour, which they heighten by adding powdered charcoal.

When this lac is laid on the work, and dried, it is polished with a stone and water, and the polished surface is ornamented by gilding or painting, which is secured by an external coat of varnish, made of oil and turpentine, boiled to a proper consistence.

The japanning among Europeans is differently performed, but the work bears a near resemblance to that of the Japanese when finished; it is applied to wood papier-maché, leather and iron, or tinned iron. When the articles are of that nature, that they will not bear heating in a stove to dry and harden the japan, they must be done with lac similar to the real japan; but as the lac is only brought to Europe in a solid form, it must first be reduced to a fluid state, by dissolving it in alcohol, or some essential oil; and this varnish being spread on the work, the alcohol or oil will evaporate, and leave a hard superficial coat of lac. The varnish may be mixed with the requisite colours, or the colours may be painted upon the surface of the varnish, between the successive coats which are applied; and in the latter case admit of painting according to a design.

For such goods as will admit of sufficient heat in a stove, a more economical method is pursued, the principal coats of japan being made of boiled linseed oil, with proper colouring matters. These are dried and hardened in the stove, and the painting or gilding is laid on; a thin lac varnish is lastly applied, to give the external surface; but it assimilates so well with the first coat of japan, that the whole wears as well as if it was done with solid lac in the Japanese method.

Japanning with lac. This is principally used for ornamenting wood, leather, and paper, but the latter can be japanned by heat like the metals.

The following receipts are given in the Handmaid to the Arts, for the varnishes which are to form the grounds or surfaces on which the painting or gilding are to be laid. Dissolve two ounces of coarse seed lac, and two ounces of resin, in one pint of rectified spirits of wine. This varnish must be laid on in a warm place; and the work will be better done if the substance to be japanned can be warmed also, but all moisture and dampness must be carefully avoided. Two or three coats of this coarse varnish must be applied, preparatory to laying the grounds which contain the colour, and which are made as follows.

For a white ground, prepare flake white, or white lead, by washing it with water, and then by grinding it with one-sixth of its weight of starch; when this is dried, temper it properly for spreading with mastic varnish, which is prepared by dissolving mastic in spirits of turpentine, by a gentle heat in a water bath; or the colour may be compounded with gum anime, reduced to powder, and ground first with turpentine, and then ground with the colours, adding as much of the mastic varnish as is necessary to make it work with the pencil. When this white japan is laid on, the external varnish which is applied upon it after the painting or ornaments are finished must be of the most transparent nature, that it may not injure the whiteness of the colour. For this purpose select the clearest and whitest grains from a large parcel of seed lac, reserving the coarser grains for other varnishes; take two ounces of this chosen lac, and three ounces of gum anime, reduce them to a gross powder, and dissolve them in a quart of spirits of wine; five or six coats of this varnish must be laid on over the white colour. The seed-lac will give a slight tinge to the colour, but the hardest varnish cannot be made without it; when hardness is not so essential, a less proportion of seed-lac may be used, and to take away the brittleness of the gum anime, a small quantity of crude turpentine may be added. Another varnish, either for mixing up with the white colours, or for covering them when laid on, is made of gum anime, dissolved in old nut or poppy oil, by gently boiling the oil, and putting into it as much of the gum as it will take up. This varnish must be diluted with oil of turpentine for use; it will not bear polishing, and must therefore be applied very carefully to lay it smooth.

For blue japan grounds, use a bright Prussian blue, or smalt, or verditer, glazed over by Prussian blue; the colours are best mixed with shell lac varnish, and brought to a polishing state by five or six coats of seed lac varnish. If the blue ground is bright, and the shell lac varnish is laid on, it will give a green hue, owing to its own yellow colour; the varnish of oil and gum anime, as above, being used for the external varnish, will have a clearer colour, but it is not so hard.

For red japan grounds, vermilion may be used to produce a scarlet ground, but it has a glaring effect when used alone. This will be in some measure corrected by glazing it over with carmine, or fine lake, or even with rose-pink. For a very bright crimson, instead of glazing with carmine, Indian lake should be used; the lake may be dissolved in the spirit of which the varnish is composed, and a coat of this being laid on, the shell lac varnish may be used to produce the external surface, as it will very well transmit the tinge of the Indian lake.

For yellow japan grounds, for bright yellow, king's yellow or turbeth mineral should be employed, either alone or mixed with fine Dutch pink. The effect may be heightened by dissolving powdered turmeric root in the alcohol which is used for making the external varnish. The alcohol should be strained off from the dregs of the turmeric, before the seed lac is put in to form the varnish. Dutch pink alone, if of the best quality, will make a good yellow ground.

For green japan grounds, king's yellow and bright Prussian blue may be mixed to make a green, or turbeth mineral and Prussian blue; and a common kind may be made of verdigris, mixed with either of the above yellows, or with Dutch pink. For a very bright green, the crystals of verdigris, called the distilled verdigris, should be employed; and to heighten the effect, the colour should be laid on a ground of leaf-gold, which renders it very brilliant.

For orange japan grounds, mix vermilion or red lead with king's yellow, or Dutch pink, or orange lake used alone is a fine colour. To prepare this, take of the best anotto four ounces, and of pearl ashes one pound; put them together into a gallon of water, and boil them for half an hour, then strain the solution through paper. Make also another solution of a pound and a half of alum, in a gallon of water, and mix this gradually with the solution of pearl ashes and anotto; a precipitate of the colouring matter will be formed, which, being dried in cakes or lozenges, is the orange lake.

For purple japan grounds, a mixture of lake and Prussian blue may be used, or vermilion and Prussian blue for a coarser purple.

For a black japan ground. Ivory black and lamp black are the proper materials for this purpose. They should be laid on with shell lac varnish, and the external varnish may be of seed lac, as the tinge of it can do no injury.

For a ground of gold. Gold leaf may be laid on over the whole surface. See *Japanners* GILDING. Or the imitative gold or silver powder may be used with the size there described. When the desired ground is obtained, the ornamental painting is next performed. The colours for painting are mixed up with varnish of shell or seed lac, dissolved in spirits of wine, or otherwise by varnish of mastic, dissolved in oil of turpentine; to which gum anime may be added, as before directed, for mixing up the colours of the white ground, and which applies to all the other grounds. There is, in fact, no difference between the manner of preparing the colours for laying the grounds, or for painting upon the ground. The pencils must be moistened either with the spirits of wine or oil of turpentine, so as to make the colours work. In some very nice works, the colours may be tempered in oil, for the more free use of the pencil, and to obtain greater dispatch. The oil should previously have one-fourth part of its weight of gum anime dissolved in it, or gum sandarac or mastic. When this oil is used, it should be diluted with spirit of turpentine, that the colours may lie more even and thin.

When the painting is to be on a ground of gold, water colours may be used for the ornamental painting. They are prepared with isinglass size, corrected with honey or sugarcandy. The ornamental gilding for japanners work is explained in the article GILDING.

External varnish. The hardest varnish is made of seed lac, as before mentioned, but has a yellow tinge. To make this, wash the seed lac in water, to clean it from impurities; dry it, and powder it coarsely; then put three ounces of it into a bottle with a pint of rectified spirits of wine. The bottle should not be above two-thirds filled, and must be gently heated, and shaken frequently, until as much of the lac is dissolved as can be, and the varnish is then to be poured off into a bottle, and kept stopped very close. The more highly rectified the spirit is, the more lac it will dissolve. This varnish must be laid on in a dry warm place, and the work previously made perfectly dry: no part should be crossed or passed twice over in laying the same coat, if it can be avoided.

When the outer varnish has been as often repeated as is necessary, the work is polished with a rag dipped in fine powdered pumice stone, or rotten stone; and when a good surface is thus obtained, it is finished by rubbing it with the hand alone, or with butter or oil.

About the middle of the last century, almost all elegant furniture was japanned by these means; but it is now disused, except for coaches, and for some small articles. The japanning of such articles as will bear the heat of a stove, to harden the varnish, is now brought to a very high perfection, and is very cheap compared with the lac japan.

Japanning of tin and paper wares by the stove. This is distinguished into two kinds; clear work, in which the japan is required to be transparent; and black japan, which is opake. The *varnish for clear work* is composed of raw linseed oil, umber, and a little amber, with a small portion of white rosin. These materials are boiled for several hours in a cast-iron pot, which is set in brickwork over a furnace, and the mouth of the pot surrounded by a funnel or chimney of brickwork, with only one opening to obtain access to it; and this opening is provided with an iron door, to shut close in case the materials should take fire. The boiling evaporates the most fluid parts of the oil, and the varnish becomes thick. It is known to be sufficiently boiled by letting fall a drop on a piece of tin-plate; and if it does not spread upon the surface, but keeps in a circumscribed spot, the varnish is esteemed sufficiently boiled, and may be taken out of the boiler. This varnish is to be mixed up to a proper consistence for working with spirit of turpentine, the varnish being a little warm.

The black japan varnish is made by the same process, but asphaltum is used instead of amber; and it is thinned for use with tar spirit instead of spirit of turpentine; also lamp black is added to the varnish.

Either of these varnishes are to be laid upon the work by a soft hog's hair brush, such as is known by the name of a painter's tool, and it must be prepared by drawing out all the hairs which are thicker than the others, or all those which have the flesh end downwards. The work must be carefully cleaned from dirt, resin, &c. and with this brush it is thinly coated over with the varnish. It is left for a few minutes to set, and it is then put into the drying stove, the heat of which at first makes the varnish more fluid, and it flows with great evenness over all the surface; but when the spirits evaporate, the varnish becomes solid, and in thirty or forty minutes may be taken out, and suffered to cool previous to varnishing again. The proper time for the second application is known, by applying the finger on the varnished surface with a moderate pressure; if the adhesion of the varnish is such that the finger will not slide over the surface, at the same time that there is no actual sticking to the finger, it is then in the right state to receive another coat of varnish. The work should not be suffered to dry beyond this state, otherwise the successive coats will not adhere so firmly. A second varnish being applied, the article is dried again; then a third coat is applied, and the work is left in the stove five or six hours, or all night, to harden and dry off the varnish. If it is the clear varnish which is thus treated, this time will be sufficient; but it will grow darker in proportion as it is longer exposed to the heat, or as the heat is increased. For black work the heat is raised as high as possible, without melting the soldering, or charring the varnish; and this is continued three or four days. This process makes the hardest and most durable of all varnishes, and of a most brilliant jet black colour.

To obtain a smooth surface, it is rubbed with woollen rag with pumice stone powder and water, and it is polished by rottenstone powder, and finished by the friction of the bare hand with a little butter.

Mottled japan, in imitation of tortoise shell. This is done by covering the tin with one coat of varnish as above, mixed with Venetian red, and then it is coated with black varnish. The fingers are drawn over the varnished surface in a waving direction; to distribute the varnish unequally, and thus cause the red colour to be shewn through in spots or clouds, imitating tortoise shell. Otherwise the tin is painted in spots with vermilion mixed in shell lac varnish; and this is coated with the clear varnish, which is afterwards stoved till it becomes deeply coloured, and is rather opake, so that it shews the vermilion spots and the surface of the tin beneath in an imperfect manner, and much resembles the clouds of tortoise shell.

Some simple articles in wood may be treated in this way, provided they are not put together in pieces with glue, and are not liable to be split by the heat; for instance, walking canes are most beautifully ornamented at Birmingham. These processes of japanning by heat are to be found in some receipts by Kunkel, but do not appear to have been practised till the Birmingham manufacture was begun.

When ornamental painting or gilding is required, it is done upon a clear japan ground when the same is set. A layer of gold size being spread over the surface, (see GILDING,) the leaf gold or gold powder is applied, and also the required painting, the colours being mixed as before directed for lac japanning. Stencils are sometimes used to lay the gold powder in particular patterns: they are pieces of paper, with openings cut out in particular forms; and being applied upon the surface of the work, if the powder is applied by a piece of rag, it willbe laid according to the pattern cut out. A variety of different coloured metallic bronze powders are used in the Birmingham ware; and for the smaller parts they lay them on with stump brushes.

Transparent or pont-y-pool Japan.—The articles japanned in this way are prepared by a good ground of black varnish made very smooth; a layer of gold size is then laid on, and the whole surface is covered with silver powder; upon this is laid a coat of thin varnish mixed with the desired colour, such as Prussian blue, or lake mixed with spirit of turpentine, to make it spread. When this is dry, it is sized over, and painted or ornamented with gilding in silver leaf or powder. The whole is coated with an external varnish of a gold colour, which changes the colour of the silver leaf to that of gold.

The use of the first coat of silver powder is, to give a resplendency to the colour, which is very beautiful.

The French have a mode of producing flowered stains of colour of the most brilliant hues, which are waved very much like the flowers which are found in a frosty morning upon the windows of an apartment. We are informed that it is done by means of an acid applied to the surface of the tin before it is japanned.

The stoves for japanning are built of brick or stone, generally three stories high, with three stoves upon each floor. The fire is at the bottom, and is covered over with a strong iron plate. The flues are carried up at the sides and ends of the stoves, and are made to afford three different degrees of heat, for drying off the clear varnish, or for darkening it, or for darkening the black varnish. (J. F.)

JAVA.

Java,* the southernmost of the Sunda islands, is situated between 6° and 9° of south latitude, and between 105° and 115° of east longitude from Greenwich. It extends, nearly in the direction of east and west, about 650 miles, and its average breadth is about 95. On the north lies the island of Borneo; on the north-east, Celebes; on the east, the islands of Bali and Madura; on the south and west, the Indian ocean; and on the north-west, the island of Sumatra, from which it is separated by the Straits of Sunda, which, at the narrowest point, are about 20 miles broad. On entering these straits a fine prospect opens to the view. The low coast of Sumatra appears covered with trees, behind which its majestic mountains rise in gradual ascent; while the opposite coast of Java, not inferior in beauty, indicates the fertility of its soil, by its numerous rice fields, and groves of cocoa-nut and palm trees.

The whole of the north coast of Java is low, swampy, and woody ground, except a little to the west of Bantam, where the high land stretches down to the sea-coast. On this side are several bays, where there is safe anchorage during the good or south-east monsoon; but in the bad monsoon, when the north-west wind blows hard, it is dangerous to anchor near the coast. The south coast is less known than the northern, and is a bold rocky shore almost inaccessible. A chain of high mountains, commencing at the eastern extremity, in the province of Balambouang, running to the westward, and gradually decreasing in height, divides the island longitudinally into two parts, of which the northern section is the largest and best.

In several mountains of this great chain are observable the craters of volcanoes, which were formerly violent in their eruptions, and many of which still emit smoke after heavy rains. Numerous mineral springs, of various virtues and temperatures, are found in their vicinity. An account of a very curious natural phenomenon in the plains of Grobogan, about 50 miles N. E. of Solo, has been published by Mr. Brande, which may be deserving of notice in this place as a species of volcanic eruptions. As a party from Solo "approached the village of Kuhoo, they saw, between two trees in a plain, an appearance like the surf breaking over rocks, with a strong spray falling to leeward. The spot was completely surrounded by huts for the manufacture of salt. Alighting, they went to the bludugs, as the Javanese call them, and found them to be on an elevated plain of mud, about two miles in circumference, in the centre of which immense bodies of salt mud were thrown up to the height of from ten to fifteen feet, in the form of large globes, which, bursting, emitted volumes of dense white smoke. These large globes or bubbles, of which there were two, continued throwing up and bursting seven or eight times in a minute by the watch. At times, they threw up two or three tons of mud. The party got to leeward of the smoke, and found it to smell like the washing of a gun-barrel. As the globes burst, they threw the mud out from the centre with a pretty loud noise, occasioned by the falling of the mud upon that which surrounded it, and of which the plain is composed. It was difficult and dangerous to approach the large globes or bubbles, as the ground was all a quagmire, except where the surface of the mud had become hardened by the sun. Upon this they approached cautiously to within fifty yards of the largest bubble, or mud pudding, as it might very properly be called; for it was of the consistency of a custard pudding, and of very considerable diameter. They also got close to a small globe or bubble, (the plain was full of them of different sizes,) and observed it closely for some time. It appeared to heave and swell; and when the internal air had raised it to some height, it burst, and the mud fell down in concentric circles, in which shape it remained quiet, until a sufficient quantity of air was again formed internally to raise and burst another bubble. This continued at intervals from about one half to two minutes. From various other parts of the quagmire, round the large globes or bubbles, there were occasionally small quantities of mud shot up like rockets to the height of 20 or 30 feet, and accompanied by smoke. This was in parts where the mud was of too stiff a consistency to rise in globes or bubbles. The mud, at all the places they came near, was cold on the surface; but they were told it was warm beneath. The water which drains from the mud is collected by the Javanese, and, by being exposed in the hollows of split bamboos to the rays of the sun, deposits crystals of salt."

Java is watered by a great number of rivers, which descend from the central chain of mountains; but, on account of their shallow channels, and the sand banks at their outlets, none of them is navigable by vessels even of a moderate size. All along the coast of the island, high and low water occur only once in 24 hours, and the changes of the moon have no influence on the tides.

A military road traverses the island nearly from west to east for upwards of 700 miles; and will remain a monument of the perseverance and enterprize of General Daendels. Twelve thousand men are said to have perished in its formation, from the insalubrity of the tracts through which it runs. It is conducted over mountainous regions of vast extent, through immense forests, and numerous marshes and rice fields. There are numerous roads in the environs of Batavia, shaded with trees, ornamented with handsome villas in their vicinity, and crossing in various directions rivers and streams on stone and timber bridges. The new eastern road towards Buitenzorg presents every advantage for expeditious travelling. On this road, extending as far as Kalatigas, 700 miles east of Batavia, there were formerly regular post stages at every five or six miles; but the relays of post horses have been lately withdrawn between Buitenzorg and Samarang, and the same facility of passing through the regencies does not now exist. The ordinary country roads in the interior are passable only for the native carts drawn by buffaloes.

The principal towns and stations in Java, besides Batavia, the capital of the country, are, Weltervreeden, Cornelis, Bantam, Samarang, Solo or Soura Carta, Djoejocarta, and Sourabhaya. Weltervreeden, about three miles from Batavia, was selected by the Dutch government as a military station, being greatly preferable in point of healthiness and local advantages to any other spot in the vicinity of the capital, and is now the head-quarters of the British troops. To this place General Daendels had intended to remove the seat of government, and all the public offices, both civil and military; and, for this purpose, a large commodious building had been nearly completed before the capture of the island by the British. Cornelis, a few miles from Weltervreeden, was the field of action in the recent invasion of the island; but few traces of its fortified lines now remain, as the works have been razed, and the fertility of the soil has already spread a wide jungle over the spot where British valour decided the fate of Java. About sixty-one miles west from Batavia are situated the ruins of the once flourishing city of Bantam, in a low situation, surrounded by jungle and stagnant waters, and remarkable for the insalubrity of its climate. Samarang, about 343 miles from Batavia, is the chief central station on the island, and has a considerable European population. It is a large town, defended by a stone parapet and rampart, with bastions, and a wet ditch. The town has a neat appearance, and a number of good houses; a large church, a new town-house, and a variety of public buildings, both elegant and commodious, are within and without the city. The climate is greatly preferable to that of Batavia, and has a corresponding effect on the European inhabitants. The environs are ornamented with numerous villas; and beautifully variegated hills and dales enhance the scenery. Solo, or Soura Carta, the capital of the Soesoehoenan, or emperor, is a large populous town, 61 miles from Samarang. The Crattan, or residence of the emperor, is very spacious, and contains several palaces in its area. The European town and fort are very neat; and the latter, about 800 yards from the Crattan, contains a British garrison. The Dutch had acquired such ascendency over the native princes, that they were allowed to erect forts close to their respective capitals, by means of which they forcibly secured the influence which they had artfully obtained. Djocjocarta, about 87 miles from Samarang, is the residence of the sultan of that name. The population within the Crattan is very considerable. At the entrance on the north side is an extensive square for the exhibition of fights of wild beasts, and various tournaments. The interior of the Crattan is filled with palaces, the most remarkable of which is an ancient edifice in the midst of a large lake. The only entrance is by a covered way under water, to which light is communicated by windows, in turrets which appear above the surface. Sourabhaya, a large town with a numerous population, European, Chinese, Javanese and Malayan, 540 miles from Batavia, is situated on a fine river, which vessels of some burden navigate up to the town. The mouth of the river is defended by Fort-Calamaas, a circular battery, mounting 40 guns. General Daendels expended large sums in the construction of works for the defence of the harbour, and designed to render the place a principal port for the trade to the eastward. Guns were cast, and a fine arsenal formed; and vessels were built from the timber which the neighbouring forests supplied, and which was floated down the river. The British resident lives at Simpang, in a large building close to the river; and in the same quarter is the general hospital, almost unrivalled for extent and commodiousness. The country in the vicinity is accounted healthier than most other parts of the sea-coast, and the district is exceedingly populous and productive.

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* By Ptolemy it is called the Island of Barley, and its name Yava is said to have that signification; but the grain is unknown to the inhabitants, and will not grow in the island, except in some mountainous tracts, where it has been raised by Europeans as a curiosity.

The early history of Java is entirely lost in the fables of antiquity. Its annals give accounts of political relations having subsisted in more modern times between the island and various states in Sumatra and Borneo; and this is partly confirmed by the circumstance of the written language and the language of the court in these districts being Javanese, while the indigenous dialect is entirely different. History and tradition relate that the inhabitants of Java were once united under one sovereign, which is corroborated by the similarity of their language and institutions; but when the Dutch first established themselves in the island, about the year 1619, it was divided into three great states, namely, Bantam, Jacatra, and the empire of the Soesoehoenan, or emperor; which last was the most extensive, and comprehended more than two-thirds of the whole island. It is at present divided into five principal states or governments, namely, Bantam, Jacatra, Cheribon, the empire of the Soesoehoenan, and that of the Sultan. Bantam, which lies towards the south-west, is separated from Jacatra by a narrow slip of land called Grending, and by a chain of mountains called Goenong Tjeberum, terminating to the south in the bay of Wynkoopsbergen. In 1751, it became subject to the Dutch East India Company, who had been invited to interfere in its intestine commotions: (See Bantam.) Jacatra, rather larger but less populous than Bantam, was conquered by the Dutch in 1619, and taken entirely under their government, who built Batavia near its ancient capital Jacatra: (See Batavia.) Cheribon, about half the size of Jacatra, and situated to the east of it, is divided between two princes, who are feudatories of the Company. The empire of the Soesoehoenan, before the war of 1740, comprehended all the rest of the island to the east of Cheribon; but after that period, thirty of its fifty-six provinces were ceded to the Company, and seven to the Sultan Manko Boeni. Of these seven provinces the most extensive and important is that of Mataram, which is washed by the southern ocean. All these princes were vassals of the Company, to whom they were bound to deliver all the produce of their respective countries at fixed prices, and to act with them offensively and defensively against every enemy. The whole of these countries were divided by the Dutch into 123 districts, in each of which they established a resident, to secure the fulfilment of their commercial privileges, and also a native chief or governor, called Tomogong, to collect the produce payable by the peasants for the use of the sovereign, the Dutch and themselves. The Dutch, especially in later times, held the supremacy in the island by a very precarious tenure; and were obliged to adopt the policy of fomenting disunion among the more powerful native princes, who governed as their tributaries and allies, as well as of bringing large reinforcements of troops from Europe, to keep them in due subordination. In the year 1811, a British armament sailed from India against the settlements in Java, and speedily succeeded in reducing the whole island under the dominion of the East India Company.* Its new masters immediately instituted numerous schemes for its improvement; and, in a short time, rendered the greatest benefit to the whole community, by clearing and cultivating the waste and unhealthy grounds around the capital, by abrogating the extreme severity of the Dutch code, in the punishment of crimes, while the police was rendered more effectual for their prevention; by collecting the revenue in a more equal and less oppressive manner, and by augmenting the colonial and coasting trade of the island. All the courts of justice were modelled on the plan of those of Great Britain, so as to separate the judicial from the police duties, and insure the more prompt and impartial administration of justice. The principal courts were established at Samarang, Sourabhaya, and Batavia, which last was supreme. Regular custom-houses were appointed at the same places; and no vessels were allowed to enter for trade at any other port in Java. At Batavia a duty of 6 per cent. and at Samarang and Sourabhaya of 8 per cent. *ad valorem*, was levied on all goods and merchandise imported by sea, and required to be paid within one month. Cloths, which were the manufacture of native eastern ports, paid 15 per cent.; and 12 per cent. was laid upon all European and Chinese goods im-

* See an account of the capture at the conclusion of this article.

ported in European and Asiatic vessels. Goods transferred in the roads paid the same duties as if actually landed for sale; but on goods landed for exportation, and not for sale, the importer paid half duty on the invoice value, and gave security that they should not be sold on the island. All goods and merchandise having paid the import duty were exempted from export duty. For the defence of the island, a Javanese corps of 4000 men was raised, and 1500 men of one of the native princes taken into British pay, and clothed with the British uniform. Instead of the indefinite exactions, and forced services, and inadequate rates of price for the native produce, imposed by the Dutch, a moderate land-tax, equitably arranged, was exacted by government for the security of property and protection of person. This new duty, fixed and explicit, was acceded to by the natives with universal satisfaction, and paid with the utmost alacrity. The exertions of the cultivators being thus encouraged by the certainty of possessing whatever they should raise beyond the proportion paid to the government, the agriculture of the island was remarkably improved and extended. The revenue, instead of being diminished, was raised to six times its former amount. In 1808, under General Daendels, it was only 818,128 rupees; while in 1814, under Governor Raffles, it amounted to 5,368,085, leaving a clear surplus revenue of 2,800,000 rupees per annum. In this flourishing condition the island of Java has been restored by treaty to its former masters; a measure to which the native authorities are said to have manifested the greatest reluctance.

In Java, as in most tropical climates, the year is divided into two seasons, namely, the east or dry monsoon, and the west monsoon or rainy season. The east, or good monsoon, commences in the month of April or May, and terminates about the end of September or beginning of October. During its continuance, the sky is generally clear, (except that sometimes in the evening, and towards the end of the season, a thunder cloud comes down over the mountains,) and the trade winds blow from four or five leagues off shore, through the whole of the Indian seas to the south of the line, from the south-east, and east-south-east. The west, or bad monsoon, generally begins about the end of November; and, while it continues, the westerly winds often blow with great violence, accompanied by heavy torrents of rain, and storms of thunder. About the beginning of March, they become more variable, till they give place in April to the easterly winds. March and October, with part of the preceding and following months, are called the shifting seasons, or the breaking up of the monsoons, and are considered as the most unhealthy periods of the year. Along the whole coast, the alternate land and sea breezes blow regularly throughout the whole of the year, and greatly moderate the intensity of heat. During the east monsoon, the sea breeze is generally confined between north-east and north; but, in the west monsoon, it goes as far as north-west. It begins to blow about 11 or 12 o'clock in the forenoon, and increases gradually until evening, when it imperceptibly dies away to a perfect calm about eight or nine. The land wind begins at mid-night, or a little before, and continues till an hour or two after sunrise, when it falls calm, till the accustomed hour of the sea breeze. From the month of July to November, the thermometer on the coast generally ranges between 80° and 90° during the hottest time of the day; and, during the coolest part of the morning, is seldom lower than 76°. In ascending towards the higher grounds, the warmth of the atmosphere gradually diminishes from 85°, the ordinary heat in the plain, to 50°, the temperature experienced on the summit of the mountains, which are even occasionally covered with snow. In the highest parts that are cultivated the heat during the day is from 60° to 65°, and at night as low as 54°. The climate on the coast, and especially at Bantam, is more pernicious to the health of Europeans, than that of any other country where settlements have been formed. Of persons newly arrived, the usual calculation is, that three in five will die during the first year, and of the survivors from nine to twelve in the hundred annually; exclusive of the troops and seamen, among whom, in consequence of their irregularities, the mortality is truly deplorable. The weight of the air is nearly the same throughout the year; but does not possess so much elasticity as in northern regions. The barometer seldom varies more than two or three tenths of an inch; and experiments in electricity do not succeed so well as in Europe.

The soil of the island is generally a pure vegetable mould, resting on clay, or argillaceous iron-stone, or coarse limestone of a loose and porous texture; and is equal in fertility to that of any country in the world. The northern coast rests entirely on coral fabrics; and near the foot of the mountains are several mineral springs impregnated with iron; but nothing more is known of the mineralogy of the country.

The soil in its natural state is covered with the most luxuriant vegetation, and yields a great variety of valuable and curious productions. Many places are covered with thick forests, rendered impenetrable by the quantity of underwood and creeping plants, forming a kind of net-work, through which a passage cannot be effected without the aid of a cutting instrument. The large forests, which belonged to the Dutch India company as sovereigns of the country, especially those on the north-east coast, furnish an abundance of timber for ship-building and other purposes. In these native woods, the numerous tribe of palms or cocoa nut trees are distinguished by their luxuriant growth, and sometimes reach the astonishing height of 150 feet. This tree is to the natives of Java what the bamboo is to those of China. Its stem furnishes the standards, rafters, and laths of their houses; and its leaves are used as thatch. The pulpy substance of the nut affords a sweet and nutritive food; the liquid which it contains, an agreeable and refreshing beverage; and the kernel yields by pressure a useful oil for various purposes. The shell of the nut is converted into cups, which are often carved with wonderful neatness and skill; and the fibres of the husk are manufactured into mats, coarse cloth, and cordage. A milky fluid also, which exudes from the young nut during its growth, is collected by the natives with great care into vessels suspended at the extremity of the branches, which in its first stage of fermentation is called palm-wine, and in its second becomes a pleasant vinegar. It is a material ingredient in the distillation of arrack; and, if slowly evaporated over a fire or in the open air, leaves as a residue a kind of coarse brown sugar. The celebrated *upas*, or poison tree, described as situated in the centre of the island, and destroying by its noxious effluviæ all animal and vegetable life in its vicinity, to the extent of ten or twelve miles around, is now ascertained to have no real existence. There are in Java several plants and trees, from which a poison called *ipo* or *upas* is extracted; but these are generally found in the most fertile places, surrounded by the most luxuriant vegetation.* Fruit trees of various kinds are remarkably abundant; and many of them extremely beautiful. The most remarkable is the Mangoostan, accounted the most delicious fruit in the world, equally pleasing to the eye and gratifying to the taste, of a round form and purple colour; and growing on a very beautiful tree, which bears like the orange both fruit and flowers at the same time on the extremities of the branches. The mango, another exquisite fruit, grows on a large spreading tree like the walnut. The rambootan, a hairy fruit, a cool and agreeable fruit, of a delicate sub-acid flavour, grows on a showy and elegant tree. The doorian, a large fruit, resembling the bread-fruit in appearance, of a most disgusting smell, and of a flavour like a custard, seasoned with garlic, but said to become by frequent use extremely fascinating, grows on a lofty tree with small pointed leaves. The boa lansa, in great estimation among the lower classes, grows upon a tree of a moderate size, in clusters like grapes, of which each individual fruit resembles the famous li-tchi of China, and has a pulpy substance with a delicate sub-acid taste. Pine apples are produced in such abundance, that they are sent to market in cart loads, and sold at the rate of a halfpenny a piece, but are not much esteemed in the country except for preserving. Out of many other fruits, may be mentioned the atrocarpus or jack fruit, which grows wild in great abundance; the averrhoa much used for tarts and pickle; the eugenia or rose apple, sweetsop, custard apple, dates, pomegranates, tamarinds, figs, guavas, ananas, bananas, oranges, lemons, citrons, shaddocks, grapes, melons, and pumpkins. Most of the fruits of Europe have been transplanted to the island; but except strawberries and a few others, which are said to thrive in the interior parts of the country, most of them are found to dwindle and degenerate in that equinoctial climate. Among the trees and shrubs which are remarkable for singularity or beauty, may be noticed the casuarina equisetifolia, whose pendant branches resemble the hair of of the cassowary; the mitchelia tchampaca, bearing flowers of an exquisite fragrance, which yield by distillation a spirit more powerful, but not less delicate, than the perfume extracted from roses; the terminalia catappa, a large and beautiful tree, bearing a nut, usually known by the name of the Indian almond: the bombax, which bears a long pod full of a silky substance, used for stuffing cushions, &c. the coral trees, lyriodendrum, tulipifedrum, magnolia, milia, bignonia, all showy and elegant trees. The gardenia florida, Arabian jasmine, clove, cinnamon, tuberose, nutmeg, plumeria, seree or lemon-grass, are cultivated in the gardens on account of their beauty and fragrance. Among the rarer plants are the elastic gum-tree, the convolvulus Jalappa, the styrax liquida, the bread-fruit, and the mountain cabbage-tree of the West Indies. But the most extraordinary vegetable production of Java, and the other eastern islands, is the nepenthes distillatoria, or pitcher plant, which is found in the most arid situations, but is provided with a curious contrivance for securing a sufficient supply of moisture. To the footstalk of each leaf is attached a small tube, shaped like a pitcher, covered with a lid, which is moveable on a kind of hinge or strong fibre passing over the handle, and connected with the leaf. By the contraction of this fibre the lid is opened, when the weather is showery or the dews fall; and, when the moisture has filled the pitcher, closes again so firmly as to prevent evaporation, securing the water for the sustenance of the plant.

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* See Memoir by M. Leschenault in the *Annales du Museum d'Histoire Naturelle*, cap. xi and xii. p. 457.

The agricultural productions of the country are highly valuable in a commercial point of view, and are raised with little trouble by the native cultivator. The soil is slightly tilled by a clumsy plough drawn by one or two buffaloes; and the only manuring which it receives consists in burning upon the fields all the weeds and rubbish, which have sprung upon their surface. When a piece of ground ceases to yield an adequate crop, it is merely suffered to lie fallow for a few years to bring it again into a fertile state. Garden grounds are moistened with water, in which oil-cakes and various excrementitious substances have been dissolved, which renders the soil extremely productive. The principal production of Java is *rice*, which, in whiteness, flavour, and other qualities, excels that of all the eastern archipelago, and ranks next to that of Japan. The island produces this grain in such abundance, that it has been called the granary of the East. Besides furnishing a sufficiency for its own consumption, it supplies many of the adjacent countries, and all the more easterly Dutch settlements. In the year 1767, the quantity of 14,000 tons was sent to Batavia, Ceylon, and Banda. In reaping the rice, a small knife is used instead of a sickle, with which every stalk, singly, is cut about a foot below the ear, and they are then bound in sheaves, the tenth of which is the reward of the reaper. The rice is separated from the husk, by stamping it in hollow wooden blocks; and the more it is stamped, the whiter it becomes when boiled. The next staple commodity of Java is *pepper*, of which there are various kinds, and which is chiefly produced in the western parts of the island. The whole quantity produced in the country amounted, in 1777, to six millions of pounds weight, and the regulated price at which the king of Bantam was then bound to deliver it to the Dutch company was about two pence halfpenny per pound. The pepper of Java is esteemed next in point of quality to that which comes from the coast of Malabar. *Sugar* is raised in Java in considerable quantities, but chiefly in the province of Jacatra. In 1768, the whole produce exceeded fifteen millions of pounds, and was capable of being greatly augmented. The cane grows luxuriantly, and is a favourite object of culture with the Chinese inhabitants, who are the great planters and manufacturers of sugar on the island. It is planted from September to April, and stands twelve or fifteen months on the field, according as the land is rich or poor; and if the soil be good, it can be cut four times. The sugar, after being manufactured, is divided into three kinds or qualities, of which the first is sent to Europe, the second to India, and the third, which is the brownest, to Japan. *Coffee*, though not indigenous, is raised in large crops, especially in the provinces of Cheribon and Jacatra. It was introduced about the year 1720 by Governor-General Zwaardekroon, who procured the plants from Mocha. It is cultivated in the same manner as in the West Indies; and, in 1768, about five millions of pounds were produced on the island, which did not cost the Company above two pence halfpenny per pound. The *cotton shrub* is cultivated in almost every part of the island, except Bantam, where very little of it grows. The yarn spun by the natives is sold to the Company, according to its quality, from 9d. to 1s. 6d. sterling per pound. *Salt* is brought in considerable quantities to Batavia from Rembang, and is exported chiefly to Sumatra, where it is sold at an immense profit. *Indigo*, though not originally produced in Java, has been cultivated with great success since the Dutch had possession of the country, and is exported principally to Europe. *Turmeric* and long pepper, sago and cocoa, are among the productions and exports of the island. The *catjang*, a species of dolichos, is extensively cultivated by the Chinese inhabitants for the sake of the oil, which is expressed from the seed, and of which a considerable portion is sent to China. The cajaputta oil, expressed from the melaleuca leucadendrum, and so celebrated as a specific in rheumatic affections; the nardus or spikenard, sandal wood, and calambac or aloes wood, are also products of Java, and form a part of its trade with China. The cassia fistula, once considered as one of the most approved laxatives, was formerly sent in great quantities to Europe. The roots of the water caladi (the arum esculentum) are boiled as an article of food, and its broad leaves are considered as an efficacious topical application for dispelling the pains of the gout.

Of the numerous animals found in Java, a few only of the more remarkable can be noticed. The native horses are well formed, but of a diminutive size, and extremely vicious. They are trained in a very remarkable manner for hunting antelopes. When the game is started, the sportsman pursues at full speed, lying close to the horse's neck, and regardless of the reins, as the horse follows the prey like a greyhound, and, on overtaking the antelope, endeavours to secure it by throwing a noose over its horns. Should the rider lose his seat, the horse nevertheless continues the pursuit; and instances have occurred of his pawing the antelope to the ground, or by mouthing and kneeling, holding it fast till the arrival of the hunting party. Buffaloes are generally employed in the draught, both for ploughs and carts. They are very large animals with small eyes, great ears, and commonly immense horns bending inwards. They are almost amphibious, remaining always in ponds, unless when obliged to go in quest of food; and when domesticated, requiring to be led three times a day to cool themselves in the water, without which they could not be brought to work. Antelopes are found in the forests, and are frequently kept in parks by the princes. The rhinoceros of Java is of a huge size, and found chiefly in mountainous districts. In the eastern part of the island are large uncultivated tracts, covered with thick woods, abounding with tigers, wild buffaloes, wild hogs, leopards, and very large apes. For one species of the monkey tribe, called the Wow-wow, the Javanese profess a kind of fellow-feeling, in consequence of a tradition among them, that their ancestors originally sprung from that species of ape. There is a species of wild hedgehog, which sometimes contain in their gall-bladder a stone, called by the Portuguese the pedra da porco, and considered by the Dutch as possessing the most wonderful medicinal properties. When put into a glass of wine for an hour, its virtues are supposed to be communicated to the liquor, which is then used as an infallible specific for all kinds of poison, for obstructions, fevers, and various other diseases. One species of lizard, called Lacerto Gecko, a native of Java, is peculiarly deserving of notice, for its wonderful faculty of walking, apparently in opposition to the laws of gravity, running up and down the smoothest polished Chunam walls, in pursuit of flies, and able to take so fast a hold of a smooth perpendicular surface as to carry up a weight equal to that of its own body. (See Herpetology. vol. x. p. 392 where the mechanism is described by which this is effected.) Large crocodiles abound in the rivers and creeks, which the inhabitants, under the influence of terror, have made the objects of adoration. The great boa snake is even of greater magnitude, and a more formidable nature than these alligators. Some of them have been killed in the forests which were 30 feet in length, and capable of swallowing whole the largest hogs. The forests and mountains produce an immense variety of the feathered race, from the large cassowary to the minute humming bird. Of those which are most distinguised for the beauty of their plumage, may be mentioned the argus pheasants, fire-backed pheasants, crowned-pigeons, birds of paradise, golden thrush, king's fisher, Java sparrows, or rice birds, and many of the loories and pazaquets. The insect tribes are extremely numerous: snakes, scorpions, spiders, ants, musquitoes, fire-flies, and many other dangerous and disgusting vermin, swarm in the roads, houses, and even bed-chambers. A venomous spider is very common in the thickets, the body of which is nearly two inches in diameter, the fore legs or claws four inches in length, and the webs spun by it so strong as frequently to entangle and catch the smaller birds. Every object, indeed, in this country, seems impregnated with life. The bay of Batavia, swarming with myriads of living creatures, exhibits a phosphorescent light during the night-time; and a glass of water taken out of the canal becomes in a few hours a collection of animated matter, the minute portions of which, multiplying by division and subdivision, move about with astonishing rapidity. The coasts of the island abound with excellent fish, one species of which, called the Jacob Evertzen, often weighs 400 lbs.; sharks infest the bays, and swim boldly round the ships; and many animals, still unknown in natural history, are said to frequent the shores of Java.

The commerce of Java is very considerable, as, besides its own productions, it used to be the general depot of all the spices of the Moluccas. It is, properly speaking, however, merely an exchange trade, as all exportation of cash or bullion is expressly prohibited; and even the dollars which a merchantman may bring to the ports are not allowed to be taken away again, but must all be expended on goods. All traders were generally farther restricted by the Dutch company as to the nature of the cargo which they wish to export, and were required to take one-third or fourth of it in spices. The trade in certain articles, such as opium, camphor, benzoin, calin (a sort of Indian metal,) pewter, iron, saltpetre, gunpowder, &c. was, under the Dutch, reserved exclusively for the company, and the opportunities of gain by private trade have been gradually decreasing since the middle of last century. The principal exports from Java have been already noticed under the head of its productions; but the greater portion of the articles imported from other eastern countries may be considered as intended more for future exportation, than for the use of the island. From Bengal are brought patnas, blue cloths, and other stuffs, drugs and opium; from different ports in Sumatra, camphor of the best quality, benzoin, calin, elephants teeth, and birds nests;* from Borneo, gold-dust, diamonds, and birds nests; from Europe, kersymeres, cloths, hats, gold-wire, silver, galloon, stationery, wine, beer, dollars; from Muscat, dollars and gum-arabic; from the Isle of France, olive-oil, wine, vinegar, hams, cheese, soap, trinkets, ebony, mercury; from the Cape of Good Hope, garden-seeds, butter, Madeira and Constantia wines; from China, immense quantities of porcelain, and silks of every kind; from Japan, camphor, fans, articles of furniture, sabres, of an excellent temper, and ingots of fine copper for common coinage to pay the troops.

Money, especially of gold, is very scarce at Java; and the current coins are a mixture of Dutch and Indian pieces, of which the following Table gives the value in sterling money, at the par exchange of eleven francs per pound.

	Francs.		*L.*	*s.*	*d.*
The old Japan gold coupang . . .	24	0	2	3	$7\frac{1}{4}$
The new ditto	14	8	1	6	$2\frac{1}{4}$
The milled Dutch ducat	6	12	0	12	0
The silver-milled ducatoon . . .	4	0	0	7	$3\frac{1}{4}$
The unmilled ditto	3	18	0	7	1
The Spanish dollar or piastre from	3	3	0	5	$8\frac{3}{4}$
to	3	6	0	6	0
The rix dollar	2	8	0	4	$4\frac{1}{4}$
The Batavia rupee	1	10	0	2	$8\frac{3}{4}$
Other rupees about	1	7	0	2	$5\frac{1}{2}$

There are likewise half-rupees, quarter rupees, and fanams, equal to one-twelfth of a rupee. There are copper coins issued by the Company, particularly the stiver, of which eighty-eight are equal to a rupee; two-penny pieces, equal to two stivers; and doits or farthings. The rix-dollar, equal to 48 stivers, is the money chiefly used in private trade; and the milled silver ducatoon, equal to 66 stivers, was the current coin of the Company through their Indian possessions. A paper currency, issued by General Daendels during the late war, and termed Porbolingo paper, was common in the island at the time of its capture by the British, but was by them intended to be gradually called in and abolished.

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* See China, Vol. VI. p. 300—Note †.

Most merchants goods are calculated by the picol of one hundred and twenty-five pounds Amsterdam weight, which is subdivided into a hundred cattis, each weighing one pound and a quarter. Sugar is taken in cannassers of three picols, or 375 pounds each; coffee, in bags of 252 pounds; and cinnamon, in bales of eighty. Rice and other grain is measured by coyangs, which must weigh, when originally purchased by the Company, 3500 pounds; but which, by deductions for dust, drying, perquisites to the warehouse keepers, and other hands through which they pass, are finally reduced, when the article reaches the consumer, to 3000 pounds. There is also a small rice measure of 13½ lbs. called ganting.

The general population of Java has been variously estimated; by Valentyn at 3.300.000; by the gentlemen of Lord Macartney's embassy in 1792, at 2,300.000; by a census, said to have been taken by General Daendels, in 1808, the returns, exclusive of the south coast, exceeded 3,000,000; and by the latest surveys of the British, there are supposed to be 5,000.000 of persons on the island. The inhabitants, especially around Batavia, are composed of various tribes; but principally of native Javanese, Malays, Chinese, and slaves.

The Javanese live in a state of absolute slavery to the native princes, except that they are not transferred by sale from one master to another. The form of government among them is perfectly despotic, and the power of the prince in every sense uncontrouled. His will is literally the law, and is restricted by no regular institutions, either civil or religious. There are no hereditary distinctions or ranks among the people; but, by the mere authority of the monarch, the humblest may be raised to the chief dignities, and the highest degraded to the state of the meanest subject. They have no security in their property, or power to dispose of it, farther than the sovereign may permit. The land, particularly, is his exclusive property; and, in place of salaries to the officers of government, portions of ground are allotted and revoked at pleasure. Neither grant nor occupation can convey to a subject the remotest claim to permanent possession; but large tracts of territory are frequently given one day, and resumed the next; and scarcely an instance occurs of lands being held by the heirs of those who occupied them 30 years ago. The poorest peasant is not even at liberty to dispose of the fruits of his own industry at his own pleasure; but is bound to carry the whole, or a part, either to the company or the prince, at a regulated, and frequently most inadequate, price. Though the unbounded prerogatives of the sovereign, and this fluctuating state of property, cannot admit a hereditary nobility, there are nevertheless a privileged class, who receive titles and extensive powers at the pleasure of their despot; and who are proportionally revered by the superstitious people as representatives of royalty. The distinction between the people and these privileged orders is extremely marked and humiliating, and extends even to the language, of which the men of rank speak one dialect, and the plebeians another. The language is even adapted to the different gradations of rank; and the sovereign particularly often makes use of one dialect, which no subject dare use, and is spoken to in another, which can be addressed only to himself. When a Javanese, in short, approaches the presence of his prince, his great object is to express the immeasurable inequality between his condition and that of the sovereign. He assumes, therefore, the most abject position of body, rather crawling than walking; shews his respect not by decency of attire, but anxiously displays his relative meanness by studied raggedness or partial nakedness; and instead of recommending himself by the elegance of his language, selects the dialect of the most ignorant slave, or mimics the barbarous idiom of a despised stranger. It is the custom to express respect, not by standing, but by sitting in the presence of a superior; and even the slaves who attend as menials squat at the feet of their master or mistress, instead of placing themselves behind their back. The natives of Java are generally about the middle size of Europeans, straight and well made, steady and upright in their gait, affecting a superiority over the other inhabitants. Their eyes are black and prominent, the forehead broad, the nose somewhat flattened and curving downwards at the point, the upper lip rather projecting and arched, the joints of their hands and feet remarkably small, and especially in the female sex remarkably pliant, so as easily to bend backwards. The colour of their skin is a deep brown, their hair black, and kept constantly smooth and shining with cocoa-nut oil. Black is also the favourite colour of the teeth, which are all stained of the deepest hue, except the two in the front, which are covered with gold leaf. Children of both sexes go entirely naked till their eighth or ninth year; or, at most, the young females wear a belt round their loins with a broad metal plate in front. The dress of the men among the common people consists of a piece of cotton wrapt round the waist, drawn between the legs, and fastened behind, with a handkerchief or small cap upon the head. Persons of a higher class wear a wide Moorish coat of flowered cotton or other stuff, and generally turbans instead of caps. They eradicate the hair from every part of the body except the head; and rub the face and other parts not covered by clothing, with a composition of cocoa nut oil and sandal wood dust, as a preventative against too copious a perspiration, and the bites of insects. The dress of the women nearly resembles that of the men. It consists of a piece of cotton or chintz, called saron, wrapt round the body as high as to cover the bosom, and hanging down to the knees or ankles. Over this they sometimes wear a short jacket, but generally the shoulders and part of the back remain uncovered. They have no covering to the head, but wear their hair bound in a fillet, and fastened behind with large pins of wood, tortoise-shell, silver or gold, according to the rank of the lady: this head-dress is frequently adorned with a variety of flowers. Both sexes are remarkably fond of bathing, especially in the morning; yet are in other respects very filthy in their persons.

The dwellings of the lower orders are rather huts than houses, constructed of bamboo, plastered with mud, and thatched with leaves of the cocoa-nut tree. There is seldom more than one apartment for the family and poultry; and the furniture generally consists only of a bedstead of bamboo, a few pots for boiling their victuals, a hollow block for pounding the rice, and a few cocoa-nut shells as drinking vessels. They are sufficiently temperate in point of diet, in consequence of their extreme poverty, yet altogether indiscriminate, and even voracious, as to the nature of their food or times of meals. Their common article of subsistence is rice, boiled with a little fish or capsicum, or salt, and the fruit of the cocoa-nut; but in the mountainous regions, where rice is not raised, they make use of a certain root called tallas, with the salt which they procure from wood ashes. Notwithstanding, in short, the fertility of the country, the oppressed inhabitants are little better than starving savages. They are continually chewing betel or pinary, or rather a composition of the areca nut, lime of shells, and seeds of long pepper, made into a paste, and rolled up in a green leaf of betel-pepper, which communicates to the tongue and lips a deep red colour, afterwards turning to a dark mahogany brown. The areca nut, especially when fresh from the tree, has a strong narcotic power, and a small portion will intoxicate those who are not accustomed to it. They are fond of opium, and indulge freely in intoxicating liquors at their religious ceremonies; but the greater part of the people stupify themselves with the less expensive articles of tobacco and bangue. Though subject to few diseases, they are not long lived; seldom exceeding the age of 50, and very few attaining threescore years. Their physicians, who are frequently females, though ignorant of anatomy, are said to produce surprising cures by their knowledge of medicinal herbs, and by the use of friction with oil. The Javanese are polygamists, and marry as many wives as they can maintain; besides keeping a retinue of female slaves as concubines, but the lower classes have seldom more than one wife. They are said to be extremely indifferent with regard to the chastity of their females, and to be in this respect the most depraved people in the world. Their women are more comely than the men, but become extremely ugly as they grow old. They are much attached to Europeans, and fatally jealous of losing their affections. A Javanese person of rank spends most of his private hours in the society of his women, smoking his hooka in placid apathy, while they are dancing before him, or listening to their narrations of traditionary stories, or the adventures recorded in the sacred books. The principal amusement, of a more active nature, is a kind of tennis-play, at which they are remarkably dexterous, striking the ball (which is about the size of a man's head) with their feet, knees, or elbows, and keeping it in continual motion like a shuttle-cock. They are also extremely fond of cock-fighting, for which they keep a particular breed of a prodigious size, nearly as large as the Norfolk bustard. Instead of spurs, they fix to the bottom of the foot a piece of sharpened iron shaped like a scythe, and about the size of the blade of a large penknife; with a single stroke of which the bird will sometimes completely lay open the body of his antagonist. The principal weapon of the Javanese, which they always carry with them, is a kind of dagger called a creese, resembling a small hunting knife, with a blade of hardened steel, of a serpentine shape, and capable, from its form, of inflicting a large and wide wound. Its point also is frequently stained with a mortal poison. Their mode of salutation consists in touching the forehead with the right hand, accompanied by a slight inclination of the body. They are described as proud and cowardly, extremely arrogant in their treatment of persons who are their inferiors, in which light they regard all foreigners; but not less cringing towards their superiors, or those from whom they have any favours to expect. They are remarkably indolent in their habits, and are with great difficulty excited to labour; a disposition, which, considering the industry of the Chinese who reside among them, may be ascribed not so much to the influence of their climate, as to the oppressive nature of their government, which renders them so uncertain of being suffered to possess the property which they may acquire, and thus takes away every motive to active exertion.

The Chinese inhabitants of the island are very numerous, especially around Batavia, where the poll tax, paid only by the men, yields 40,000 rix-dollars, where they are calculated to amount to 100,000 souls. Their appearance, dress, and character is every where the same as in the empire of China; but in Java their extraordinary industry forms a striking contrast with the laziness of the other inhabitants. Though severely taxed by the Dutch, they generally found means to accumulate wealth. In all the towns they are the great holders of capital, and carry on a considerable trade with their native country, and the several islands in the Eastern Archipelago, as well as around the coast of Java. They are the principal shop-keepers, the most skilful gardeners, the most ingenious artificers, on the island. They are free masters of whatever they can earn by trade or agriculture, beyond the assessments levied by the Company's government: and in the rational hope of obtaining the reward of their exertions, they readily undertake the most toilsome occupations, which the oppressed and plundered Javanese would regard and would probably experience to be lost labour. But, with all these industrious habits, they are extremely addicted to gaming; and the houses licensed for the purpose in their quarter of Batavia, are so numerous as to yield an annual tax of 8000*l.* Though sufficiently pusillanimous and effeminate, they are extremely turbulent, and apt to break out into open insurrections, for which they were often punished by the Dutch in the most sanguinary and summary manner, (See BATAVIA); but, of late years, it has been the more humane policy of the Company's government to divert their attention by perpetual amusements, and to keep them in subordination by officers of their own nation.

The Malays are also a numerous class of the inhabitants of Java, but are a most worthless and ferocious race of people. They are sufficiently active, bold, and enterprising in the pursuit of plunder, and passionately addicted to every kind of gaming. They will frequently stake upon the issue of a cock-fight their last morsel of bread, their whole bodily clothing, and even their wives and children. They are treacherous in their dealings, remorseless in their enmities, and capricious in their friendships. Their rage is of the most ungovernable description, resembling a kind of mental frenzy; and their revenge is inflexible in its aim, however fatal its consequences to themselves. A blow, especially, is an indignity which they never forgive, and which makes them lose all consideration for their own existence. Under the influence of revenge or disappointment, a Malay sometimes adopts the desperate resolution of running a muck (as it is vulgarly called, from the word *amock* to kill); and, arming himself with a dagger, he sallies forth after swallowing a large dose of opium, attempting to kill every person who comes in his way. He is of consequence soon knocked on the head like a mad dog, or sometimes secured alive by means of a long pole armed with iron hooks; and, in this case, was usually put to death by torture, to deter others from imitating the example. But, since the abolition of the gambling houses by order of Lord Minto, not a single instance of these frantic bursts of despair has occurred at Batavia.

The last class of inhabitants are the slaves, who are imported chiefly from Malabar, Celebes, Timor, Madagascar and Mosambique. They are distinguished in the towns by having their legs and feet uncovered; and are employed either in domestic services, or trained to useful trades, by which they generally earn for the use of their masters a higher interest for the money expended in their purchase and subsistence, than could be procured by employing it in any other way. The most numerous and useful are Malays, from the different islands of the Eastern Archipelago, who are extremely prompt at imitation, and expert in all handicraft trades. Those from Malabar are mild and passive.

willing to be instructed, but slow of apprehension, ill adapted for hard labour, and generally used as personal attendants on their proprietors. Those from Madagascar and Mosambique are also a harmless and pliant race, tall, and athletic, but remarkable for their simplicity, and devoid of all ingenuity. The greater part of the female slaves are brought from Pulo Nias, a small island on the western side of Sumatra, and are greatly esteemed for their smooth skins, elegant shape, and lively dispositions, sometimes selling at the rate of a thousand dollars. The slaves of both sexes are well fed and lightly worked; but frequently treated with great severity. In consequence of the excess in the proportion of females, and the little care taken of their offspring, who are seldom the fruit of a connubial tie, there is required a large annual importation to keep up their number; and it is estimated, that more than a thousand are imported every year for the citizens of Batavia alone. There is little occasion, indeed, for this class of beings in a place where thousands of free Chinese, the best and most handy servants in the world, are ready to serve in every department, on the most moderate terms. Their treatment at least will now be greatly ameliorated, by the abolition of all farther trade in slaves in the British settlements, of which the good effects have already extended to the island of Java.

The Jawa or Javanese language, though now supplanted by that of the Malays, on the coast, is admitted to be the most ancient, and seems to have at one time been current throughout the whole extent of the island. In the interior, not one native among ten thousand can speak the Malay language; and the two people are not in the least intelligible to each other in their speech. The Jawa is sufficiently copious, and overflows with words of pure Sanscrit. The Hindoo names for the days of the week, though now obsolete, are universally known to the learned Javanese. The alphabet of Java is nevertheless peculiar; and has no resemblance, in the order of the characters, to the Deva Nagari. The simple letters are twenty in number, besides compound characters. Each letter has an inherent vowel, as in the Bengalee which is always pronounced like *a* in the English word ample, and is always sounded in reading, unless when a mark indicates its suppression. The other vowels are always joined to the consonants, and have generally one determinate sound. The compound characters are commonly placed beneath the simple letters; and then the inherent vowel of the upper letter is suppressed, while that of the compound one is sounded. The plural is formed, as in the Malay, by merely repeating the word; and there is no variation on account of number or person in the verbs. The orthography is extremely simple, and the construction not unlike that of the Malay.

There is satisfactory evidence, that the Javanese once professed the Hindoo religion in some form; but as there is no appearance of the grand Brahminical distinction of casts having ever prevailed among them, it is conjectured that the most prevailing system was that of Buddha. The traditions, however, of their ancient belief, the superstitious observances still extant, and the temples and idols peculiar to the Hindoo worship, with inscriptions in the sacred language of that faith, found in various parts of the island, furnish sufficient evidence, that the tenets of Brahma had also obtained a footing. Many of the penances inculcated in the Hindoo ritual are occasionally practised by the Javanese; and all who are descended of the royal blood scrupulously abstain from using the flesh of the cow. Many idols of Brahma, Vishnu, Mahadeva, and Bhavani, both of stone and metal, have been found in the island; and that of Ganesa, with his elephant head, was frequently recognised by the British officers, during their late campaigns in Java. More than 100 stones were discovered in the interior, covered with inscriptions, which Mr Marsden ascertained to be written in the Square Pali, a sacred character of the Birmans. The most extensive remains of these Hindoo structures are found at Borong Budor (the place of many idols) in the district of Cadoc, at Brambanam, and in the districts of Mataram, and Ballenbouang. In the adjoining island of Bally, the religion of Buddha still predominates; and a few idolaters are found in the eastern mountains of Java; but the prevailing religion at present is that of Mahommed, adulterated by many superstitious relics of the ancient systems. The Mahommedan faith was introduced in 1406, by Sheikh ibn Molana or Ben Israel, an Arabian, who soon became a powerful sovereign, as well as a venerated apostle in the island. The kings of Bantam and Cheribon claim him as their ancestor; and pilgrimages are performed to his Mosque and Mausoleum, which stand near the town of Cheribon, and are ranked among the most curious antiquities of the Eastern Isles. The Javanese Mahommedans do not bury their dead in coffins, but merely wrap their bodies in a piece of white cloth before being deposited in the grave; and place two stones, one at the head and another at the feet, which they believe will serve as seats to the two angels, who are to examine after death into the conduct of every individual in this world.

We shall now conclude this article with an account of the British expedition to Java, abridged from the detailed account published by Major Thorn, an intelligent and enterprising officer, who was himself attached to the staff of the forces employed there; and as the reduction of Java presents a series of brilliant achievements of the British arms, the splendour of which appears not to have been duly appreciated by the public, or to have been lost in the greatness of the efforts of our countrymen in the plains of Spain and Belgium, we shall present our readers with a succinct account of the operations of the army till the final subjugation of the island.

The force destined for the attack of Java amounted to upwards of 5000 Europeans, and an equal number of native troops of the East India Company's service, nearly 12,000 men in all, under the personal command of Lieutenant General Sir Samuel Achmuty, commander in chief at Madras. Of these about 2500 were inefficient from sickness when they landed at Java. The British armament, composed of 4 line of battle ships, 14 frigates, 7 sloops of war, 8 East India Company's cruisers, 57 transports, and several gun boats, in all about 100 sail, anchored in the bay of Batavia on Sunday the 4th of August 1811, and the debarkation of the troops took place on the same day, at Chittingching, a village about 10 miles to the eastward of Batavia. As the point of landing was left exposed by the enemy, the debarkation was effected without loss or opposition. It was the commander in chief's intention to advance direct to Cornelis, about nine or ten miles in the interior, where the enemy was posted in force, and to endeavour to penetrate by the route of Batavia, placing that city in the rear, from which he might derive supplies, and keep up the communication with the fleet. In pursuance of this plan, Colonel Gillespie, with an escort of dragoons, reconnoitred the road and country along the coast towards Batavia, to within two miles of the capital. The videttes of the enemy were observed on the other side of the Anjole river, which flowed between them and our troops, and the bridge across which was burnt down. It was a matter of surprize that the country was yielded up as far as this river without dispute, as, from its intricate and difficult nature, an active enemy might have opposed serious obstacles to an advance. The inactivity of the enemy, and the little appearance of force on the Batavia side, together with a serious conflagration in the city, induced the commander in chief to attempt the passage of the Anjole. This was effected without opposition by the advance of the army at 10 o'clock at night, on a bridge of boats provided by the navy, the enemy having contented himself with breaking down the bridges over the different canals and rivulets, to impede the approach to the city without risking any actual engagement.

The capital being summoned on the 8th of August, the mayor made his appearance, on the part of the burghers, to beg protection for them. Although little information of the enemy could be procured from this source, it was ascertained that they were assembled in force at Weltervreeden and Cornelis, the former place being about three miles distant from Batavia. The British began now to experience the consequences of being in a hostile country, the respectable inhabitants having been compelled to retire into the interior, and the water conduits having been destroyed, to cut off as much as possible a supply of water. In this state of affairs it became expedient to act with caution. A small party was pushed into the city to reconnoitre. Several of the enemy's videttes just shewed themselves, and galloped off in the direction of Weltervreeden. The party occupied the town-house, and by their presence rescued much valuable property from plunder and destruction. The town having surrendered at discretion, a royal salute was fired from the shipping, on hoisting the British flag at the crane wharf. Intelligence being received that the enemy meditated a night attack upon the detachment in the town, the men were called out at 11 o'clock at night, and ordered to lie upon their arms. Scarcely had they taken post, when the head of the enemy's column appeared, and opened a fire on the piquet stationed at the bridge leading to Weltervreeden. There was just time to raise the draw-bridge. The firing increasing all around the town, Colonel Gillespie sallied out at the head of a party to charge the enemy's advance in flank. This movement had the desired effect. The firing ceased, and the enemy were seen no more during the night. On the following evening, the town was saved from destruction by the discovery of a Malay, with a fire-brand in his hand, in the act of setting fire to magazines containing a great quantity of gunpowder.

Hitherto we have seen success attending the expedition, in consequence of the remissness of the enemy in obstructing its progress, and in making use of the means of defence within their reach. We perceive a difficult country yielded up without opposition, a river passed without contest, and the capital taken possession of without the loss of a man. General Janssens appears to have been deficient in the use of his light troops with which he was well provided; and instead of retarding the operations of an invading army, which proves always disastrous to it, he concentrated his chief resources within a short march of the capital, and at once brought on a general engagement, the most desirable object for the British commander.

The British force and its guns being transported across the Anjole; the advance, consisting of 1000 Europeans and 450 Asiatics, under Colonel Gillespie, marched on the morning of the 10th of August from Batavia in pursuit of the enemy. On approaching the cantonment of Weltervreeden, they found the place abandoned by the enemy, who had retired about a mile, to a strong position, on the road to Cornelis. The enemy's right was protected by an artificial water course called the Slokan, and their left by the great Batavia river. Pepper plantations concealed their line, and an abbatis, behind which were planted four horse artillery guns, blocked up the road to Cornelis. Dispositions being made to turn their flank, the object was effected, after surmounting great obstacles; the British troops rushed forward, and charged their artillery with the bayonet. The action lasted, however, two hours, from the impediments and difficulties to be overcome in closing with the enemy. A total defeat at length ensued, with the loss of 500 men, and several officers of distinction, together with four guns. A large quantity of military stores, and 300 pieces of ordinance, were captured in the arsenal at Weltervreeden. Preparations were now made to drive the enemy from their strong position at Cornelis. Here the whole French force exceeding, 10,000 men, was stationed, under the Governor General Janssens, and General Jumel, sen,or military officer. The position was defended by two rivers on the east and west, both unfordable, and was shut up in a deep trench, strongly palisadoed. Seven redoubts, and many batteries of heavy cannon, occupied the most commanding ground within the lines; the fort of Cornelis was in the centre, and the works were defended by a numerous and well organized artillery. As the season for field operations was far advanced, the heat of the climate intense, and the British force too small to admit of regular approaches, the commander in chief decided upon carrying the works by assault. Batteries of twenty 18 pounders and 8 mortars were erected to disable the principal redoubts, by the fire of which the enemy were greatly disturbed in their position, and their nearest batteries were silenced. The 26th of August was fixed for the assault. Colonel Gillespie, whom we always find at the post of honour and danger, was appointed to lead the main attack. He was supported by Colonel Gibbs at the head of another column. Colonel Wood was directed to advance against the enemy in front, and if possible open the position for the line stationed at the batteries, while other subordinate attacks were ordered to distract the enemy's attention, and to promote the main object. This object was to surprise a redoubt beyond the lines, and to cross the bridge leading into them with the fugitives, then to assault the redoubts within the lines, Colonel Gillespie attacking those to the left, and Colonel Gibbs to the right. Advancing by a detour through an intricate country, Colonel Gillespie, on approaching the works, learnt that the rear of his column had not arrived. Relying on the prompt and able assistance of Colonel Gibbs, as soon as the fire of the main attack should point out its direction, Colonel Gillespie resolved to advance. Twice he was challenged by the enemy's sentrics, and answering "patrole," passed on. An officer's piquet next challenging, the word "forward" was given, and so rapidly was the command obeyed, that the piquet was demolished in an instant. The redoubt was next assaulted and carried with the bayonet, with such celerity, that not a man escaped. Passing forward to secure the passage over the bridge, the attacking column was exposed to a tremendous fire, the spot being enfiladed by all the enemy's batteries. Having succeeded in gaining this point, the key to the position, a second redoubt was warmly disputed by the enemy, and it was not carried till after severe loss on our part. At this moment Colonel Gibbs arriving he was directed to carry another large redoubt on the right; which having effected in a most gallant style, an explosion of a gunpowder magazine took place, by which many lives were lost. The front of the position was now open, and our troops rushed in from all directions. The enemy maintained themselves in considerable force in front of fort Cornelis, but they were attacked with the bayonet, and completely overthrown. Colonel Gillespie, enfeebled by a slow fever, was overpowered by his extraordinary exertions. On receiving a contusion in the attack of the park, he fainted in the arms of Captains Dickson and Thorn. Having, however, soon recovered, and seeing the cavalry come up, he cut a horse from the enemy's guns, and immediately mounted it. The arrival of his own charger soon enabled him to head the charge in pursuit of the enemy. The route became general; and the pursuit was continued till the whole of the enemy's army was killed, taken, or dispersed. General Janssens saved himself with difficulty during the action; reaching Buitzenzorg, a distance of 30 miles, with a few cavalry, the sole remains of his army. The enemy lost an immense number in killed and wounded, and 5000 men were taken prisoners.

After the victory at Cornelis, a verbal offer of terms was sent to General Janssens, which he refused, on the plea of still having resources. The commander-in-chief determined to follow him in person to the eastward; and learning, by intercepted letters, that he had repaired to Samarang on the sea coast, he concerted with the admiral to conduct a force there, and to compel him to abandon the position. A joint invitation was sent to surrender at discretion, in order that the horrors of war might be averted from the colonists; but this was again rejected. The fort of Samarang, which it was deemed expedient first to reduce, was discovered to be evacuated. Janssens, however, having collected a force among the native princes, still occupied a position near the town. The enemy were posted on high and rugged hills, their flanks defended by the extreme difficulty of ascent; 30 pieces of cannon on platforms covered the front, and a valley 1200 yards broad separated the two forces. Notwithstanding the formidable appearance of the position, the commander-in-chief, from imperious circumstances, determined to attack the enemy in front. Colonel Gibbs, at the head of the advance, assisted by the fire of our guns at a great elevation, rushed across the valley. The enemy, paralyzed by the unexpected attack and imposing attitude of the attacking column, made but an ineffectual use of their guns, and were already vanquished. Their guns were abandoned; but the enemy, being chiefly cavalry, eluded pursuit. After this last effort General Janssens, finding himself deserted by his men, sent in a request to the commander-in-chief for a cessation of hostilities, and an offer to submit to terms.

Thus, after a short but brilliant campaign, the island of Java was wrested from the dominion of France, and annexed to the number of British colonies. Lord Minto, the governor-general of India, who had accompanied the expedition, having witnessed the triumph of the British arms, and having given publicity to the merit of the army in the records of government, returned to Calcutta, and erected a monument, at his own expence, to the officers who fell in the service of their country. Sir Samuel Achmuty, having left a force deemed sufficient for the protection of the new conquest, also returned with the rest of his troops to Madras.

We shall now call the attention of our readers from the affairs of Java to the neighbouring island of Sumatra, an act of singular atrocity having occurred at Palimbang, in the massacre of the peaceable Dutch colonists by the command of the sultan of Palimbang. To punish this flagitious proceeding, an expedition was dispatched under the command of Colonel Gillespie. Perhaps an account of this expedition might be introduced more properly in the article of SUMATRA itself; but at the same time, regarded as an operation of part of the army of Java, we wish to present our readers, at one view, with a connected account of the military transactions of the period in this quarter. The enterprize about to be related is of that daring character which places its author in the list of those who have signalized themselves by acts of personal intrepidity.

The sultan of Palimbang, taking advantage of the distracted state of Java, adopted the sanguinary resolution of cutting off at one blow the Dutch settlement in his dominions by a general massacre. It was rumoured that this hatred of the Dutch colonists originated in the libidinous habits of the eldest son of the sultan, who, in one of his nocturnal rambles, had been thwarted in his criminal designs upon the wife of a native by the Dutch patrole, brought to her rescue by her screams. The guard, ignorant of the rank of the culprit, pressed him so hard in pursuit, that he was compelled to seek safety in his boat, which he reached with difficulty, by plunging into the river. A thirst of revenge took full possession of the breast of the prince, who vowed to extirpate the colony in language loud enough to be heard by all his attendants. It appears that the sultan was soon prompted to second the barbarous resolution of his son, as two days only after the occurrence, and soon after the news of the success of the British in Java had reached Palimbang, a message from the former arrived to the Dutch resident, desiring him to come to the palace at Palimbang,—an invitation which, contrary to the advice of his friends, the resident imprudently accepted. Armed Malays, under various pretences, intruded themselves one by one into the fort, who, overpowering the guards, bound the Europeans and natives of the garrison, and tearing them from their weeping families, hurried them on board prows, prepared for their conveyance down the river, at the mouth of which they were all murdered. They were put to death under the most horrible cruelties, and the prows which contained them were afterwards set on fire and consumed. The unfortunate victims, it is said, amounted to 24 Europeans and 63 native soldiers. But the instigator of this horrible proceeding was doomed to experience speedy vengeance. The armament destined for Palimbang sailed on the 20th of March, 1812, from Batavia, but unhappily, from detention by contrary winds and currents in the straits, ample time was afforded the guilty sultan for flight or resistance. The former measure he had resolved to adopt, having removed his women and treasure into the interior of his country, while both he and his ministers endeavoured to amuse the British commander with declarations of respect, and messages requesting to be informed of the object of the armament. Appropriate answers were returned, with the assurance that the views of the British government would only be confided by the commander of the forces to the royal ear. But the insidious policy of the sultan began fully to develope itself. A message arrived, importing that the sultan would be happy to see his friend the British commander at Palimbang, with a few attendants only, as the presence of so large a force might occasion serious alarm to his subjects. Formidable batteries in appearance, though badly constructed, were placed at Borang, 40 miles from the sea, to guard the approach to the capital. Unmolested passage up the river being demanded of the messenger by Colonel Gillespie, this was granted, and also the occupation of the batteries, which was promised as a pledge of sincerity, a person styled their commandant being left to conduct the British to the spot. The next day, the British advance, with its guns, making its appearance within half gun-shot, the batteries which the sultan had ordered his troops to defend were abandoned by the enemy. Their cannon, amounting to 102 pieces, ready loaded and primed, were taken possession of. A scene of desultory and savage hostility soon spread around. Fires in all directions were kindled, and burning rafts were prepared for the destruction of the shipping; happily the incendiary Malays were dispersed by shot from the boats of the Cornelia, before a conflagration ensued. On the morning of the 23d of April, information was received that the sultan had fled from Palimbang on learning that the batteries of Borang were seized, and that the utmost confusion prevailed in the capital, many parts of which were a prey to rapine and assassination. To put a stop to this horrible state of things, and to prevent the massacre of the wealthy Chinese, which it was rumoured the sultan's adherents meant to perpetrate on the ensuing night, and whose property was to become the prize of the assassins, Colonel Gillespie meant to interpose a prompt relief. For this object a resolute body guard was selected, consisting of 17 grenadiers of the 56th regiment, accompanied by Captain Bowen and Lieutenant Monday of the navy, Major Butler, Major Thorn, and Lieutenant Forrest. At their head was Colonel Gillespie. The rest of the troops was ordered to follow with all expedition. It was night before they reached old Palimbang. The canoe which contained its leader outstript in sailing the other two boats, and the report of a signal gun, fired by the enemy, increased the anxiety for their coming up, as the apprehension of some treacherous design was entertained. Horrid yells and shrieks in all directions broke around, while a conflagration illuminated a tract of country, stretching for upwards of seven miles on both sides of the river. By the exertions of the crews, the other two boats were brought up to the support of their friends. A scene of horror now was displayed, which would have subdued the courage of ordinary men, but called forth the characteristic presence of mind of Colonel Gillespie. To use Major Thorn's own words, "Romance never described any thing half so hideous, nor has the invention of the imagination ever given representations equally appalling with what here struck us in reality." Undaunted by hosts of armed men, Colonel Gillespie boldly stepped on shore, at the head of his devoted band, and marched with a firm step, through a multitude of Arabs and ferocious Malays, whose weapons, steeped in poison, gleamed by the light of the torches. Huge battlements with massy gates, leading from one area to another, received the party, presenting the frightful spectacle of human blood still flowing and reeking on the pavement. The gates closed on its rear, and the blood stained court yards through which it was conducted appeared as the passage to a slaughter-house. A Malay who approached the colonel through the crowd, while walking by his side, had a large double-edged knife secretly conveyed to him by one of his countrymen. At the moment, a flash of lightning darting through the the tempest of the night, disclosed the weapon, while the assassin was endeavouring to conceal it in his sleeve. The colonel's eye caught the object, and, regardless of the crowd, he ordered the Malay to be seized, and thus frustrated by his firmness of mind the murderous design. The weapon was found, but the Malay escaped. On arriving at the palace, a more dreadful picture of devastation and outrage was displayed. Here rapine and murder had gone hand in hand. Vivid flashes of lightning and peals of thunder conspired with the glare of the conflagration to give a peculiar character of awe to the scenes which caught the sight. The flames, which devoured every thing around, in spite of the rain which fell in torrents, threatened the spot where the band had sought a temporary shelter. The crackling of bamboos, the falling in of burning roofs with tremendous crashes, and the near approach of the flames, amidst a hostile multitude and desperate assassins, gave to the situation of the party a most appalling prospect. An arduous task yet remained, to secure possession of the fort; and to perform this, the party was prepared to sell their lives as dear as possible, should an attack be made before the arrival of a reinforcement. The interior of the palace being carefully examined by torch light, all the entrances but one were barricaded. At this the grenadiers were stationed, and the strictest watch maintained. Soon after midnight, the party had the satisfaction of hailing the arrival of Major Trench with 60 men of the 89th regiment; and the remainder of the force under Colonel Macleod joined the little garrison early the next morning. Thus, by an act of unparalleled intrepidity, 17 British grenadiers, and the crews of two boats, with the officers above mentioned, were put in possession of a fort and batteries, mounting 242 pieces of cannon, without the loss of a man. A position which, by any other species of attack, must have risked the safety of the armament. The celerity of the movement, and the sudden arrival of the few British, whose numbers the panic of the enemy had magnified, caused the dispersion of the sultan's adherents, the prevention of their murderous project, and the relief of the town from the horrors of pillage. An American, in charge of a Chinese junk at Palimbang, gave a dismal recital of the storm about to burst that night, and which the interposition of the British had averted. This junk was marked as the first victim of its fury. The solemn deposition of the guilty sultan, by Colonel Gillespie, took place, to the great joy of the people, and his brother was proclaimed in his stead. The object of the expedition being thus happily terminatnated, the force, with the exception of a garrison left behind, repaired to Samarang, where a fresh field for British valour was open in the heart of Java.

The sultan of Mataram or Djoejoecarta, who had been intriguing the downfal of his last masters, still continued disposed to dispute the possession of Java with the British. The new Lieut.-Governor Raffles, and Colonel Gillespie, now commander of the forces in Java, repaired to Djoejoecarta, the sultan's capital, and after trying in vain to settle matters amicably, prepared for hostilities. The residence of the sultan, or Crattan, as it is called, is about three miles in circumference, surrounded by a broad wet ditch, with draw bridges, a strong high rampart with bastions, and defended by 100 pieces of cannon. In the interior are numerous squares and courts, all strong and defensible; 17,000 regular troops manned the works, and an armed population of 100,000 men occupied the country for many miles round. The Dutch fort, within 800 yards of the Crattan, was calculated for little else than a military depot, and the fire from it was only intended to amuse the enemy while the force was concentrating. At length the troops having arrived, formidable from their intrepidity, not from their numbers, they were ordered into the fort, preparatory to the attack of the enemy's strong-hold. It was determined to carry the fortifications by assault, as the most prompt way of reducing the place, and of giving security to the colonies, threatened by the irruption of armed thousands at Bantam, Cherilon, Sourabaya, and other places, on the first signal. The different attacks being arranged by Colonel Gillespie, the works were escaladed, and carried with irresistible impetuosity. The troops were animated to heroic exertion by the cry of "death or victory" resounding through the ranks. In many places the enemy were dispersed by their own guns turned upon them. The sultan was compelled to surrender himself a prisoner, the cavalry and horse artillery being posted so as to intercept the fugitives. Hostilities having now ceased, the island of Java was restored to tranquillity and order, and has, we believe, been recently given over to the king of the Netherlands. See Stockdale's *Sketches of Java*; Sir George Staunton's *Account of the Embassy to China*; Barrow's *Voyage to Cochinchina*; Thunberg's *Travels*; Hamilton's *East India Gazetteer*; *Baptist Missionary Periodical Accounts*, No. xxvi.; Thorn's *Account of the Capture of Java*; and Brande's *Journal of the Arts and Sciences*.

ICE is a transparent crystallised substance, formed by the congelation of water when reduced to a temperature below

32° of Fahrenheit. As ice is generally produced by a very rapid congelation, it commonly occurs in an aggregated mass of separate crystals, the axes of which are turned in different directions. Under favourable circumstances, however, where the process of congelation has been slow, and the water exposed to no agitation, perfect crystals of ice are sometimes formed. M. Hassenfratz, M. Hericaut de Thury,[*] and Mr Scoresby, have observed crystals of ice that had the form of regular hexahedral prisms; and Romé de Lisle, M. D'Antic, and Mr Scoresby, have sometimes found them in the state of octohedrons, composed of two four-sided pyramids.

In examining the optical properties of ice, Dr Brewster found, that even large masses, two or three inches thick, formed upon the surface of standing water, were as perfectly crystallized as rock crystal or calcareous spar, all the axis of the elementary crystals, corresponding with the axis of the hexahedral prisms, being exactly parallel to each other, and perpendicular to the horizontal surface.

This unexpected result was obtained by transmitting polarised light through the plate in a direction perpendicular to its surface. A series of beautiful concentric coloured rings, with a dark rectangular cross passing through their centre, were thus exhibited. These rings were of the same nature as those seen along the axis of *Zircon;* for when they were combined with the rings produced by this substance, a system of rings was formed, smaller than that which was produced by either singly; whereas, had they been of the opposite character, the rings produced by the combination would have been greater than one of the systems produced separately. Hence, ice belongs to the attractive class of crystals. The polarising force of ice is $\frac{1}{2117}$, that of rock crystal being $\frac{1}{360}$. Its refractive power is 1.307 less than that of water, and its specific gravity is also less than that of water. For an account of the chemical laws on which the congelation of water depends, see CHEMISTRY.

Under the article COLD, and also under GREENLAND, some of the phenomena which accompany the formation of ice in polar regions are briefly mentioned. Their history, however, is sufficiently important to require a minute description, on account of the great scale on which congelation is effected, the variety of the appearances presented, the striking grandeur of some, and the singularity of others, together with the suggestions which some known circumstances concerning it afford for the prosecution of interesting objects.

The appearances which the ice presents in its outline, especially when existing in a detached state, are diversified; and, being of great interest to mariners who navigate the polar seas, they are designated by distinct terms, with as much familiarity as the varieties of form which occur on land.

A continued sheet of ice, so extensive that its ulterior boundary cannot be seen from the mast-head of a ship, is called a *field.*

Fields are formed from ice which is in the first instance fixed. They owe their origin to a process of congelation on the surface of the ocean, to which the vicinity of land is not, as some have supposed, necessary. This process takes place both in a rough and in a smooth state of the surface, when the temperature is sufficiently low. It requires a temperature considerably inferior to the freezing point of fresh water, as the force must be sufficient to surmount the attraction of the salt for the water which holds it in solution, for more or less separation always takes place: the ice formed under these circumstance, never affords water of equally strong impregnation as the original water of the ocean.

On a rough surface, this process begins with the formation of detached crystals, called by the sailors *sludge*, which resemble snow immersed in water without undergoing liquefaction; by the union of the crystals, and the accumulation of the sludge, the surface is rendered smooth. The continued sheet now formed is soon broken into fragments of about three inches in diameter; these again coalesce and form a continued texture of a stronger kind, which, in its turn, is broken into masses of much larger size. These are rounded at the edges by mutual attrition, and receive the name of *pancake ice.*

In sheltered situations and in still weather the congelation goes on more regularly, and to appearance more rapidly. The thin sheet formed in the first instance receives accessions to its thickness from beneath. In twenty-four hours of keen frost it often acquires a thickness of two or three inches; and in less than two days is strong enough to bear the weight of a man. This is termed *bay ice*, from being formed in sheltered bays. That which is of older formation is distinguished into two kinds, according to its thickness, being called *light ice*, when from a foot to a yard thick, and when above a yard *heavy ice.*

Some fields of ice are so smooth in their surface, so transparent in their texture, and so exactly similar to the ice formed on fresh lakes, that it has been believed scarcely possible that they should be produced by the freezing of the ocean, and they have been considered as owing their origin, at least in part, to the freezing of rain or melted snow, which had settled on a flat surface of young ice, encircled by a ledge of older ice, which retained the water like a cup.

Loosened pieces, which are smaller than fields, but still of very large dimensions, are called *floes.* Pieces much smaller, detached from the angles of larger ones, and floating in a congregated state, are called *brash ice.*

Ice of any form or size, floating in a state sufficiently loose to allow a vessel to sail freely among it, is called *loose*, *open*, or *drift ice.*

A number of large pieces in close contact, forming a congeries which cannot be seen over from a mast head, are called a *pack*. A similar congeries, which can be seen over, is called a *patch*. When a congeries of either kind is of an oblong shape, it is called a *stream* of ice.

A protuberance, considerably elevated above the common surface of flat ice, is called a *hummock*. Hummocks often attain the height of thirty feet or upwards. They are sometimes formed by fields of ice crushing each other, so that large pieces, separated from the margin, are raised on edge, or a numerous wreck is accumulated on the top of a field. Hummocks are generally near the margin, but sometimes they extend to the middle of a field, showing that their origin is sometimes different from that now described. They communicate to the ice a variety of fanciful shapes, and render the whole appearance of it highly picturesque.

When the effect of concussions of pieces of moderate size is to accumulate such masses above a comparatively thin *floe*, that the surface of the latter is depressed beneath that of the water, this part is called a *calf*. Some of these *calves* are sufficiently deep to allow a vessel to sail over them. But it is dangerous to approach them, their depth being uncertain and unequal; and when they rub freely against the superincumbent pieces, they often become so far detached that their buoyancy raises them to the surface, and their momentum during a change of situation is sufficient to stave the timbers of a vessel, or reduce it at once to a wreck. Sometimes even a gentle heaving motion of this sort, by raising one end of a vessel, immerses the other end, to the imminent danger of precipitating it in that direction to the bottom.

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[*] M. Hericaut de Thury observed the crystals of ice in the subterraneous glacier of Fondeurle, about two leagues to the east of Valence. The whole of the floor of the cavern was composed of hexahedral prisms of the most perfect transparency, of which the terminal surface presented striæ parallel to the faces of the prism, while the crystals which were found within the hollow stalactitical masses of ice were partly triangular prisms, and partly hexahedral prisms; some of which were also striated on the terminal faces, and presented facets which replaced the terminal edges at the junction of the base and the prism. He was not able, however, to find any crystals with a complete pyramid.

Concave sinuosities in the border of a large mass of flat ice are called *bights*. They often afford a convenient refuge to ships, but sometimes they give occasion to detentions of the most inconvenient and dangerous kind.

We have now to notice some changes of a grander and more terrific description, to which the ice is subjected. That powerful tendency to undulation of the surface, communicated by the agitation of the adjoining liquid surface of the ocean during a continued storm, which is denominated a *ground swell*, sometimes produces a sudden disruption of extensive fields. The ice, when thin, accommodates itself to the surface by bending; but, when several yards in thickness, it refuses to yield beyond a certain extent, and is broken into pieces with dreadful explosions. The best account that we know of the appearances presented on such occasions is given by a party of Moravian missionaries, who were engaged in a coasting expedition on the ice along the northern shore of Labradore, with sledges drawn by dogs. They narrowly escaped destruction from one of these occurrences, and were near enough to witness all its grandeur. We extract it from the recent interesting compilation of the Rev. Dr Brown, on the *History of the Propagation of Christianity*, vol. ii. p. 51. "The missionaries met a sledge with Esquimaux turning in from the sea, who threw out some hints that it might be as well for them to return. After some time, their own Esquimaux hinted that there was a ground swell under the ice. It was then scarcely perceptible, except on lying down and applying the ear close to the ice, when a hollow disagreeable grating noise was heard ascending from the abyss. As the motion of the sea under the ice had grown more perceptible, they became alarmed, and began to think it prudent to keep close to the shore. The ice also had fissures in many places, some of which formed chasms of one or two feet; but, as these are not uncommon even in its best state, and the dogs easily leap over them, they are frightful only to strangers. As the wind rose to a storm, the swell had now increased so much that its effects on the ice were extraordinary and really alarming. The sledges, instead of gliding smoothly along as on an even surface, sometimes ran with violence after the dogs, and sometimes seemed with difficulty to ascend a rising hill. Noises, too, were now distinctly heard in many directions like the report of cannon, from the bursting of the ice at a distance. Alarmed by these frightful phenomena, our travellers drove with all haste towards the shore; and, as they approached it, the prospect before them was tremendous. The ice, having burst loose from the rocks, was tossed to and fro, and broken in a thousand pieces against the precipices with a dreadful noise; which, added to the raging of the sea, the roaring of the wind, and the driving of the snow, so completely overpowered them, as almost to deprive them of the use both of their eyes and ears. To make the land was now the only resource that remained, but it was with the utmost difficulty that the frightened dogs could be driven forward; and, as the whole body of the ice frequently sunk below the summits of the rocks, and then rose above them, the only time for landing was the moment it gained the level of the coast,—a circumstance which rendered the attempt extremely nice and hazardous. Both sledges, however, succeeded in gaining the shore, and were drawn up on the beach, though not without great difficulty. Scarcely had they reached it, when that part of the ice from which they had just escaped burst asunder, and the water rushing up from beneath instantly precipitated it into the ocean. In a moment, as if by a signal, the whole mass of ice for several miles along the coast, and extending as far as the eye could reach, began to break, and to be overwhelmed with the waves. The spectacle was awfully grand. The immense fields of ice rising out of the ocean, clashing against one another, and then plunging into the deep with a violence which no language can describe, and a noise like the discharge of a thousand cannon, was a sight which must have struck the most unreflecting mind with solemn awe. The Brethren were overwhelmed with amazement at their miraculous escape, and even the pagan Esquimaux expressed gratitude to God for their deliverance.

Ice, in that elevated form which is called the *iceberg*, demands particular attention. This term is applied to such elevations as exist in the vallies of the frigid zones; to those which are found on the surface of fixed ice; and also to ice of enormous thickness and stupendous height in a floating state. The vallies of West Greenland are filled with icebergs to an extent never yet explored. The seven icebergs in the vallies on the west cosst of Spitzbergen were supposed by Mr Scoresby, when seen by him, to present a perpendicular front 300 feet high. Their green hue, and glistening splendour, exhibited a pleasing variety, and added a richness to the prospect, by the contrast which they presented with the magnificence of the neighbouring snow-covered mountains. From these icebergs enormous overhanging masses are sometimes detached by their own weight, as from the glaciers of the Alps. This separation is aided by a softness of cohesion which they acquire in the thawing season; and it is also believed that quantities of water pent up within them exert, in the act of freezing, an expansive force, which produces disruption. Masses of this kind, in a floating state, are most plentiful in Baffin's Bay, where they are sometimes two miles long, and two-thirds of a mile broad, bristled with varied spires, rising more than 100 feet above the surface, while the base extends 150 yards beneath it. Icebergs of an even surface, elevated 30 yards above the sea, and five or six square miles in area, are very common. Those of East Greenland are of inferior size. The largest that Mr Scoresby ever saw was 1000 yards in circumference, flat on the summit, and nearly 20 feet above the level of the sea. This difference probably arises from the more sheltered situation of the large bays of West Greenland.

We have reason to believe that many icebergs are formed at a distance from any land. This appears from the account which Muller gives of an expedition made, in the year 1714, by Markoff a Cossack, after he had been foiled by drift ice in an attempt to explore the ocean to the north of Russia. This adventurous person set off with a party from the coast of Siberia, at the mouth of the river Yani, in North Lat. 71°, in the month of March, to travel on the surface of the ice to the north pole in sledges drawn by dogs. He proceeded for seven days till he reached the 78th degree, when his progress was impeded by ice elevated into prodigious mountains, from the summits of which he could discern nothing but mountainous ice to the northward. He therefore returned, and, after some hardships and losses, reached the coast of Siberia on the 3d of April, having in 19 days travelled 800 miles. To what extent these masses may be detached during summer in regions nearer the pole than any that have hitherto been navigated, we cannot determine; but it is not improbable, that from this source many of the loose icebergs are derived which are found floating to the west of the islands of Spitzbergen. It is probable that many are also formed on the eastern coasts of these islands, which are more favourable to such a process. But the numbers of these enormous masses that come by Davis's Straits are by far the greatest, and the coast of Newfoundland is often crowded with them. They gradually dissolve as they move to the southward; but some have been found in Lat. 40°, 2100 miles from their source.

These lofty masses are formed partly by the accumulation of drifted snow first slightly softened by the summer heat, and acquiring an augmented solidity by a subsequent process of congelation. It is probable that their high peaks receive accessions from the falling moisture, which is more readily congealed than that which lies lower, the temperature being lowest at the highest elevations. We mentioned under the article COLD an ingenious conjecture of Professor Leslie, that they attained their great height by the deposition of hygrometric water from the air ascending from the surrounding ocean, in a manner analogous to those rising peaks of ice which are formed in the congelations produced in the ingenious process for freezing water by its own evaporation, of which that philosopher is the inventor. But we may be allowed to suspend our entire acquiescence in this opinion, till it is ascertained how far these formations themselves may arise from a cause totally different, viz. the elevation of moisture by the capillary attraction of the previously formed crystal. We know that this is the mode in which similar peaks are formed during the leisurely crystallization of certain neutral salts by evaporation. If a solution of muriate of ammonia is left for some days to evaporate spontaneously in a glass, appearances of the same kind are presented.

The shelter created by icebergs is often highly useful to the whalers, by protecting them from gales, as well as from the concussions of drift ice, as the latter moves more quickly, requiring a shorter duration of the wind in one direction to attain its utmost velocity. The ships are sometimes moored to the icebergs for security; but this situation is not without its dangers. The masses are sometimes so nicely balanced as to be easily overturned. They sometimes catch the bottom in places comparatively shallow though still of great depth, and the effect of the concussion is to detach large pieces from them, or to cause the whole mass above water to plunge forward under the surface, and the vessel moored to them is staved and wrecked. The same effect is produced by the rising of immense calves. These occurrences sometimes happen when the ship rides at a distance of 100 yards from the emergent part. The motions are indeed of so tremendous magnitude, that a vessel is sometimes lost by the vast waves and whirls which they occasion, which overwhelm every smaller object within a considerable distance of the rolling mountain. Icebergs often prove useful by supplying the ships with fresh water, whch is found collected in large wells on the surface, and is let down into the vessel by a cylindrical piece of canvas, called a *hose*.

The irregular outline of the fixed polar ice, and the changes to which it is subjected in the course of years, are highly interesting. Before the 15th century, the eastern coast of West Greenland was free from ice in summer, and could be freely approached by ships. After a considerable trade had for 400 years been carried on between Iceland and that country, which was inhabited by a large and flourishing colony, the polar ice suddenly exceeded its former limits, launched down in a direction nearly parallel to the coast as far as the southern Cape, and barricadoed the whole coast in such a manner as to render it ever since inaccessible. The fate of the colony is unknown. If the increased severity of the climate was insufficient to destroy it, this effect was inevitable from the destruction of all the resources on which it depended. The mass of ice lying between Old or West Greenland and the northern part of Russia on the east, though varying in different seasons, presents a striking uniformity in its general outline. After doubling the southern promontory of Greenland, it advances in a north-eastern direction, half enveloping Iceland in close seasons, till it reaches the small island called John Mayne's Island, which it frequently encloses. It then trends a little more to the eastward, and intersects the meridian of London in the 71st or 72d degree of latitude. Having reached the longitude of 6, 8, or 10 degrees east in the 73d or 74th degree of latitude, it suddenly stretches to the north; sometimes proceeding on one meridian to the latitude of 80°, at others forming a deep sinuosity, extending only two or three degrees northward, then south-easterly to Cherry Island; it then assumes a straight course a little south of east, till it forms a junction with the coast of Nova Zembla.

On the whole, the tendency to a fixed state of the ice is greatest on the eastern sides of land. These are rendered peculiarly cold, from the westerly winds having had their temperature reduced by blowing over the eternal snow and ice of the continents. These winds are in their origin warmer than the east, as they generally originate in southerly situations; whereas the east winds, originating in the north, are less liable to a reduction of temperature in passing over a frozen continent. Thus the eastern shores are exposed to all the original coldness of the east winds when they blow, and to an additional coldness acquired by the west winds; while the western shores are wafted by the west winds in their mild state, in which they keep up a liquifying process, a quality which they lose after traversing the land. It is well known that south-west and north-east winds are more common in the northern hemisphere than the north-west or the south-east. Winds that blow directly from the west tend to produce a perpetual extension of the ice; but the south west winds give that form to its boundary which we find it actually to possess, *i. e.* a line stretching to the north-east. But why, at one period, the coast should for centuries be free from ice, and at another period be perennially lined with it, is one of those phenomena in the changes of climate, for which, like many others in meteorology, we cannot account. For an illustration of the circumstances now stated, we refer to the meteorological Essays of Mr Dalton. See also our article METEOROLOGY. The form of the outline of the ice varies, however, according to the direction and force of storms and currents.

The deep bay formed by the boundary of the ice to the west of Spitzbergen is the only track for proceeding to the fishing latitudes in the north. In close seasons, the ice at the extremity of this bay is so close, that the vessels cannot advance beyond the 75th or 76th degree; but in open seasons, they have an uninterrupted navigation along the western coast of Spitzbergen to Hackluyt's Headland, the north-western angle. An open channel extends in such seasons from 20 to 50 leagues in breadth, to the latitude of 79° or 80°, gradually approaching the coast, till it effects a junction with its northern extremity by a curvilinear head. It is only in this open part, that they can proceed sufficiently far to the north to find the whales. These animals, of stupendous size but timid in disposition, prefer these places as affording the most secure retreats, enabling them to dive beneath the ice out of the reach of danger, and to return to the open part to respire. It is in the 78th and 79th degrees of latitude that they occur in greatest number. At the southern part of Spitzbergen, there is at the bottom of the bay, called *the whale fisher's bight*, a barrier of compact drift ice, mixed with bay ice, stretching from the fixed ice on the west to that on the east, and from 20 to 40 leagues in breadth. This always exists in the early part even of open seasons, and to find their way across this barrier is, with mariners, one principal object of anxiety and exertion. For this purpose every advantage is taken of those openings in the ice, which are expressively called *veins of water*. When the wind is fair they set all possible sail in order to accomplish it speedily, and yet find it necessary to be on their guard against the dangers which surround them from pieces of floating ice, dangers which of course are augmented in proportion to the velocity of a ship's motion. These difficulties occur in the month of April; but by the end of June the ice is dispersed, and a safe return afforded, which could scarcely be obtained if it continued equally prevalent, as the fogs which obstruct the view at the end of the season would prevent them from seeing their way through similar obstructions. In sailing to the north, it is of importance to anticipate the separation of the ice, in order to catch the best season for the fishery.

Great and unexpected changes often take place in the manner in which the drift ice is collected. It frequently happens that a ship is completely beset, and unable to move in one direction or another, and next day, without apparent cause, the ice is completely dispersed, and an open sea presented on every side. A tendency to separation always takes place in the drift ice during a calm. The changes to which the local situation of a ship is on such occasions subjected are not less surprising. Two ships surrounded with close ice, a few furlongs apart, have sometimes been in a few days separated to a distance of several leagues, though no apparent change took place in the continuity of the pack. Bay ice sometimes proves beneficial to the whaler, by imbedding the ship, and averting that danger which arises from the unequal shock produced by the brunt of the heavy ice. But it is in other respects extremely troublesome as it is often the means of besetment, and thus the primary cause of the greatest calamities. A sheet of it a few inches in thickness is sufficient to render a ship immoveable. If, under these circumstances, it is too strong to be broken by a boat, recourse is had to the laborious operation of sawing it.

The general tendency of the loose ice in the neighbourhood of Spitzbergen is to drift to the south-west, towards Iceland and Cape Farewell in West Greenland. When we consider the obstacles encountered in the navigation of the northern seas, which are not more exempt than others from stormy weather, and find that these fishing voyages are attended with so much average security, we have a striking exemplification of the adventurous spirit of man, and of the power of art in surmounting difficulties of the most threatening kind. A combination of thick weather, a stormy gale of wind, and a tempestuous sea, crowded with detached pieces of ice, each of which is enveloped in a thick spray raised by the dashing of the waves, presents one of the most terrific navigations that can be conceived.

The phenomenon called the *ice-blink* is worthy of our attention. It is a lengthened stripe of lucid whiteness in the sky, bordering the visible horizon, which often affords a beautiful and perfect map of the ice, 20 or 30 miles beyond the limit of direct vision. This even serves to shew to the experienced observer the exact kind of ice, whether field or packed, which occurs in that direction.

Mr Scoresby has projected a plan for surmounting the obstacles opposed by the ice in a visit to the north pole, by travelling over the surface of it, in the manner already mentioned as having been put in practice by Markoff. This is detailed in an intelligent and ingenious paper, read before the Wernerian Society, which contains much information relative to the polar ice, and to which on this subject we have been principally indebted. Access to it previously to publication has been most obligingly furnished to us by professor Jameson, the president of that Society. Of that plan it would be out of place to give any particular account. It will be inferred from the circumstances already mentioned as having occurred to Markoff, that, though not impracticable it must be extremely precarious, and that those who engage in it must be prepared for total disappointment after the most Herculean exertions. Yet it is worthy of remark, that if no obstruction arose from the form of the surface of the ice, an expedition undertaken from the northern coast of Spitzbergen to the north pole and back would exceed that actually performed by Markoff only by 250 miles. Some important information, in reply to a series of queries directed to the elucidation of this subject, is given by Colonel Beaufoy, in Dr Thomson's *Annals of Philosophy* for May 1817. It was obtained from Russian fishermen who had wintered at Spitzbergen. The tendency of the accounts given by them is, to impress us with the difficulty of such an undertaking, both as arising from the great inequality of the surface of the ice, in so far as could be inferred from observations made in that part of the world, and from the storms of wind and snow, which are represented as extremely frequent. An answer to an additional query, however, is still wanted: Is there any period of the winter, at which a few weeks of fair and calm weather may in general be depended on? Or, are there any meteorological appearances from which such a track of weather may be occasionally predicted? One interesting practical enquiry is suggested by the degree of success obtained by Markoff. Might not an attempt be made to explore by similar means the site of the ancient colony of West Greenland.

Of the ice of the southern hemisphere we have less particular accounts. But we know that ice extends to a much greater distance from the south pole than from the north. The 80° of north latitude is almost annually accessible at one part to navigators, and has occasionally been exceeded. The 73° or 74° may be attained in the closest summers. But the *ne plus ultra* of the antarctic hemisphere is the 72°, *i. e.* 600 miles short of that of the arctic: The nearest approach made to the South pole being 1130 miles, and to the North pole 510. Icebergs and floating ice of all forms abound in the southern seas, and present similar appearances to those found in the northern.

We shall now take notice of one circumstance in the history of ice which is seldom particularly described, viz. that it is found forming at the bottom of water, even on a large scale, while the surface remains liquid. This seems contrary to what might be expected from the order which takes place in the successive reduction of temperature in different parts of the same portion of water, as well as from the comparative specific gravities of water and ice. The facts are well ascertained, as occurring in Germany, in Great Britain, and in North America. In Germany two kinds of ice are described as formed in that situation: one which is called *sichl-eis*, is the first that is formed at the beginning of a severe frost, and immediately rises to the surface in small grains, similar to hail. The other, from retaining its situation longer, is more commonly observed and better known. This is called in Germany *grund-eis*. In Scotland, where it is not uncommon, it is called *grund-grue*, i. e.

"ground-grown." Men of science, not having attended to these phenomena, have considered them, when accidentally met with, as extraordinary. It has happened, when they were in quest of something else, that they have found at the bottom of a river a sandy mass agglutinated in a manner which they did not comprehend, till they found that the cementing medium was ice. At other times they have been struck with great surprize on finding gravel, earth, or mud, mixed with ice on the surface. But such phenomena are familiar to the fishermen and boatmen on some of the northern rivers, particularly the Elbe. They sometimes find it difficult to fix their anchors, on account of the smoothness which the ice imparts to the bottom. When taken up, the anchors are sometimes coated with ice, and at other times it forms on them in such quantities, as to raise them to the surface by its bouyancy. Ice, instead of fish, is not unfrequently brought up with the fish-hooks. The sluices and flood-gates are sometimes rendered immoveable by the ice formed at the bottom. It often acquires a great thickness before it rises, and then brings up with it not only earth and gravel, but stones of large size. We are told, on credible authority, that in the Elbe the stones, to which buoys had been fixed as marks of the dangerous shallows, have been brought to the surface by the *grund-eis*, and removed to a different part of the river. On the margins of lakes numerous new fragments of rock have been found on the subsiding of frost, which had been brought up in this manner from the middle and floated to the edge. Some species of bottom are more favourable to this process than others: sand and gravel are more so than solid rock. M. Brauns, a Hanoverian, after consulting with much care the best sources of information, learned that, in the northern seas, traces both of *sichl-eis* and *grund-eis* were found where the depth of the water was 108 feet. In the Baltic alone it was found at depths still greater. One reason why these phenomena are seldom observed is, that ships return before the setting in of the strong winter frosts. Mr Knight, in the *London Philosophical Transactions* for 1816, thus describes the phenomena as they occurred under his own observation, and at the same time delivers his opinion of their physical cause. "I first witnessed the existence of ice in the bottom of the water in the river Teme, which passes near my residence in Herefordshire, in the last winter. In a morning which succeeded an intensely cold night, the stones in the rocky bed of the river appeared to be covered over with frozen matter which reflected a kind of silvery whiteness, and which, upon examination, I found to consist of numerous frozen spicula crossing each other in every direction as in snow; but not having any where, except very near the shore, assumed the state of firm compact ice. The river was not at this time frozen over in any part; but the temperature of the water was obviously at the freezing point, for small pieces of ice had every where formed upon it on its most stagnant parts near the shore; and upon a mill-pond just above the shallow streams, in the bottom of which I had observed the ice, I noticed millions of little frozen spicula floating. At the end of this mill-pond numerous eddies and gyrations were occasioned, which apparently drew the spicula under water, and I found the frozen matter to accumulate more abundantly on such parts of the stones as were opposed to the current where that was not very rapid. On some large stones near the shore, of which parts were out of the water, the ice beneath the water had acquired a firmer texture, but appeared from its whiteness to have been first formed of congregated spicula, and to have subsequently frozen into a firm mass, owing to the lower temperature of the stone or rock."*

The theory here given by Mr. Knight falls short in accounting for the facts which he himself observed, for, by supposing the spicula to have been formed at the surface, and afterwards precipitated by the trembling motions of the water to the bottom, it does not contain an explanation of that congelation which must go on at the bottom itself before the spicula can adhere to the stones. On other occasions it is formed in places where the motion is far from being sufficient to send the floating crystals to the bottom. It is also to be remembered that, instead of such spicula as Mr Knight describes, smooth and compact ice is found in these situations. We would therefore observe, that water, when reduced to 32°, and then deprived of an additional portion of caloric, though it has a tendency to freeze, yet experiences in this respect different degrees of facility, according to certain circumstances. One of these is the presence of certain solid points or rough surfaces. Hence water reduced to 26° without freezing, immediately freezes when a crystal is dropt into it, and the ice forms first upon the chrystal itself. Agitation also seems to influence it. Water, when left quite stagnant, may remain liquid, and be immediately frozen by a gentle shaking. But a great degree of agitation while it is cooling seems to retard congelation, and always prevents it from proceeding with regularity. Now it appears to us, that in whirls and eddies, the water at the surface loses a certain portion of caloric, and receives a tendency to congelation, which however is resisted to the motion to which it is subjected, and may be promoted in another place by a slight additional aid from an external cause. The motion, indeed, while it prevents the freezing of the surface, assists that process at the bottom, by accomplishing the reduction of the whole body of water to the freezing temperature. It is well known that the temperature of greatest contraction and specific gravity of water is somewhere above the freezing point, about the 40° of Fahrenheit. While higher than 40°, a reduction of the temperature at the surface, by increasing the specific gravity, produces a sinking of the superficial portion, and an intermixture with that which is beneath. But, after it has reached the 40th degree, a farther reduction of temperature, instead of contraction, produces an expansion; and the water retains its situation, unless operated on by some other force. While it is perfectly still, therefore, it remains at 40° at the bottom, while at the surface it is at 32°, and in that part the process of congelation goes on, the mere conducting power of water requiring a long time to effect an equalization of temperature. The difference of specific gravity, however, between water at 40° and at the freezing point is not great, and a very slight motion is adequate to produce a thorough intermixture, and the consequent extension of the freezing temperature through the whole. When this is effected, and at the same time the congelation resisted by the motions of the surface, it is promoted by the nature of the substances at the bottom. The varieties in the qualities of different substances in this respect, as ascertained by experiment, are curious. Hair, especially boiled horse hair, wool, chaff, moss, and the bark of trees covered with lichens, are found to promote the formation of ice in a higher degree than any metals. Of the latter, copper, brass, steel, and above all tin, have ice formed on them sooner and more abundantly than iron. Polished stone and earthen-ware attract very little. On wax, resins, pitch, silk, leather and wood deprived of its bark, it is seldom or never found. On the bottoms of boats, however, incrustations have been found, which have been evidently formed of the ***sichl-eis***.

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* The formation of ground ice has also been observed in the river Avon in Wiltshire in England, which discharges into the sea, and is navigable as far as Salisbury. Whenever the weather sets in with severe frost, the water at the bottom of the Avon congeals into vast bodies of ice, resembling in its appearance fleeces of wool: these fix themselves to weeds and gravel at the bed of the river, and increasing in size and weight, rise to the surface of the stream with whatever substance it is attached to, and would in its progress to the sea, if suffered to accumulate at the mills and hatches, carry every opposing substance before it. This ground ice is a serious annoyance to the millers on that river, as during the severity of the frost they are obliged to watch their rivers and floodgates night and day, lest they should be blocked up by its immense masses. Before the sun rises, the ice clings to whatever it touches, and in this state all exertion of force or of art scarcely makes any impression on it: but when the sun is up it soon becomes brittle, though many feet under water, and is as easily broken and dispersed as the surface ice. The congelation invariably takes place at the bottom of the river in one night, and before the surface of the stream is at all frozen. The Avon flows through a gravelly soil, but a great number of brooks of a ferruginous quality discharge themselves into it. Ground ice is every winter observed at the bottom of rivers in the U. S. where they are shallow, but I cannot say from my own knowledge that it is formed in those that are deep: the fact can however doubtless be ascertained, if it does exist, and the communication of it by those who have the opportunity would be useful. [Mease.]

This process requires a powerful frost. Hence it appears comparatively seldom in the more temperate countries. Yet it is described M. Desmarest as having occurred in the Rhone and the Seine. The laws by which it is regulated are worthy of a more minute experimental investigation than they have hitherto received.

See Romé de Lisle's *Crystallographie*, tom. i. p. 4. Hassenfratz *Journal de Physique*, Jan. 1785. D'Antic, *Id.* 1788, vol. xxxiii. p. 57. Hericaut de Thury, *Journal des Mines*, 1813, vol. xxxiii. p. 157. The Memoir of Mr. Scoresby in the *Memoirs of the Wernerian Natural History Society of Edinburgh*, vol. ii. part 2. Col. Beaufoy in *Thomson's Annals*, May 1817. Desmarest, *Journal de Physique*, Jan. 1783; and M. Jules-Henri Pott, *Id.* July 1788. See also the articles COLD, GLACIERS, GREENLAND, HUDSON'S BAY, OPTICS, and POLARIZATION. (*H. D.*)

ICELAND.

ICELAND, is a large island situate on the verge of the Arctic Ocean, between the 63° and 67° of north latitude, and the 12° and 25° of longitude west from Greenwich.

This island was discovered about the year 860 by a Norwegian pirate named Naddodr, who was accidentally driven upon the coast while on a voyage to the Faroe islands. A few years afterwards a Swede, *Gardar*, succeeded in circumnavigating the island, and gave it the name of Gardarsholm. Its present name was given to it by Floke, a famous pirate of those times, who remained two years, during which he explored most of the southern and western coasts. The country was colonized in the year 874, from Norway; the subjugation of which, by HAROLD the fair-haired, had produced much discontent among the petty states which he reduced. The leader of the emigration from Norway was named *Ingolf*, who, with his kinsman *Hiorleif*, went to Iceland in the year 870, and made arrangements for the settlement. It is asserted by some of the Icelandic historians, that there were actual settlements in the island before this period; but this seems improbable. The first of the Norwegian visitors found, on some parts of the coast, wooden crosses, and implements, from which it is inferred, that those who had preceded them were Christians. In the *Landnama Bok*, which is among the earliest of the Icelandic historical records, it is stated that, among other things, writings in the Irish language were found. The statements on this subject are so various, that it is impossible to form any probable conjecture on the point in question.

The colony first settled in the south-western part of the island, and the spot where the town of Reikiavik now stands was chosen, on account of the result of a superstitious observance, which guided many of the settlers in the choice of their future places of abode. When Ingolf approached the shores of Iceland, he threw into the sea the door of his former habitation in Norway, and having found it cast on the beach at Reikiavik, he there fixed his station. In the course of half a century, the coasts of this remote country were well peopled; and in the *Landnama Bok*, already mentioned, which contains minute details of the spreading of the colonies, we find several names of Scotch and Irish families who came over and settled.

At first, every body of emigrants remained under the influence of a leader, who parcelled out the land to his followers. But this feudal arrangement was soon found inconvenient, from the contests which arose for possessions claimed by the various petty chieftains. By common consent, a new system of government, which included the whole country, was settled in the year 928. The island was divided into four provinces, superintended by an hereditary governor. The southern and western provinces were subdivided into three prefectures, the northern one into four, and the eastern into two. The authorities over these were also hereditary. There were still more subdivisions, called *Hreppar*, in each of which five officers were appointed, men of property and respectability, whose care it was to keep peace and good order, and to manage the concerns of the poor in their respective districts. The proceedings of the superintendants of districts were under the cognizance of the prefect and his deputies, who met once a year; from whom there was an appeal to the provincial court, and finally to the supreme assembly of Iceland.

This great assembly was held annually on the shores of the lake called Thingvalla, from the name of the assembly *althing*, which is derived from *al*, all, and *thing*, a court of justice. A president was chosen, with the title *Laugman*, or administrator of the laws, and was invested with all the symbols of dignity and power. It was his province to interpret the laws, and pronounce sentence; and his authority, though dependent on the will of the states, was often continued for life.

Such is an outline of a constitution settled without any contention, to which may be referred the arrangements in the government of almost every modern state in Europe. The Hreppstiores have the same jurisdiction with our justices of the peace, and the prefects of our sheriffs. The provincial assemblies resemble our quarter sessions, and the supreme assembly our parliament. For a minute account of the Icelandic commonwealth, the reader may consult the *Crymogæa* of *Arngrim Jonas.*

The code of laws adopted with this new form of government, and which were progressively amended by the assembly, is a remarkable example of the genius of the people of this age. To enter into a minute examination of it would far exceed the limits prescribed to this article, and we must refer to the works enumerated at the end. With respect to the criminal laws, corporal punishment was rarely inflicted; the atonement for almost every offence, being a fine, extended, according to circumstances, even to the confiscation of the whole property of the criminal. The trial by jury, though not enacted, was sometimes resorted to in particular cases.

"The constitution thus adopted by the Icelanders (says Dr Holland in his introduction to Sir George Mackenzie's *Travels in Iceland*,) was preserved with little change for more than three centuries, during which period the records exist of thirty-eight laugmen, who in succession sustained the executive power. Were it allowed to apply the term to a desolate island on the confines of the Arctic circle, this might be called the Golden Age of Iceland. Secured by physical circumstances from the ambition of more powerful states, an efficient government and well directed laws provided for the people all the advantages of justice and social order. Education, literature, and even the refinements of poetical fancy, flourished among them: like the aurora borealis of their native sky, the poets and historians of Iceland not only illumined their own country, but flashed the lights of their genius through the night which then hung over the rest of Europe. Commerce was pursued by the inhabitants with ardour and success; and they partook in the maritime adventures of discovery and colonization, which gave so much merited celebrity to the Norwegians of this period. Many of their chiefs and learned men visited the courts of other countries, formed connections with the most eminent personages of the time, and, surveying the habits, institutions, and arts of different communities, returned home fraught with the treasures of collected knowledge. Nor was there among the Icelanders of this period an extinction of the elevated spirit, common to their forefathers and to the age. The Sagas, or tales of the country, afford many striking pictures of that high feeling of honour, and of those deeds of personal prowess, which were cherished by the disposition of the northern nations, and which refused not to exist even in this remote and desolate region."

The colonization of Iceland having been undertaken by men of rank and education, literature was carefully cherished among them; and their language, the Gothic, was preserved in its utmost purity. The ancient mythology of Scandinavia afforded ample scope for poetic fiction and ornament; and the desolate region of Iceland, the gloominess of which was only interrupted by natural phenomena the most awful and tremendous, gave a range to the favourites of the muse, which imagination could scarcely exceed. The taste for poetry, thus imbibed by the first inhabitants, descended to their posterity; and to this day it is no small part of the amusement of the people, during the darkness of winter, to recite the legends of former times. Nor was the fame of the Icelandic Skalds* confined to their own country. Foreign potentates cherished them in their courts, and munificently rewarded them for singing their praises.

The character of the Scandinavian poetry of this age was stamped by metaphorical obscurity. Resemblance could not be too distant, nor too fanciful, for a northern poet; and the habitual use of metaphor occasioned the adoption of phrases as familiar, which, to those unaccustomed to the style, appear extravagant and unnatural. This obscurity does not however extend through the whole of Icelandic composition, which, particularly in the relation of common events, is often exceedingly simple. Rhyme was rarely employed; and the harmony of the versification seems to have depended on alliteration, and the arrangement of particular sounds adapted to the nature of the language. Thus there was opened a broad field for the exercise of skill, as well as imagination; and the frequent contests in versification brought the Scandinavian poetry to be an art of the most refined nature. Having more leisure, the Icelandic poets excelled; and, from catalogues still preserved, we find, that of the Skalds who flourished in Sweden, Denmark, and Norway, the majority of the whole number were Icelanders.

The most celebrated and valuable remnant of northern poetry is the Edda, a work designed as a common means of education in the favourite pursuit of this extraordinary people. The Edda appears to have been composed at different times, and by different writers, about whom there has been much controversy. There are two different works which bear this title, the Edda of Sœmund, and that which bears the name of Snorro Sturlesen, to whom it is ascribed. The first or ancient Edda consits of a number of odes, of which the Voluspa, or prophetess of Vola, and the Hává-nal, are the most important. The former is a short and obscure digest of the Scandinavian mythology; and the latter consists of moral precepts, supposed to have been delivered by the god Odin. They are attributed to Sœmund Sigfuson, an Icelander, who was born in the year 1056; and so eminent, as to have acquired the denomination *Frode*, or learned. The other Edda is more perfect, and better adapted to the object of instruction in the art of poetry. The first part contains a view of mythology in the form of a dialogue, in which the attributes and actions of the deities, and other events, are explained. The second part is a collection of synonymes, epithets, and prosodaical rules, in which the errors of style, and the varieties of metre, are carefully pointed out.

The historical writings of this age do more honour, perhaps, to Iceland, than the cultivation of poetry. Of these, the Sagas, which are of a mixed character, blending, to a certain extent, fiction with authentic narrative, are exceedingly valuable. They possess great variety, some detailing particular events relating to politics or religion, some the history of a particular family, and others the biography of eminent individuals. As might be expected, many of these narratives are tedious; but in many are to be found examples of simplicity, which carry the reader back to the times in which the actors lived, and insensibly lead him to consider himself not an indifferent spectator.

The Sagas have elucidated the history and antiquities of the north in an eminent degree; but the regular historical writings which have come to us from the Icelanders are yet more valuable. The *Annales Oddenses* of Sœmund Frode; the *Landnama Bok*; the Chronicle of the Kings of Norway, by Snorro Sturleson; and numerous other works, testify the abilities and correctness of the writers. Besides poetry and history, mathematics and mechanics were cultivated; and jurisprudence formed an important study. Travellers penetrated into Asia and Africa; and the maritime adventures of the Icelanders prove that attention was paid to astronomy and geography. Philology was not neglected, and the most celebrated Roman authors were familiar to all the learned men. The Greek language was not much cultivated.

Before the establishment of Christianity, which took place in the year 1000, the Runic was the only character in use; but more seems to have been trusted to memory than to writing. With Christianity, the Roman characters were introduced, and a new incitement was thus given to education, and every literary pursuit. The first school was established by Islief the first bishop of Skalholt, about the middle of the 11th century; and soon after three others were formed in different parts of the island. In these the youth were taught to read, write, and compose in their own language, and initiated in the classics and in theology, to which last particular attention was given.

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* The works *skaldr*, or skalds, signifying bards, is probably derived from *skiael*, wisdom; whence the English word skill.

The establishment of Christianity was not the least remarkable event in the early history of Iceland, since it was effected in a manner which displayed, in a striking manner, the genius and government of the people. Frederic, a bishop from Saxony, began to preach the Christian doctrines in the year 981; and the number of converts gradually increased. The propagation of the new faith met with every species of opposition; but at length the contests became so frequent, while those who adopted Christianity greatly increased in number, that the national assembly, which met in the year 1000, took the matter into consideration. While the question for the establishment of the new religion was debated, a messenger hurried into the assembly, and announced that fire had burst from the earth in the southern part of the country, and was carrying destruction before it. The heathen party instantly exclaimed, that this was the vengeance of the gods against their presumption. But Snorro, who was a zealous advocate for the Christian cause, called out to them, "For what reason did your gods display their wrath, when the rock on which we stand was burning?" The place of assembly is in the midst of frightful proofs of the power of volcanic fire; and this exclamation of Snorro turned the scale in favour of the Christian faith. The decision of the assembly was solemnly pronounced by Thorgeir, the Laugman; and all religious disputes were immediately suspended. A church establishment was soon afterwards arranged, and the first bishop of Skalholt, Islief, was ordained in the year 1057. From this period, during nearly two centuries, a pure religion was exercised by the Icelanders, undisturbed by the errors and superstitions of the Romish church.

The discovery of Greenland, about the year 972, is another feature of this early age; and one still more remarkable was the discovery of the north-east coast of America, in the year 1001 by Biorn Heriolfson, who was driven to the south while on a voyage to Greenland. A colony was established in Greenland, which subsisted till the beginning of the 15th century, when all traces of it were lost. About the same time, a material change for the worse appears to have occurred in the climate of Iceland, where, it is said, corn formerly grew. The loss of Greenland was occasioned by an unusual accumulation of ice, which has bound up the coasts ever since, and frustrated every attempt to reach the place where the once flourishing colony existed.

The part of America first seen was probably some part of the coast of Labrador. Leif, the son of Eric, the discoverer of Greenland, on hearing the report of this discovery, set out to pursue it; and passing by the coast first observed by Biorn, he came to a straight separating a large island from the mainland, probably that of Newfoundland. Thorvald, brother to Lief, went over to this new country, which, from finding wild vines growing in it, was called Vinland; after remaining two years, he was killed in a skirmish with the natives, who had not been seen till this time. A regular colony appears to have been afterwards established in Vinland. But after the early part of the 12th century, scarcely a vestige of this colony can be found, and the situation of Vinland is destined to perpetual obscurity.

The moral character of the Icelanders, during this period of their history, seems to have kept pace with their intellectual endowments, and to have stood high. Previous, however, to the introduction of the Christian religion, some unnatural customs and superstitious usages obtained. The exposure of children, though not prohibited, was soon relinquished, after the morality inculcated by the New Testament came to be fully understood; and ceased more than a hundred years before the practice was abolished in Norway. The most singular superstition was the Beserkine. From the *Kristni Saga*, and the Ecclesiastical History of Iceland, we learn that the Beserkins were professed warriors, who, by means of magic, had rendered their bodies invulnerable. Rousing themselves by incantations into frenzy, these men committed every kind of violence, and rushed naked into battle. There is every probability that some of these were miserable and infatuated wretches, while others adopted the profession with the view of imposture.

The independent and happy state of Iceland was not destined to be uninterrupted. The love of power produced intestine evils, which the ambition of Norway carefully fomented. The civil contests were not always trifling; for instances are recorded, in which fleets of twenty sail, and bodies of 1200 men, fought on one side. The desire of peace, and the promises of the Norwegians, now become jealous of the prosperity of Iceland, at length produced a formal proposal in the national council, that the country should be governed by a single potentate; and in the year 1261, the whole, except the eastern province, submitted to Haco, king of Norway. A few years afterwards, the submission of Iceland was completed, but under conditions which still maintained their rights and their commerce. In 1280, Magnus, the successor of Haco, gave to the island the code of laws well known by the title *Jonsbok*, which was no more than a revised copy of the ancient laws.

The last political change which occurs in the history of Iceland was, its transference with Norway to the crown of Denmark in the year 1380. A period of tranquillity, during which rank and property became more equalized, and trade was almost wholly transferred to other nations, succeeded; and a feeling of dependence checked enterprise, while vigour and activity were gradually lost. In the year 1482, a pestilence carried off nearly two-thirds of the population; and another broke out towards the close of the century. In addition to these calamities, the Icelanders were at this period exposed to the incursions of pirates, who plundered their property, committing frequent murders, and carrying off the inhabitants. "These events," says Dr Holland, "which concurred with the causes before described in depressing the spirit of the people, and destroying the strength and prosperity of the country, are recorded in the annals of Iceland with an affecting and almost painful simplicity. No attempts are made to excite a sentiment of commiseration beyond what humanity would of itself yield to the recital of such complicated evils. We are told that whole families were extinguished, and districts depopulated, by the virulence of the disease; that the learned, the pious, the wealthy, and the powerful, all dropt into a common grave; that the labours of industry ceased; that genius and literature disappeared; and that the wretched remnant of the Icelanders, scarcely themselves saved from destruction, sunk into a state of apathy, superstition, and ignorance. In pursuing his melancholy narrative, the historian sometimes looks back to the former celebrity and splendour of his country; but he goes no farther; and all beyond is left to the feelings and imagination of the reader."

But the decline of literature, and of the national character of the Icelanders, may be traced to more remote causes. Europe began to emerge from darkness and barbarity, and the continental nations gradually rose into equality in learning. The poets and historians of Iceland were therefore received with less distinction. The errors, superstitions, and tyranny of the church of Rome, broke in upon the pure and peaceful worship of Iceland about the end of the 12th century. The levying of Peter's pence, and raising money by indulgences, were not warded off by the poverty of the people, who were oppressed even by the native bishops. From the 13th to the 16th century, the annals of Iceland present nothing of interest, being filled with records only of the depression of all mental exertion, and of physical calamities.

The reformation of religion, and the introduction of printing, by the establishment of a press at Hoolum about the year 1530, seemed to be the dawn of renewed life to Iceland.

The reformation was not effected without violence. John Areson, bishop of Hoolum, was the most strenuous and violent opposer of the introduction of the Lutheran doctrines. He assembled a body of armed men, and, marching southward, attacked and seized Einarson, bishop of Skalholt. He was arrested himself, however, the following year, by the order of Christian III. in whose continental dominions the reformed religion had been adopted. Areson, and his two natural sons, were beheaded at Skalholt; and in 1551 the new doctrines were legally established and universally received. The schools were re-established; but so great had been the depression of learning, that it was found difficult at first to procure men of sufficient knowledge to superintend them.

Now that science began to illuminate the rest of Europe, we cannot expect to find the former condition of Iceland restored, nor even the progress of knowledge keeping pace with that of other countries. The physical evils to which Iceland is exposed operated with greater effect than before; and though we can enumerate several eminent individuals, whose writings are creditable and useful, yet their literary fame has seldom stepped beyond their native island.

To the zeal of Thorlakson, bishop of Hoolum, who ushered many useful works into the world from the Icelandic press superintended by himself, the people were indebted for the first translation of the Bible into their own language. It first appeared in 1584. The friend of Thorlakson, Arngrim Jonas, published twenty-six different works in divinity, history, jurisprudence, and philology, all of which exhibited very extensive acquirements. Another eminent historical writer was Biorn de Skardsaa, who published Annals of Iceland from the year 1400 to 1645, and several other works.

The 17th century is destitute of any important events. At its commencement piratical incursions of the French, English, and Algerines, were not unfrequent. Of the latter, a large body landed on various parts of the southern coast, and on the Westman islands; and, besides plundering their effects, murdered nearly fifty of the inhabitants, and carried 400 of both sexes into captivity. This happened in the year 1627; and nine years afterwards, when the king of Denmark had paid a ransom, only thirty-seven survivors were found. This century also disgraces Iceland by the superstitious enormities which were practised. A belief in necromancy was so prevalent, and held in such horror, that, within the period of sixty years, twenty persons perished in the flames.

The commencement of the 18th century was marked by the destruction of 16,000 persons by the small-pox. From 1753 to 1759, the seasons were so inclement, that famine carried off 10,000 people, besides vast numbers of cattle. In 1783, the most terrible volcanic eruption on record broke out from the neighbourhood of the mountain of Skaptaa, and for more than a year showered ashes on the island, and enveloped it in a thick cloud of smoke. Cattle, sheep, and horses were destroyed, and a famine ensued. The small pox again appeared; and in a few years above 11,000 people perished.

Notwithstanding the calamities incident to their situation, the Icelanders have still preserved literature from decline. In later times we have the names of Torfæus, Arnas Magnæus, and Finnur Jonson, who have greatly adorned the modern literature of their country. Arnas Magnæus was the son of an obscure priest, and by his talents he raised himself in 1694, when only thirty-one years of age, to the situation of professor of philosophy in the university of Copenhagen; and soon afterwards he was appointed professor of northern antiquities. He made a splendid collection of books and manuscripts in the Icelandic language, which was almost entirely destroyed by fire in 1728. His pupil and friend Finnur Jonson has eminently contributed to preserve the literary character of his country. He was made bishop of Skalholt in 1754, and devoted a long life to the improvement and happiness of his countrymen. His Ecclesiastical History of Iceland is an admirable work, though somewhat minute in its details; and presents a degree of patient and accurate research which has seldom been equalled. The well known exertions of Professor Thorkelin, in behalf of Iceland, are happily yet continued; but the state of war, in which Europe has so long been immersed, has brought Iceland into a state of suffering from which she cannot soon be relieved.

In the present times, individuals are not wanting, who exhibit, though less successfully, all the zeal of their ancestors in the pursuit of learning. Their acquirements are such as would grace any society; and when the remoteness of their situation and the multitude of their privations are considered, the picture which Iceland presents at the commencement of the 19th century is truly worthy of admiration. The school is not now so flourishing as it used to be; but education is systematically carried on amongst all ranks; and the degree of information possessed by the lower orders is far from being inconsiderable.

Two schools were founded in the 16th century, one at Hoolum, in the northern quarter of the island, and the other at Skalholt. These were united and transferred to Reikiavik, towards the end of last century; and a few years ago, it was moved to Bessestadt, the former seat of the governors of Iceland. The arrangements for conducting this school have met with a severe interruption in the war between England and Denmark, and every thing has the appearance of disrepair and approaching ruin. The establishment consists of three masters and twenty-four scholars, the funds not admitting a greater number. The head master, who has the title of Lector Theologiæ, has a salary of 600 rixdollars. He superintends all the concerns of the school; the study of theology being his particular department. One of the most accomplished men in Iceland, Steingrim Jonson, was lately removed from this situation to one of the most valuable livings in the country, that of Oddé. This, it was understood, was preparatory to his becoming Bishop of Iceland, on the demise of the present bishop. His successor in the school is of the same name, and is reputed a man of great learning and talent. The second master teaches Latin, history, geography, and arithmetic; and the third, the Greek, Danish, and Icelandic languages. The bishop examines the scholars once a-year, according to a prescribed form of proceeding. After studying at this school, some of the young men go to finish their studies at Copenhagen; but by far the greatest number return to their homes, where, secluded from the society even of their own countrymen, and while the darkness of a long winter gives them leisure, they often pursue their studies, and acquire no inconsiderable extent of knowledge.

Poetry is still cultivated with surprising eagerness; and the number of manuscripts of unpublished works is very great. History is not so much cultivated; and science, strictly so called, scarcely at all. In the year 1779, a society was instituted at Copenhagen for aiding the literature of Iceland, and bettering the condition of its inhabitants. This society, which comprehended among its members, not only eminent Icelanders and Danes, but many foreigners of note, published fourteen volumes of transactions, containing essays on history, poetry, agriculture, the fisheries, and the natural history of Iceland. In 1790, a project was made for transferring the society to Iceland, which occasioned such dissensions as suspended all the proceedings, and the name only of the society now exists.

A second Icelandic society was established in the island in the year 1794, by the present chief justice Stephenson, whose exertions in behalf of the literature and general improvement of his country have been indefatigable. The number of members in this society was originally 1200, and each contributed a dollar annually. The printing establishments at Hoolum and Hrapsey having fallen into decline were purchased by the new society, and an establishment erected at Leira. From thence have issued a considerable number of works printed for the use of the society. Various occurrences, among which the war between Denmark and Great Britain had the chief influence, have occasioned the almost total extinction of this society. It is to be wished that, as war has ceased to disturb the nations of Europe, the Icelanders will be enabled again to enjoy the only recreation which their situation admits; and that their history, political and literary, of which we have given an outline, will not cease to be interesting. A new society was established in 1816, by the exertions of a very able young man, Mr Raske, under librarian in the royal library at Copenhagen; and there can be no doubt of Icelandic literature reviving under his care in disseminating, with the assistance of this Society, the means by which the Icelanders may overtake learning in the rapid progress she has made.

The circumstances of Iceland have required little or no alteration either in the laws, or in the form of government which was established 600 years ago. The supreme authority is entrusted to an officer, with the title of Stiftamtmand, who has a general superintendence of every department. Under the Stiftamtmand each of the four provinces, into which the island is divided, is governed by an Amtmand, or bailiff, whose duties are the same as those of their superior within their respective jurisdictions. Each province is divided into syssels or shires, over which the sysselmen preside. These officers collect the taxes, and are paid by a rate out of the amount collected. They hold courts of law, and on the whole their duty is in almost every respect the same as that of sheriffs in Scotland.

In each parish there is an officer, called Hrepstiore, whose chief business is to attend to the concerns of the poor, and to assist the sysselman in the preservation of the public peace. For the decision of petty disputes among the people, there are a certain number of persons in each parish, denominated Forlikunarmen, who may be called official arbiters.

All cases, whether civil or criminal, are first brought before the sysselman, who holds a court once a year, or oftener if necessary. In criminal cases, and in public suits, the amptmand orders the trial, after previous examinations on behalf of the crown. From the inferior court there is an appeal to the high court of justice, which sits six times in the year at Reikiavik. This court was established in the year 1800, at which time the assemblies at Thiugvalla were abolished. The Stiftamtmand presides, but has no voice in the proceedings. There are three judges, the first is called Justitiarius, and the other two Assessors. Evidence and pleadings being heard, the causes are determined by a majority of the three judges. From this court there is an appeal to the superior courts at Copenhagen.

The punishment of petty offences is fine and whipping. Sheep-stealing, which is the most common offence, is punished by imprisonment and labour for a term of three or five years, according to circumstances. A repetition of crimes brings on the offender transportation to Denmark, where he is confined at hard labour in the work-house for the remainder of his life. The infliction of such severe punishment is, however, very seldom required. Murder is exceedingly rare; and, except in cases which subject the criminal to capital punishment, he is not confined before the time of trial.

With regard to property no entail of land is allowed. When a proprietor dies, his lands are valued and divided into shares, of which the eldest son has the choice. The daughters receive an equivalent to half the portion of a son. A wife surviving her husband, possesses half of his estate. The rights of tenants are such as would essentially contribute to the improvement of the soil, were sufficient inducements held out to encourage it. A tenant cannot be removed, unless the proprietor can bring proof that the farm has been neglected, or that the farmer has not behaved well. Leases are not common; but letting land from year to year is a frequent practice, six months notice to quit being necessary. Although a tenant cannot be removed while he conducts himself well, and manages his land properly, he may quit his farm whenever he pleases. On every farm there is a permanent stock of cattle and sheep, which is transferred from tenant to tenant, and for which a certain fixed rent is paid. As many more cattle and sheep as the farm can maintain may be kept. Besides the rent for the stock, a land rent, landskuld, is paid according to an old valuation.

The public taxes are so inconsiderable, that they are not sufficient to defray the expences of the civil establishment. Some of the taxes are levied on property, regulated by an annual survey made by the Hrepstiores. In ancient times, the calculation was made according to the number of ells of the cloth called *wadmal*, which each person possessed or could manufacture in a year, and the tax was levied on every hundred ells. The term hundred is now applied differently, and an Icelander is said to possess a hundred, when he has two horses, a cow, a certain number of sheep, a boat and fishing materials, and forty dollars in specie. When a person possesses more than five hundreds, he pays, over and above the stated tax, twelve dried fish. This tribute is called *tuind*,* and increases in proportion to the amount of property, and is allotted equally to the public revenue, the church, and the poor. There are several other taxes of small amount. The produce of the taxes being chiefly in kind, is collected by the sysselmen, and, by them paid over to the landfoged, or public treasurer, who disposes of them to the merchants. The sysselmen are paid according to what they collect; and even when they are very successful, their trouble is but ill rewarded. The landfoged is subject to the chance of gain or loss in his transactions with the merchants; and he retains a third part of the whole as his salary.

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* Whence, perhaps, is derived the Scottish Term *Teinds*.

The taxes for the maintenance of the poor are much more severe on the people than those levied for the public. There is no regular establishment for the poor, if we except three small buildings in different parts of the country allotted for the reception of incurable lepers. Every farmer or householder is by law obliged to receive and support his own destitute relations; and should he have none such, orphans, and those whose age and infirmities render them incapable of supporting themselves. The expence thus incurred amounts sometimes to twenty or thirty times the amount of his public taxes, when a householder does not choose to receive paupers into his family.

The religious establishment of the country consists of a bishop, provost, and parish priests. The two sees of Skalholt and Hoolum happening to become vacant at the same time, they were united in the year 1797, in the person of Geir Vidalin, who now enjoys the title of Bishop of Iceland, and is settled at Reikiavik. The island is divided into 184 parishes, in most of which there is more than one church, on account of the scattered state of the population, the average of which for each parish may be about 260. There are nineteen provosts, each of whom, besides the general superintendance of his district, has the charge of a parish.

The revenue of the bishop amounts to 1800 dollars; that of the parishes is very unequal, some being in value nearly equal to 200 dollars, on account of the goodness of the farms attached to the livings, while others, with a greater population, are scarcely worth thirty dollars. The glebes add considerably, however, to their scanty allowances; and as every farmer is obliged to furnish the priest with a day's work, and to keep a lamb for him, his farm costs him but little labour. He also receives occasional small offerings and perquisites for officiating at marriages, baptisms, and burials. The churches are in general neat but plain buildings, constructed of wood and turf. Some of them indeed are little better than hovels, while others are large and comfortable. At Reikiavik there is a large church, built of lava, and roofed with tiles. A more elegant one of this kind is to be seen at Bessestad. The church in the Westmann islands is reckoned the most elegant.

Young men destined for the church, after they have left the school, and been admitted as probationers, earn their livelihood by fishing and other labour, and after a certain term are examined, and received into orders, after which they await a settlement, the prospect of which is often very distant, and when obtained does not yield ease and comfort. The habitations of the priests are seldom better than those of the farmers, and are not better furnished; a bed, a table, and a few chairs, and those very indifferent, being the whole stock, in addition to a few boxes and chests, in which the clothes and chattels of the family are kept. Here, however, learning and genius are to be found; and an attention to the duties of their station is displayed by the Icelandic priests, which may well excite feelings of shame among those of other countries, who have no privations to hinder them from the proper performance of their duty. The following description of a Sabbath scene in Iceland is not more elegant and affecting than it is correct. It is from the pen of Dr. Holland, and we quote it from Sir George Mackenzie's Travels. "The Sabbath scene at an Icelandic church is indeed one of the most singular and interesting kind. The little edifice, constructed of wood and turf, is situated, perhaps amid the rugged ruins of a stream of lava, or beneath mountains which are covered with never-melting snows; in a spot where the mind almost sinks under the silence and desolation of surrounding nature. Here the Icelanders assemble to perform the duties of their religion. A group of male and female peasants may be seen gathered about the church, waiting the arrival of their pastor; and all habited in their best attire, after the manner of the country; their children with them; and the horses which brought them from their respective homes grazing quietly around the little assembly. The arrival of a new comer is welcomed by every one with a kiss of salutation; and the pleasures of social intercourse, so rarely enjoyed by the Icelanders, are happily connected with the occasion which summons them to the discharge of their religious duties. The priest makes his appearance among them as a friend; he salutes individually each member of his flock, and stoops down to give his almost parental kiss to the little ones, who are to grow up under his pastoral charge. These offices of kindness performed, they all go together into the house of prayer."

The trade of Iceland has never been managed in such a way as to be of important benefit to the natives, of whom but a small number are engaged in it. The following Tables, taken from Stephenson's *History of Iceland during the 18th Century*, will serve to give a correct idea of the state of commerce.

Table of Imports into Iceland in the Year 1806.

DISTRICTS.	Rye Meal.	Rye.	Barley.	Oats.	Peas.	Pearl Barley.	Barley Groats.	Buck Wheat.	Oat. Groats.	Rice.	Wheat Flour.	Rye Bread.	Biscuit.	Wheaten Bread.	Brandy.			Rum.	Wine.
															Danish.	French.	Grape.		
	Barrels	Barrels.	Barrels.	Barrels.	Barrels	Barrels.	Barrels.	Barrels.	Barrels.	Lispd.lb.	Lispd.lb.	Sk.pd.L.lb.	Sk.pd.L.lb.	Sk.pd.L.lb.	Barrels.	Barrels.	Barrels.	Barrels	Hds.
Reikiavik	3502	2265	27	72	777	531	128	7	8	3 10	66 0	90 15	226 4	47 4	255	43	149	28	60
Eskifiord	5[illegible]3	575	.	4	310	145	109	. .	4	. .	. .	51 12	21 4	. . .	59	98	6	4	8
Eyafiord	978	2965	32	6	856	190	80	5½	4¼	1 0	28 5	35 14	19 17	0 13	105	52	25¼	12½	6½
Isafiord	1017	701	26	2	136	161½	56½	2	4	30 13	16 12	53 6	5 5	2 15	150	33½	32	3	12
Total	6140	6506	85	84	2079	1027½	373½	14½	20¼	35 7	111 1	231 7	270 10	50 12	569	226½	212¼	47½	86½
												Barrels.	Barrels.						Pipes.
In 1630	4501	. .	. .	. .	17	83	. .	. .	. .	. .	. .	352	93	. .	262	. .	. .	. . .	13¾
1743	8036	. .	. .	. .	52	135	. .	. .	. .	. .	. .	1239	684	. .	722	14	12½	. . .	57⅓
1779	10665 Rye and Barley.	475	1138	98	133	367	. .	. .	. .	. .	. .	986	422	. .	1160	36⅔	. .	18	71

DISTRICTS	Vinegar.	Mead.	Beer.	Malt.	Coffee.	Sugar.	Treacle.	Tobacco	Paper.	Soap.	Salt.	Iron.	Tar.	Coal.	Hemp.		Fishing Lines.	Cable.	Twine.
															Hackled.	Uuhackled			
	Hhds.	Barrels.	Barrels.	Barrels.	Sk.pd.L.lb.	Sk.pd.L.lb.	Sk.pd.L lb	Sk pd.L.lb	Reams.	Firkins.	Barrels.	Sk.pd.L lb.	Barrels.	Lasts bar.	Sk.pd.L.lb	Sk.pd.L.lb	Pieces.	Pieces.	Sk.pd.L.lb.
Reikiavik	5	24	7	10	13 15	24 17	13 14	96 19	63	46	842	170 13	159	26 4½	27 0	17 6	7117	1122	4 8
Eskefiord	1	9	. .	11	4 10	10 0	4 5	52 5	25	1	325	5 4	31	9	. . .	. . .	817	. . .	0 3
Eyafiord	2	17	34½	18	2 7	6 13	5 10	44 3	65	7	549	2 13	13	2 17	1 16	1 16	907	. . .	0 1
Isafiord	2¼	3	11	. .	6 6	7 5	1 13	44 13	4	1	862	21 14	116	3 0	0 3	0 3	3630	23	2 0
Total	10¼	53	52½	39	26 18	48 15	25 3	238 0	157	55	2378	200 4	319	32 12½	27 4	19 5	12471	1145	6 12
In 1693	. .	216	. .	38	. .	. .	. .	. . .	. .	. .	834	781 0	61	. .	. .	. .	34412	. .	9 1
1743	. .	67	. .	12	. .	. .	. .	20 10	. .	. .	1864	272 0	147	. .	. .	. .	. . .	. .	. .
1779	. .	67	. .	213	10 7½	27 0	. .	256 15	218	lbs. 2054	2954	310 0	291	22 0	15 0	. .	12890	. .	9 5½

TABLE *of Exports from Iceland in the Year* 1806.

DISTRICTS.	Fish.	Dried Fish. Stock Fish.	Salted Cod in Barrels.	Salted Cod in bulk.	Oil.			Fish Liver.	Tallow.	Salted Salmon.	Wool.		Woollen Yarn.	Stockings.
					Cod.	Shark.	Seal.				White.	Mixed.		
	Sklb.L.lb.	Sklb.L.lb.	Barrels.	Sklb.L.lb.	Barrels.	Barrels.	Barrels.	Barrels.	Sklb.L.lb.	Barrels.	Sklb.L.lb.	Sklb.L lb	Sklb.L.lb.	Pairs.
Reikiavik	1606 3	1809 2	66	2 8	495½	110	10	12	149 15	28½	327 14	58 14	0 9	19.567
Eskefiord*	. . . .	. . .	28	. .	36	79½	. .	. .	151 10	. .	92 12	56 4	4 3	26.186
Eyafiord	30 18	. . .	36	. .	17	561	. .	. .	278 6	. .	166 17	11 5	24 11	79,900
Isafiord.	364 5	24 16	20	7 13	259	913	14	. .	19 8	.	92 5	7 18	. . . .	56.023
Total. .	2001 6	2333 18	150	10 1	807½	1663½	24	12	598 19	28½	679 8	134 1	29 3	181 676
In the year 1624 .	843 0	5817 0	444½	. .	950	. .	. .	. .	Barrels. 337	5½				
1630 .	207 0	2823 0	142	. .	1445¼	. .	. .	. .	133¾	5				
1743 .	392 0	5380 0	658	. .	471	. .	. .	. .	Sklb.L.lb. 475 6	3	265 0			
1779 .	3612 0	4901 0	1905	. .	1402	. .	. .	. .	609 8	16½	23 0			

DISTRICTS.	Frocks or Jackets.	Mittens.	Wad-mal.	Lamb Skins.	Salted Sheep Skins.	Small Shark Skins.	Fox Skins.	Swan Skins.	Goat Skins.	Eider Down	Feathers.	Iceland Moss.	Rein Deer Horns,	
		Pairs.	Pieces.							Sklb.L lb.	Sklb.L.lb.	Barrels.		
Reikiavik	130	77,203	3	2442	190	233	63	52	. .	1 11	14 12	4		
Eskefiord	345	6,737	8	642	23,516	. .	32	. .	. .	0 19				
Eyafiord	5790	57.798	. .	3723	9,091	. .	15	. .	115	0 19	. . .	. .	153	
Isafiord	17	141.338	. .	620	6	1335	35	3	. .	3 7½	12 1	0¼		
Total .	6282	283.076	11	7427	32.803	1568	145	55	115	6 16½	26 13	4¼	153	
In the year 1624 .	. .	12.232	Ells. 12.251											
1630 .	. .	13.004	4.042											
1743 .	1211	110,507	876											
1779 .	884	186 624	521	20.722	. .	. .	406	98	. .	6 0	2 9			

A volume was published, in the year 1787, at Copenhagen, by royal authority, entitled *Regulations for the Trade and Navigation of Iceland.* This was at the time when the trade was declared free; and the volume contains Tables of the Exports of Iceland from 1764 to 1784; but we have not had an opportunity of copying them.

* Eskefiord is situate on the same bay as Rodefiord.

WEIGHTS AND MEASURES USED IN THE ISLAND.

Liquid Measure.

1 pipe contains	3 ame	or	120 gallons.
1 oxhoved (hogshead)			60
1 ame	4 ankers	or	40
1 tonde	3 ankers	or	30
1 anker	5 kutting	or	10
1 kutting	4 kander	or	2
1 kande	2 potter	or	0½
1 pot	4 pæle	or	2 pints.
1 pæle		or	0½ pint.

Corn Measure.

1 tonde (barrel) = 8 skepper, or 4 English bushels.
1 skepper (½ bushel) contains 18 potter or quarts.

Cloth Measure.

1 alen or yard = 25 English inches, or two-thirds of a yard, and is divided into quarters.

Weights.

1 skippund = 20 lisepund, or 3 cwt. 22 lb. English.
1 lisepund = 16 pund, or 17 lb.
1 pund = 16 unzer, or 1 lb.

The Danish pound is 12 per cent· heavier than the English.

We have already mentioned the laws respecting property, and the conditions on which a tenant holds a farm. A farm house in Iceland has the appearance of a small village; the dwelling house, all the out-houses, and the hay yard, being within a general inclosure of turf, four or five feet high, and seldom less than five or six feet thick. The doors to the different apartments are generally arranged on the south side, and each has a sort of pediment above it, surmounted by a vane. The access to the dwelling house is by a long narrow passage, into which the different rooms open. Each room is separated from the next by a thick partition of turf, and has also a separate roof, through which the light is admitted by bits of glass or skin. The principal rooms of the better sort of people have small glazed windows in front. Ventilation is not attended to, warmth being the chief object in the construction of the houses; and the consequence is, that the smell is to a stranger almost insupportable. The houses are generally built on a rising ground, and in the middle, or as near as possible to the land devoted to the hay crop. On this land, which is in general much broken into little knolls or hillocks, the manure is spread in the month of May; and about the end of July the grass is cut, when it is scarcely more than six inches long. In this operation a very short scythe is used, and the Icelanders cut with it very neatly and expeditiously. The hay is kept chiefly for the cows, though in very severe weather the sheep and horses get a small share. As soon as the crop near the house is secured, the farmer gives a feast; and when the whole is safe in the hay yard, a fat sheep is killed, and another feast takes place.

The cows are very like the Scotch Highland sort, known in England by the name of Kyloes. No attention is paid to breeding stock; and in general we find the best stock on farms where the winter food is in greatest plenty. During the summer there is great abundance of pasturage.

The sheep appear to be a mixed breed, carrying long and coarse wool. The wool is removed by pulling it when it appears loose. A great quantity of mutton is salted for exportation in the northern districts.

Very little cheese is made, butter being the chief object in the dairy. It is barrelled without salt, and is thus kept several years. The older it is the more it is prized. In this state it reaches a certain stage of rancidity, beyond which it does not pass; and it is wonderful how long it keeps.

The horses are of a small breed, but stout, and very hardy. Those used for riding are trained to what is called pacing; and, where the ground is tolerably smooth, they go very swiftly, the motion being very easy and pleasant to the rider. The statistical information contained in the following Tables was partly furnished to the writer of this article by Bishop Vidalin, and is partly taken from Stephenson's *Iceland in the 18th Century.*

TABLE *of the Population of Iceland in the Year* 1801.

NAMES OF DISTRICTS.	Farms.	Families.	Farmers.	Hirelings having grass.	Hirelings without grass.	Priests.	Civil Officers.	Males.	Females.	Total Inhabitants.
Southern Amt.										
East Skaptafells Syssel . .	53	126	88	29	—	7	2	400	511	911
West ditto	133	248	214	26	1	8	1	678	861	1539
Rangaavalle & Westmann Isles	374	664	530	104	13	14	4	1876	2311	4187
Arnes Syssel	418	709	495	153	40	21	1	2053	2572	4625
Guldbringe and Kiose Syssels	256	704	302	132	245	13	12	1949	2046	4015
Borgarfiord Syssel	227	285	250	9	11	9	4	854	1028	1882
Western Amt.										
Myre and Hnappadals Syssels	180	235	202	13	9	9	2	694	7841	1478
Snæfell Syssel	270	652	337	143	167	10	2	1627	1914	3541
Dale Syssel	181	231	208	10	4	7	3	699	893	1592
Bardestrand Syssel . . .	203	374	332	12	21	10	2	1161	1332	2493
Western Isafiord Syssel . .	123	261	236	5	13	7	1	884	966	1850
Northern Isafiord Syssel . .	170	305	255	20	22	7	1	961	1076	2037
Strande Syssel	118	150	140	3	—	6	1	438	544	989
Northern and Eastern Amts.										
Hunavatn Syssel	375	433	405	3	6	20	2	1288	1592	2880
Skagafiord Syssel . . .	412	492	459	9	2	20	3	1385	1736	3141
Evafiord Syssel	448	535	499	6	13	17	3	1572	1881	3453
Norder Syssel	387	451	420	1	7	23	1	1337	1625	3002
North Mule Syssel . . .	217	267	222	32	3	11	1	781	1981	1762
Southern Mule Syssel . .	211	279	231	25	13	12	–	839	998	1837
Total .	4761	7401	5821	735	590	231	45	21476	25573	47207

This Table, exhibiting the state of the population of Iceland in the year 1801, is taken from the register of the Bishop, to whom returns are regularly made by the priests. The original Table contains also a detailed statement of the ages of the whole population of the island, of which the following is the general result:

	Males.	*Females.*
Under 10 years of age	6231	6300
From 11 to 20 . .	3207	3299
21 . 30 . .	3385	4060
31 . 40 . .	3190	3901
41 . 50 . .	1838	2460
51 . 60 . .	1707	2453
61 . 70 . .	1162	1842
71 . 80 . .	592	1096
81 . 90 . .	158	285
91 100 . .	6	35
Total	21476	25731

The Bishop not having made up Tables from the most recent returns, could only furnish us with the general results of the years 1804 and 1808. He said that the population was on the increase.

It appears that the excess of the female population of the island is very considerable; and that the average longevity of the women is greater than that of the men. The population has varied little during the last 100 years.

In the year 1703 it amounted to 50,444
1770 46,201
1783 . . . . 47 287
1801 . . . . 47 207
1804 46,349
1808 48,063

TABLE *illustrative of the Political Economy of Iceland, in the Year* 1804, *taken from Mr Stephenson's* 18*th Century.*

Names of Districts.	Population.	Working men.	Hired Servants	Cows.	Heifers with one Calf.	Bulls and Oxen.	Calves.	Milch Ewes.	Rams and Weathers above one year old.	Rams, Ewe-Lambs, and weathers, of 1 year old	Lambs.	Horses & Mares broken in.	Horses & Mares not broken in.	Colts and Fillies.	Boats with 8 & 10 oars.	Boats with 4 & 6 oars.	Small Boats.	Number of Gardens in use.
East Skaptafell	853	94	11	391	34	29	56	2241	408	1154	2024	615	97	78	—	19	—	5
West Skaptafell	1499	224	17	747	102	150	116	3230	371	1989	3153	1209	323	135	4	1	3	13
Westman Islands	157	42	5	39	8	1	—	268	88	165	225	39	1	—	2	11	3	1
Rangaavalle . .	3854	358	48	2074	251	174	325	8079	744	3750	7479	2889	949	468	9	8	2	23
Aarnes . . .	4398	505	105	2371	336	176	375	8550	700	2944	7050	2886	551	255	35	30	21	17
Guldbringe . .	2866	915	739	490	36	6	50	1022	140	500	974	745	38	30	9	225	252	139
Kiose . . .	1088	135	37	444	31	110	109	1449	244	979	1487	469	203	94	2	16	31	13
Borgarfiord . .	1796	260	130	764	69	94	120	3870	426	1841	3250	900	249	125	3	25	88	9
Myre & Hnappadals	1924	276	41	701	94	55	113	3898	372	1697	2929	1112	218	105	1	19	17	9
Snæfellsnes .	3541	346	598	671	55	16	56	1995	339	214	1671	670	92	27	67	118	50	8
Dale	1506	128	41	408	50	18	60	1662	218	867	1471	543	173	58	10	31	5	1
Bardestrand .	2225	448	123	665	61	31	76	3374	610	1809	2443	550	45	25	4	115	90	17
Isafiord . . .	3887	418	60	965	62	46	84	6182	1911	4048	5582	493	54	39	41	119	129	16
Strande . . .	895	89	26	201	4	4	16	2489	35	255	942	324	7	8	—	30	67	—
Hunavatn . .	2873	260	79	894	87	52	86	11310	479	2620	4370	1885	294	137	—	42	3	1
Skagafiord . .	3080	209	29	1086	114	29	52	9598	641	2299	1322	1462	432	165	8	40	17	2
Eyafiord . . .	3234	189	128	1012	74	22	116	9115	263	1842	6069	1241	177	109	10	56	20	9
Norder	2928	246	43	677	29	28	74	10013	616	3106	3217	945	38	32	2	68	55	—
Northern Mule	1845	285	30	475	28	52	75	8039	1116	3735	6549	733	71	73	1	40	11	2
Southern Mule	1900	365	59	520	31	39	83	5921	1082	2910	4779	663	97	79	—	55	23	8
Total .	46,319	5,792	2,349	15,595	1,556	1,132	2,042	102,305	10,803	38,724	66,986	20,373	4,109	2,042	208	1,068	887	293

The population of Reikiavik in the year 1806 (including 27 prisoners in the Toght-Huus) was 446. Of this number 134 were working men. Belonging to the town there were 35 cows, 2 sheep, 92 horses, 3 large boats, 26 of a middle size, 9 small ones, and 17 gardens.

			Occupied Farms.		Cattle.		Sheep.		Horses.
* 1703	.	50 444	4039		35,860	A. D.	279,812	A. D.	26.909
1770	.	46.201	3647		30,096	1760 .	491,934	1770 .	32.689
1783	.	47.287	3567	A. D.	21,457	1770 .	112,809	1783 .	36,408
1801	.	47.207	4661	1784 .	†9,986	1784 .	42,243	1784 .	8.395
1804	.	16.349	—		20,325		218,818		26,524

A. D.	1770	408	811	650	1,869 Total.
	1804	According to the above Table			2,163

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* In the year 1707, the small-pox destroyed 16,000 people. Between 1753 and 1759, famine carried off 10,000, and vast numbers of cattle perished.

† In the year 1783, the great eruption from Skaptaa Jokul destroyed a great number of cattle; but the loss in this Table appears to be exaggerated.

The manners of the Icelanders are exceedingly simple, and respectful as well to each other as to strangers. The women, however, appear to be rather restrained, it being customary for them to wait at table, and do every little office usually committed to servants in our own country. There are but few peculiar customs, and those not of particular interest. The depressed state in which the Icelanders are kept by the wretched policy of Denmark effectually subjugates those dispositions, which, in countries where freedom teaches men to be independent, quickly display themselves in innocent and recreating amusements. The sole occupation of the Icelander is to provide food for the winter season; and when the rigour of an arctic winter confines him to his hut, and the sun scarcely sends a ray to illuminate the dreary scene around, he amuses himself with the tales of older times, when his country stood high, and her learned men and warriors were honoured in every European court. That our lamentations are vain, that the Icelanders are condemned to misery yet greater than that they now endure, we fear is too true.

A country less inviting to the enterprise of adventurers than Iceland can scarcely be imagined. The mountains covered with eternal snow, the plains devastated by volcanic fire, seem to present no attractions. The country in general is mountainous ; but in some districts, particularly those extending from the south to the north coasts, nearly through the centre of the island, there are extensive plains, for the most part dreary wildernesses, and covered with herbage only near the sea, or where morasses have formed. The highest mountains are on the east and west sides of the island. They are in groups, seldom in chains ; and those called *Jokuls*, which are covered with perpetual snow, are chiefly, if not all, volcanic. The coast, except towards the south, is much indented by arms of the sea ; but with the exception of Havnefiord, on the south west, there is scarcely a safe winter harbour.

There is a considerable number of lakes in different parts of the island, some of which are of great extent. The principal are those called Thingvalla Vatn, My Vatn, and Fiske Vatn. The first of these is about ten miles long, and from three to four broad. There are many large rivers in Iceland, formed by the melting of the snow on the Jokuls ; and these have all a turbid appearance; some of them, being so white as to resemble milk diluted with water, have received the name Huit-aa, or the White River. Several emit a fetid smell, particularly when they issue from the snow. Besides these large rivers, there are many smaller, the water of which is transparent. They rise from the lower grounds. Along almost the whole southern coast eastward from Eyarback, where the great river Elvas empties itself into the sea, there are extensive shoals, formed, no doubt, by the depositions of the rivers proceeding from the great range of Jokuls to the eastward of Mount Hekla.

The population is chiefly established near the most convenient harbours, and where fish abound. Reikiavik is the principal place, and the seat of government. It has been chosen for the convenience of the harbour, and of the gravel beach, a thing of rare occurrence in Iceland. The country around is as bleak as can well be imagined.

It is impossible to travel many miles in Iceland without meeting the frightful effects of subterraneous fire. This miserable country has been exempted from the calamities of an eruption since the year 1783, at which time the most dreadful ever recorded took place. On the first of June of that year the southern districts were shaken by violent earthquakes. These continued, and were most alarming on the 8th, when smoke was seen rising among the mountains called Skapta Jokul. There appeared several eruptions from different spots, at considerable distances from each other. The showers of ashes and stones, the terrible noises, and the darkness in which the country was involved, foreboded an awful calamity. The large river Skaptaa was dried up, and the channels filled with liquid fire. Habitations were devoured, and the green pastures buried ; and the wretched inhabitants had the dismal prospect of being overwhelmed by the lava, or of perishing by famine. The lava was for a time retarded by its flowing into a lake ; but its progress was not stopped, when a fresh eruption took place on the 18th of June. The lava having divided, and begun to move in various directions, the scene became more and more dreadful. On the 22d fresh eruptions broke out and continued multiplying till the 13th of July. On the 20th, the lava towards the western side of the district of Skaptaa-fell ceased to flow. To the eastward, on the 3d of August, smoke was seen to rise from the mountain towards the north; the waters of the great river Hversfliote were dried up, and on the 9th of August the lava approached by the channel of the river, overflowing in one evening an extent of four miles. This eruption continued longer than the first ; and it is said that a fresh one happened in February 1784.

Mount Hekla has been quiet for half a century. The volcanic fire appears to have been most active in the south-east and north-east districts, during the last century. Previous to the eruption of 1783, flames were seen rising from the sea, about 30 miles off Cape Reikianes, and several small islands appeared, which afterwards sunk, leaving, however, a sunken reef, which renders the navigation round the Cape dangerous in thick weather. Similar phenomena have appeared in other parts of the world ; the most recent being the eruption of St Michael's, one of the Azores, which produced the island which was called Sabrina.

The greatest curiosities which Iceland presents are the springs of hot water, many of which are justly considered as among the greatest wonders of the world. They are, we believe, greatly more abundant in this than in any other volcanic country ; but the interest which the number and variety of these hot springs excites in a person who never saw any thing similar is quickly lost, in the feelings which are roused on beholding the magnificent and tremendous explosions of the Geysers. These extraordinary fountains are situate about sixteen miles north of Skalholt, on the east side of a small ridge, separated from some high mountains by a narrow swamp. Besides the principal fountains, there are a great number of boiling springs, cavities full of hot water, and several from which steam issues. There are also some places full of boiling mud, grey and red.

The silicious depositions of the water of the Great Geyser have formed for it a basin, 56 feet in diameter in one direction, and 46 in the other; a projection from one side causing the circumference to deviate from the perfect circle. In the centre of this basin is a cylindrical pipe or pit, ten feet in diameter. Through this pit the hot water rises, gradually filling it and the basin, after which it runs over in small quantities. At intervals of some hours, when the basin is full, explosions are heard from below, like the firing of cannon at a distance ; and at the same time a tremendous motion of the ground is felt around the basin. Immediately the water rises in a mass from the pit, and sinking again, causes the water in the basin to be agitated and to overflow. Another and stronger propulsion follows, and clouds of vapour ascend ; at length strong explosions take place, and large quantities of steam escaping, the water is thrown to a great height, generally from 30 to 90 feet. The steam coming in contact with the air is condensed into vapour, thick clouds of which are tossed and rolled one over another with great rapidity, the whole forming a very singular and magnificent exhibition. After continuing for some time, the explosions cease, when the basin and pipe are found empty. Bursts of steam sometimes take place when the water is rising, without any warning by subterraneous noise. These phenomena are caused evidently by the production and confinement of steam in cavities, so formed, that when the accumulation arrives at a certain point, the pressure of the water opposing its escape, is overcome, and the water is thrown out before it.

The New Geyser, as it was called by Sir John Stanley, is about 130 paces from the great one. It is an irregularly shaped pit, nine feet in its greatest diameter. About 20 feet below the orifice, which is not surrounded by an accumulation of silicious matter as the other, the water is seen in great agitation. At irregular intervals, the water is tossed out of the pit to a great height, followed by a prodigious rush of steam, accompanied by a roaring noise. The force is so great that, even when there is a good deal of wind, the vapour forms a perpendicular column nearly 70 or 80 feet high; and when large stones are thrown into the pit, they are shivered to pieces, and thrown out to a height often far beyond that of the jet of vapour and water.

At the time Mr Hooker saw it, there was a greater quantity of water than when either Sir John Stanley or Sir George Mackenzie witnessed its eruptions. Indeed, what Mr Hooker has described as a column of water, Sir George Mackenzie describes as one of vapour. When we consider the immense power of the agent which sets these grand waterworks in play, it is by no means difficult to suppose frequent alterations in their movement and appearance. The destruction of a natural valve, or a slight change in the configuration of the subterraneous pipes and cavities, might occasion variations in the phenomena from time to time.

The most curious of all the springs in Iceland is the *Tunguhver*, in the valley of Reikholt. Among a great number of boiling springs are two cavities, within a yard of each other, from which the water spouts alternately. While from one the water is thrown about ten feet high in a narrow jet, the other cavity is full of water boiling violently. This jet continues about four minutes, and then subsides, when the water from the other immediately rises in a thicker column to the height of three or four feet. This continues about three minutes, when it sinks, and the other rises, and so on alternately. It is difficult to imagine the structure of the cavities which occasion this irregular alternation; nor would it be easy to construct a piece of mechanism, of which steam is the prime mover, to imitate the phenomena.

In the middle of the river, which runs through the valley of Reikholt, is a small rock, from the top of which hot springs issue. At Reikholt is a bath, which was constructed 600 years ago by the famous Snorro Sturleson. It is fourteen feet in diameter, and six feet deep, being supplied with hot water from a spring about a hundred yards distant, by means of a covered conduit which has been much damaged by an earthquake. There was also a spring of cold water brought to it, so that any desired temperature might be obtained.

On the sulphur mountains, in the district of Guldbringè, are a number of jets of steam, and natural cauldrons of black boiling mud; and there is scarcely a district in the whole island without such indications of subterraneous heat, which must occasion the most singular contrast with the winter snows and ice, through which, at that season, they rise.

At Reykum in the south, and near Husavik in the north, are hot springs, which come next to the Geysers in magnificence.

The zoology of Iceland presents nothing remarkable. Of indigenous quadrupeds the number is very small, and must be limited to the fox, of which there are two varieties, the Canis lagopus, and Fuliginosus. The rein-deer, the rat, and the mouse, have all been imported; as well as the domestic animals, the dog, the cat, the goat, the sheep, the ox, and the horse. Polar bears are occasional visitors, coming from the ice which takes ground on the north and east coasts during winter. As soon as they appear, they are pursued and destroyed. The skins of the foxes, particularly those of the *Canis fuliginosus*, or blue fox, is a valuable article of commerce. The rein-deer are wild, and are derived from an original stock of three, which were all that survived of some that were sent from Norway in 1770. Instead of being serviceable, they often destroy the grass which is preserved for hay.

Several species of seals frequent the shores in considerable numbers; but they are not much sought after.

Whales are seldom seen on the coasts of Iceland; but that variety of delphinus, which we mentioned in the article Faroe, named in Orkney the calling whale, appears frequently in large shoals. The shark is common on the coasts, and is taken by large hooks fastened to an anchor by chains and strong lines. Of the skins shoes are made; and they are valuable to the inhabitants of some districts for the oil which they afford, and also for their flesh.

The cinereous eagle, or ern, is very common. The Iceland falcon, formerly so much prized, is now seldom seen, though it has not for many years been molested.

Ravens are found in great numbers near every habitation on the coast, watching for the offal of fish. They breed in the cliffs at a considerable distance from the shores.

The snow-flake, wheatear, white wagtail, golden plover snipe, and whimbrel, together with the ptarmigan, are the other principal land birds of Iceland.

Every kind of water fowl common to northern latitudes is found on the coasts of Iceland, and on the lakes. Swans frequent the lakes and swamps in great numbers. But of all the varieties which breed in the country, the eider duck is, from its habits and usefulness, the most remarkable and valuable. Early in June these birds collect in great numbers at every place adapted for making their nests, and where their food is in plenty. The nests are formed on the ground, generally in hollows among the grass, of straws mixed with the down which they pluck from their breasts. There is always a quantity of down round the nest, sufficient for covering the eggs when the ducks go to feed, which they do regularly during the time of low water, when they can get at the shell-fish among the sea-weeds. At this time these birds lose all their wildness, and suffer the enemy, avoided by all the lower creation, man, to approach, and even to touch them, and to lift them from their nests. The drakes are not so fearless; but they frequently remain near the nests, and express their displeasure when any one touches them. As soon as the young ones have left the shells, and get to the water, the eider ducks become as wild as any other bird, and in a month or six weeks almost all of them disappear, and it is not known to what place they resort. The nests are robbed of a certain number of eggs, and of the down. The former are a great luxury to the natives, and the latter is a valuable article of export. It is part of the employment of the women, during winter, to pick the straws and refuse from the down.

It is from the sea, however, which the Icelanders derive their chief subsistence and profit. The cod is very plentiful on the coasts; and formerly the fishery of Iceland was prosecuted by the English and French with great success. The fishery commences early in February; and the inhabitants of the interior move at that time towards the different fishing stations, and travel in darkness through the snow. They engage with the owner of a boat to obey every call for fishing, and to assist in the general labour, and he receives a share of the fish in return for the use of the boat. When a sufficient quantity has been taken, the people from the country return home, leaving the care of drying the fish to the inhabitants of the fishing villages. In June, the farmers carry to the trading stations all their marketable commodities, to be exchanged for necessaries and a few luxuries, and on their return they carry home their fish, to serve them during the next winter. The haddock is also taken in great plenty, and grows here to a very large size. The cod is chiefly cured for exportation, and the haddock for home consumption. The ling, skate, hollibut, flounders, and the cat-fish, are common, and are likewise dried for winter use. The skate is the least esteemed of all the other fish, and is seldom if ever eaten fresh. Herrings are taken on the north coast; but though vast shoals of them frequent the bays, this branch of the fishery is not much attended to. Sharks are an important object on the north-west coast, and a considerable quantity of oil prepared from them is exported.

Those travellers who have visited Iceland, having been there only during a short summer, and their time having been almost entirely occupied with viewing the country and its more prominent curiosities, have not pursued zoological enquiries very far. From what Mr Hooker says, the insect tribes seem to offer something new. That gentleman has furnished us with a very complete botanical catalogue, to which we refer such of our readers as desire particular information regarding the vegetable productions of this remote island. The birch is the only tree which withstands the rigours of an artcic winter; but its growth is limited, in the most favourable situations, to five or six feet.

The greatest portion of Iceland is mountainous; the highest elevations appearing on the east and west sides, while extensive plains appear, with little interruption, to extend from north to south across the island. The highest mountain, the height of which has been ascertained, is said to be about 5500 feet. The Sneefell Jokul, which bounds the western extremity, and has been esteemed by the natives the highest in the island, was measured trigonometrically by Sir George Mackenzie, and ascertained to be 4558 feet above an extensive beach formed near Stappen. It is probable that none of the Jokuls exceed 6000 feet. Many of them are very extensive, forming long ridges; a shape which, were it not for their characteristic covering of perpetual snow, would tend to lessen their apparent elevation to the eye. The height of the curve of congelation may be taken for Iceland, at 2829 feet as a mean; and thus a tolerable idea of the heights of the mountains may be had, when an opportunity occurs of observing the snow line on the Jokuls. From what has been actually observed, and from the best information, it appears that all the Jokuls are of volcanic formation; in other words, that they are either active or extinct volcanoes. The greatest height of the other mountains which are not volcanic does not much exceed 2000 feet. They are all of the trap formation; and this does not appear to reach a great height in the northern hemisphere. In Faroe, its greatest elevation appears to be somewhat above 3000 feet. As far as has yet been discovered, the formations in Iceland are limited to the flœtz trap, volcanic, and alluvial. and those of Faroe to the first and last. The flœtz trap of Greenland, that of Iceland, and of Faroe, are probably connected; and the two last may be supposed to rest on primitive rocks, as the Greenland formation has been ascertained to do.

The beds of trap are inclined for the most part at a small angle to the horizon, dipping to the eastward of the meridian; and in this respect they agree with those of Faroe.

The beds consist chiefly of amygdaloid, containing zeolite, chalcedony, opal, quartz, arragonite, and calcareous spar. The base of the amygdaloid is for the most part wacke. There are many varieties of greenstone, from the most compact to that whose component parts are of large size; felspar and augit occurring in crystalline masses of from a quarter to half an inch. Greenstone occurs also in veins, and it is in this form only that basalt has been observed in Iceland and Faroe. The veins of Iceland, and some of those in Faroe, were found to have their sides vitreous, somewhat resembling black pitchstone, and gradually passing into the character assumed by the mass of the veins. Greenstone occurs columnar. In the island of Vidöe, there are columns formed of tables several inches in thickness, and from three to five feet in diameter, and in some instances, from decomposition, easily separable from each other. Some of the tabular columns have the appearance of the tables being composed of oval concretions, rendered visible by decomposition.

Beds of tuf of large dimensions are frequent; and if they are to be denominated from the formation in which they occur, they may be called trap tuf. The resemblance which they bear to volcanic tuf is, however, in many cases remarkably strong. They occur most frequently among a class of rocks, which have been distinguished by Sir George Mackenzie by the name submarine lavas; and we shall now quote from that gentleman's account of Iceland, the description of these rocks. He has selected a particular mountain which presented a precipitous face about 2000 feet high, and which, but not without considerable difficulty and hazard, he and his fellow travellers ascended, taking specimens from each bed, a series of which is preserved in the cabinet of the Royal Society of Edinburgh. "The mountain of Akkrefell stands perfectly detached, being separated from the mountains of Esian by the Hvalfiord, and from those towards the north by a flat swampy country extending several miles. It is bounded on the south and west partly by the Faxefiord, and partly by the Borgarfiord. On the southern side the structure of the mountain is exposed almost from top to bottom, in a precipice about 2000 feet high. From Indreholm the beds appear horizontal; but on going round the mountain we found that they dipped towards the north-east, forming a considerable angle with the horizon. From the sea at Indreholm to the foot of the mountain, there is a flat swamp extending more than a mile.

To the height of about 800 feet, the mountain of Akkrefell is composed of beds generally from ten to twenty, and sometimes extending to forty feet thick, of varieties of amygdaloid and tuffa. The latter occurred sometimes not more than a foot in thickness, and was interposed between the beds of amygdaloid. When it was so thin, it much resembled red sandstone. While scrambling among the loose stones, we had met with quantities of slags, for which we were at a loss to account, as we had been told that nothing like lava existed on or near this mountain. Its appearance indicated nothing volcanic; and our surprise on finding any undoubted productions of fire in such a place was increased, when, at the height above mentioned, we saw the under part of a bed completely slaggy, and bearing the most unequivocal marks of no slight operation of fire; and on continuing to ascend, we found every bed, excepting those of tuffa, one of which was at least forty feet thick, presenting the same appearances, and many of them having an amygdaloidal character. Our astonishment was not lessened on discovering a vein of greenstone, about four feet thick, cutting these beds, and having a vitreous coating on its sides, which seems to be common to all the veins of the country. Similar beds occur in the mountains of Esian, where the most important fact connected with them was found in a mass of slag which contained calcareous spar."

The same traveller, in a memoir concerning the Faroe Islands, printed in the 7th volume of the *Edinburgh Transactions*, thus speaks of the trap rocks of that country. "The surfaces of many lavas which I passed over in Iceland were not unlike coils of rope, or crumpled cloth; an appearance which we should expect to be assumed by any viscid matter in motion. On our first visit to the island of Naalsoe, we observed the surface of a bed of amygdaloid, which had been exposed to a considerable extent by the removal of the bed above, exhibiting an exact picture of the lavas I had seen in Iceland. At first sight this discovery fixed instantaneous conviction on the minds of those who were with me, some of whom had never seen lava, that heat must have caused the appearance before us. We brought away a number of specimens, which are now before the Society, and which speak a language not to be misunderstood. We afterwards discovered varied examples of this crumpled surface in different parts of the country. In the vicinity of Eyde, in Osteroe, there were many instances in which the matter appeared as if, in a viscid state of fusion, it had flowed and spread itself out." These appearances were seen in different parts of Faroe. Mr Allan, in the same volume, has described the individual minerals found in the trap of Faroe, and expressed his entire conviction of its igneous origin; while at the same time he appears at a loss to account for the manner in which heat had operated. Sir George Mackenzie has observed, that "while the great point, the action of heat in the formation of trap rocks, seems to be demonstrated, forming a theory of the manner in which heat has operated in particular cases, is, in a general view, perhaps not absolutely necessary in the present state of geology." Indeed the farther we advance in the study the farther we find ourselves from the object of our search while we continue resolved that either heat or water shall be the sole agent. To us, the most reasonable mode for geologists to follow appears to be, to consider both heat and water as agents which have been employed in the formation of mineral substances. And we are of opinion that a third agent ought to be added as one which universally and continually operates, we mean gravitation. The attraction of cohesion and electricity may also with propriety be taken into the service; and probably, to form a just theory, we should give a share to every agent which can in any degree influence the economy of the globe; the atmosphere, the motion of the earth, magnetism, &c. But at present we must refrain from entering on this subject.

A very remarkable kind of mineralized wood is found on the mountain of Drapuhlid in Iceland. In external appearance, it cannot be distinguished from a mass of charcoal; yet it is very heavy. Chalcedony is observed in some specimens filling small fissures. When the carbonaceous matter is burned, a mass remains, which, when bruised, divides into fibres finer than hair, and resembling asbestos; shewing that the silicious matter had penetrated into the most minute pores of the wood. This substance occurs in a bed of tuf lying under pearl stone. This last substance occurs of a light grey colour, and also dark green approaching to pitch stone. It was found also forming the principal ingredient in a variety of tuf not before described. "It is composed chiefly of masses of black pearlstone, imbedded in a dull blackish green matrix. It contains also masses of amygdaloid, and we found a few nodules of pyrites in it, coated with pitch coal. Pitchstone occurs at Houls, and on the west side of the mountain called Baula.

The surturbrandt of Iceland has not been seen *in situ* by a mineralogist. It has a great resemblance to black oak found in lakes and rivers in many countries. But though capable of being shaped into tables and other articles of furniture, it is not in a condition to be cut by a plane into shavings, being somewhat brittle.

For a description of the individual minerals which occur in these regions, we must refer to the 7th volume of the *Edinburgh Transactions*, and to Sir George Mackenzie's *Travels*. The silicious depositions of the Geysers and other hot springs are very interesting, but are now well known to mineralogists.

The volcanic formation of Iceland is perhaps the most extensive in the world, covering an extent of at least 60,000 square miles. Sir George Mackenzie distinguishes three formations, which are ascribed to the action of internal heat. The oldest is that already described as submarine lavas, which resemble trap rocks more nearly, both in position and structure, than any other; and which he supposes to have flowed at the bottom of the seas. The next is a class of lavas to which he has given the name *cavernous*, from its containing numerous cavities, some of them very extensive. This is supposed to be formed of rocks which have been subjected to subterraneous heat, but not removed from their original place. Many of the appearances presented by this class seem to warrant this conclusion in regard to its mode of formation; but the conjecture is thrown out merely to attract the attention of future observers of volcanic countries. The last is the ordinary erupted lava, including ejected substances. Perhaps there is no field in which the investigation of the operations of heat could be carried on with greater facility than in Iceland, the rocks are so well exposed to view. But the shortness of the season in which travelling is practicable presents a strong obstacle. Yet we hope that some able mineralogists will repeat and extend the observations made by Sir George Mackenzie, and avail themselves of the information afforded by that gentleman.

We understand that the celebrated traveller and mineralogist, Baron Von Buch, has carefully examined the Icelandic collection in the cabinet of the Royal Society of Edinburgh, and has the intention of soon communicating to the public the result of his examination of various volcanic countries.

See *Letters on Iceland*, by Von Troil; *Voyage en Islande, fait par ordre de sa Majestè Danois*, par M M. Paulsen et Olafsen; Hooker's *Tour in Iceland*, 1809; *Travels in Iceland*, 1810, by Sir G. S. Mackenzie; *Transactions of the Royal Society of Edinburgh*, vols. iii. and vii. See also the article VOLCANO, which Baron Von Buch has promised to write for this work.

ICHTHYOLOGY.

Ichthyology is that department of natural history which treats of Fishes, classifying them according to their forms, ascertaining their haunts, describing their manners, and specifying the uses to which they may be applied. The title of the science is a compound of two Greek words, ιχθυς, *a fish*, and λογος, *a discourse*.

Fishes belong to that great division of animals, characterised by having an articulated skeleton, a bony cavity containing the brain, a spinal marrow, and red blood. They are thus associated with quadrupeds, birds and reptiles, from which, however, they may be distinguished by the following characters.

Fishes possess a heart with one auricle and one ventricle. The blood is cold. They are destitute of a windpipe and lungs, breathing by means of peculiar organs termed *gills*. They reside in water, are in general covered with scales, and swim by the assistance of fins.

The ancients regarded as fishes, all animals which seek their food in water, or which reside in that element. Hence we find whales included by older writers among fishes, constituting a subdivision, distinguished by their breathing by means of lungs. But cetaceous animals differ from fishes, not merely in their organs of respiration, but likewise in those of circulation and reproduction. Their heart consists of two auricles and two ventricles, and the blood is warm. They bring forth their young alive, and suckle them.

It is more difficult to draw the line of distinction between fishes and reptiles. The structure of the heart, and the temperature of the blood, are similar in both classes. Reptiles, however, are all furnished with lungs; and although, in a few genera, the young are possessed of gills, yet these organs disappear before the animals arrive at maturity. There are, however, two genera, in which the gills are persistent, but the animals belonging to these have digitated feet, and are not likely ever to be confounded with fishes.

The study of this department of natural history is peculiarly difficult. The element in which fishes reside conceals their movements from our view, and prevents us from becoming acquainted with their instincts and habits. In the midst of lakes and rivers, in the depths of the ocean, or in pools on the less frequented shores, they perform unmolested the great operations of nature. Hence the manner of their production, the appearances exhibited by the different sexes, the changes produced by age or season, the artifices they employ to obtain their food, the migrations which they perform, and the limits of their existence, have hitherto been but imperfectly ascertained.

The rarer kinds of fishes, occasionally found on the hooks or in the nets of fishers, are rejected by them as useless, or perhaps exhibited for a few days in the neighbouring village as objects of wonder. They speedily decay, and the only memorials of their existence are preserved in the imperfect traditions of their form. It rarely happens that an intelligent naturalist is on the spot to examine their characters, or to delineate their appearance: But even should there be a person at hand capable of forming a systematic description, still their haunts and habits must remain unknown to us. Of the various species of fishes enumerated by nomenclaturists, perhaps more than the one half are known to us only by their external forms; their food, their instincts, and their functions, remaining unascertained.

The pursuits of the ichthyologist are far from possessing those charms which excite the zeal and admiration of the naturalist, in other departments of zoology. It is easy, indeed, to form a collection of these objects, and to preserve their form and characters for scientific purposes; but a museum furnished with such specimens presents little that is gay or splendid. The colours and lustre of fish fade after death, nor can any process of embalming fix and preserve them. A coating of varnish is often resorted to as a substitute for the natural slimy covering of their skins, and the brush is employed to restore the colours; but specimens prepared in this manner are disregarded by the scientific observer, and, to the mere spectator, a collection of fishes in wax-work would be equally acceptable. The aspect of some fishes, as the eel for example, is repulsive; whilst the cold moist surface of others, disgust the fastidious naturalist, or at least lessen his anxiety to examine this portion of animated nature.

These impediments to the study of ichthyology have unquestionably retarded the progress of the science; but we are confident, that the advantages which result from an attentive examination of the subject may be placed in successful opposition. The rank which fishes hold in the scale of being, as connecting the vertebral with the molluscous animals, is alone sufficient to awaken curiosity; while a considerable degree of interest is excited, by attending to those forms and organs which fit them for residing in the waters. But this department of zoology is not occupied exclusively with matters of mere curiosity or science; the subject is of vast importance in an economical, a commercial, and a national point of view. The inhabitants of this country derive a large portion of their subsistence from the waters; nor could one half of the present population of the country be supported, were access to this great storehouse of life and nourishment cut off.

In confirmation of this assertion, we request the reader to consider the countless numbers of cod, herrings, haddocks, turbot, skate, mackrel, and pilchards, annually furnished to us by the ocean, and the salmon, pikes, perches, and trouts, captured in our lakes and rivers. A part of these is consumed by ourselves, and a part exported to foreign countries. These fisheries give employment to many thousands of healthy natives, and are universally considered as the best nurseries of intrepid seamen.

Those who have paid attention to our fisheries, and the legislative enactments by which they are regulated, must be convinced that the subject is imperfectly understood, and acknowledge that many of these statutes originate in our ignorance of the habits and the haunts of the finny tribes. It must therefore appear an object of vast importance to examine the structure of fishes, and trace their manners and economy, with the view of improving the modes of fishing, ascertaining the best frequented grounds, and the periods in which they are in season These are the objects which the ichthyologist should keep steadily in view, and to the accomplishment of these all his investigations ought to be directed. Hitherto, however, the economical department of the science has been in a great measure overlooked by the systematic enquirer. Occupied, almost exclusively, in ascertaining the position of the fins, or in counting the number of their rays, so as to form the divisions of his arrangement, the ichthyologist seldom condescends to investigate the history or discover the uses of the species. Systematic works in this branch of natural history are therefore seldom consulted by the ordinary inquirer. Disgusted with the mere enumeration of names and external appearances, of which these books consist, he retires to the hut of some old fisherman, and listens with interest to the recital of many anecdotes, illustrative of the different kinds of fish, the best frequented grounds, and the most enticing baits. In such a school he will learn much genuine natural history, mixed perhaps with a little fable.

We wish not to be understood as condemning as useless the systematic part of ichthyology, but from the heart we condemn that want of attention to the manners of fishes, so conspicuous in the writings of naturalists; a negligence, which has brought the science into discredit, and which may be considered as the principal reason why this department of nature has obtained so few admirers. But we trust the period is at no great distance, in which the ichthyologist will be as anxious to explore the habits of those fishes, with whose specific differences he is already acquainted, as he is at present to add a new species to his list, or effect some trivial revolution in the arrangement of the genera.

In order to present the reader with a general view of the present state of ichthyological science, we propose, in the following Chapters, to consider, 1st, The history of the science; 2d, The structure and functions of fishes; 3d, The condition of fishes; and lastly, Their systematic arrangement. We propose to avoid all minute details which would prove uninteresting to the ordinary observer, in order to make room for the developement of those laws which regulate this great class of animated beings.

CHAP. I.

History of Ichthyology.

The history of ichthyology during the first ages of science, may gratify curiosity, but is incapable of yielding instruction. We are in a great measure ignorant of the sources from whence Aristotle obtained his information on this subject; nor do we consider as of great importance those descriptions which he has communicated. Although he treats of the manners and uses of several fishes, and divides the class into cetaceous, cartaliginous, and spinous, his labours did not contribute much to the progress of the science. The writings of Pliny were equally unproductive of advantage. He appears, however to contemplate fishes as a distinct class of animals, without attempting to define its limits. Ovid, Athenæus, Elian, Oppian, and Ausonius, have contributed a few facts, and several entertaining descriptions. But as we are investigating the history of ichthyology as a branch of the system of nature, we must take our leave of these early writers, and examine the productions of those naturalists who flourished after the revival of letters.

Belon, a French physician, deserves to be noticed in this place, as the first modern ichthyologist In the year 1553 he published his great work *De Aquatilibus;* and in 1555 he produced another work, or rather the ichthyological part of the former, under the title, *La nature et diversité des Poissons avec leurs Portraits.* Although B. lon was more advantageously known as a traveller and ornithologist than as an ichthyologist, his labours in this last department were of service to the science. He did not attempt any general system, but, by collecting fishes into groups, he laid the foundation of many natural families or genera. He separated the osseous from the cartilaginous flat fishes, and brought together the different species of sharks into one division. The wooden cuts which accompany the work are not destitute of merit, if we take into consideration the state of the arts at the time.

In the year 1554, Rondelet, a professor of Physic at Montpelier, published his work *De Piscibus Marinis.* He has been rather ungraciously treated by his countrymen, for saying that he was unable for some time to determine on the particular fish with which to begin the descriptions, and that he gave the preference to the *Gilthead*, because it was best known to the ancients and moderns, and highly prized as esculent food. In the course of his observations, he pointed out several distinguishing characters of fishes, which must have contributed to draw the attention of naturalists to their systematic arrangement. In the first four books, he treats of the differences observable among fishes, in regard to their food and haunts, their forms and functions. In the remaining books he describes the different species, in many cases forming these into natural groups. His figures of fishes are superior in execution to those of Belon.

The work of Salvianus, which appeared in the same year at Rome, under the title *Aquatilium Animalium Historiæ liber primus, cum eorundem formis ære excusis*, contained a description of the fishes of Italy to the amount of ninety species. The distribution of the species is destitute of arrangement; but in the description of these he follows a regular plan, treating of the name, characters, station, food, time of spawning, and method of catching of each. It is a matter of regret, that this method of communicating the history of the species has been in a great measure overlooked by succeeding ichthyologists.

Passing over a number of laborious compilers, who flourished in the end of the sixteenth century, we come now to consider the merits of our countryman Willoughby, and his friend Ray. "These illustrious naturalists," says the intelligent President of the Linnæan Society in his introductory discourse, "laboured together with uncommon ardour in the study of nature, and left scarcely any of her tribes unexplored. But death, which so often disappoints the fairest hopes, cut off the former in the prime of life, before he had digested the materials, to the acquisition of which he had devoted his youth; and they might all have been lost to the world, and his name have perished with them, but for the faithful friendship and truly scientific ardour of Ray. So close was the intercourse between these two naturalists, that it is not easy to assign each his due share of merit. Indeed Ray has been so partial to the fame of his departed friend, and has cherished his memory with such affectionate care, that we are in danger of attributing too much to Mr Willoughby, and too little to himself."

The work of Willoughby, as revised by Ray, was published in folio in 1686, under the title, *De Historia Piscium libri quatuor, jussu et sumptibus Societatis Regiæ Londinensis editi.* This work, the production of a laborious observer and faithful recorder, may be considered as the basis of subsequent discoveries in the physiology of fishes. It is a valuable storehouse of facts, to which the student of ichthyology should frequently resort. The systematic arrangement employed in this work holds the first place among those systems, which appeared in the end of the seventeenth or beginning of the eighteenth centuries. The following synoptical view of this system will enable the reader to ascertain the state of the science at the period in which he wrote. The cetaceous fishes form the subject of the second book, the classification of which, as given by our author, we purposely omit.

III. Lib. De piscibus cartilagineis. Ova magna concipiunt.
  1. Sect. De cartilagineis longis.
  2. —— De cartilagineis planis.
  3. —— De cartilagineis oviparis.

IV. Lib. De piscibus oviparis, quorum plerique spinas in carne habent.
  1. Sect. De planis ovip. spin. qui in latus projecti natant.
  2. —— De piscibus anguilliformibus, seu lævibus, lubrices et plerumque oblongis.
  3. —— De piscibus corpore contractiore vel saltem

non admodum lubrico, qui pinnis ventralibus carent.

4. Sect. De spinosis dictis, quibus pinnarum dorsalium radii omnes molles et flexiles sunt.

5. —— Pisces spinosi quibus pinnarum dorsalium radii alique aculeati.

Ray afterwards in part improved upon this system, in his *Synopsis Methodica Piscium*, which was published in the year 1713. These two works are regarded by naturalists, in general, as having established the claims of ichthyology to rank as a science.

Samuel Dale, the intelligent editor of Taylor's History of Harwich, has published a system of fishes in his *Pharmacologia*, which appeared in 1739. He has the merit of introducing several new characters, especially the position of the centre of gravity. The following synoptical view of this system may be useful.

I. BRANCHIIS RESPIRANTES, CORDE UNICO VENTRICULO PRÆDITO.

Ovipari.

A. Corpore longo et lubrico, squamis quoque carente.
  a. Pinnis ad branchias obtinentes, ventralibus destituti.
  b. Pinnis utroque pari donatis; *i. e.* branchiali et ventrali.
    1. Duabus in dorso pinnis.
    2. Unica in dorso pinna.
B. Corpore contractiore vel saltem non admodum lubrico.
  a. Pinnis non aculeatis.
    1. Unica in dorso pinna.
    2. Duæ in dorso pinnæ eriguntur.
  b Pinnis aculeatis, duabus in dorso pinnis, anteriore autem spinis radiata.

Vivipari.

A. Cartilaginei.
  a. Longi.
  b. Plani.

II. PULMONE RESPIRANTES, CORDE DUOBUS VENTRICULIS PRÆDITO.

A. Dentati.
  a. Fistulosi.
  b. Non fistulosi.
B. Edentuli.

The inferior divisions, which have been omitted, depend not only upon the position of the centre of gravity, but upon the serratures of the belly, the size of the scales, the structure of the mouth, and the places in which they reside.

Artedi, the friend and countryman of Linnæus, adopted the principles of classification discovered by that great reformer of science, and applied them with success in the arrangement of fishes. But a premature death prevented the completion of his plan. Linnæus collected and arranged his manuscripts, and published them in the year 1738, in two volumes, under the title *Bibliotheca Ichthyologia*, and *Philosophia Ichthyologia*. Another edition under the same title made its appearance in 1788 and 1789, by John J. Walbaum, a physician at Lubeck. This work of Artedi is evidently the production of an enlightened naturalist, a laborious student, and an accurate observer. In it the genuine principles of the science were for the first time clearly established. He likewise assigned the true limits of generic characters, and the method of separating species. The work abounds with judicious observations and sound criticisms, and merits an attentive perusal. The following is an outline of his system.

PISCES CAUDA PERPENDICULARI.

A. Pinnarum radiis osseis.
  a. Branchiis ossiculatis.
    1. Pinnis inermibus. *Malacopterigii*

* Pinna dorsi unica in medio fere dorsi.	1. Syngnathus. 2. Cobitis. 3. Cyprinus. 4. Clupæa. 5. Argentina. 6. Exocætus.
** Pina unica in medio fere dorsi et unica postica dorsi adiposa.	7. Coregonus. 8. Osmerus. 9. Salmo.
*** Pinna unica in extremo dorsi.	10. Esox. 11. Echeneis.
**** Pinnaunica pluribusve per totum dorsum extensis.	12 Coryphæna. 13. Ammodytes. 14, Pleuronectes. 15. Stromateus. 16. Gadus. 17 Anarhichas.
***** Pinna unica longa vix a cauda distincta.	18. Muræna. 19. Ophidion.
****** Pinna exigua unica in extremo dorsi vel nulla.	20. Anableps. 21. Gymnotus.

2. Pinnis osseis, quarum quædam spinosæ. *Acanthopterigii.*

* Capite glabro	22. Blennius. 23 Gobius. 24. Xiphias. 25. Scomber. 26. Mugil. 27. Labrus. 28. Sparus. 29. Sciæna.
**Capite aspero	30. Perca. 31. Trachinus. 32. Trigla. 33. Scorpana. 34. Cottus. 35. Zeus. 36. Chætodon. 37. Gasterosteus.

a Branchiis osseis destitutis.

Branchiostegi	38. Balistes. 39. Ostracion. 40. Cyclopterus. 41. Lophius.

B. Pinnarum radiis cartilagineis vix a membrana distinctis

Chondropterigii	42. Petromyson. 43. Acipenser. 44. Squalus. 45 Raja.

PISCES CAUDA HORIZONTALI, *including the whales.*

Klein made an attempt to classify fishes in his *Historia Piscium Naturalis.* It was published in five parts, the first appearing in the year 1740, and the last in 1749 As this naturalist appeared as the rival of Linnæus, he has too often been condemned by the admirers of the professor of Upsal without sufficient examination. It is true that, in the construction of his generic and specific characters, he falls short of the excellence of Artedi or Linnæus, but in the formation of the higher divisions of his system, he exhibits an intimate acquaintance with the external characters of fishes. The following synoptical view will convey an idea of the principles of his system. We have omitted his first division, which contains the setaceous animals.

II. PISCES BRANCHIIS OCCULTIS.

A. Ad latera.
  a. Pinnata.

1. Spiraculis quinque.
    - 5. Cynocephalus.
    - 6. Galeus.
    - 7. Cestracion.
    - 8. Rhina.

2. Spiraculo unico.
    - 9. Batrachus.
    - 10. Crayracion.
    - 11. Capriscus.
    - 12. Conger.

b. Apennia.

1. Spiraculo unico. 13 Muræna.
2. Spiraculis septem. 14. Petromyson.

B. In Thorace.

1. Spiraculis constanter quinque.
    - 15. Narcacion.
    - 16. Rhinobatus.
    - 17. Legobatus.
    - 18. Dasybatus.

III. PISCES BRANCHIIS APERTIS.

A. Series I. A partibus notabilibus et corpore anguilliformi.

a. Capite et ventre notabiles 19. Silurus.

b. Notabiliter rostrati ore vario.

1. ore prono capite in solidum rostrum exeunte 20. Accipenser.
2. Ore fisso.
    - * et labrace, rostro retuso dentibus horridis 21. Lathargus.
    - ** Mandibula superiore in rostrum notabile exeunte 22. Xiphias.
    - *** Inferiori mandibula ultra superioremrostratam producta 23. Mastaaccembalus.
    - **** Utraque mandibula equaliter rostrata 24. Psallisostomus.
3. Ore in rostri tubulosi extremitate 25. Solenostomos.
4. Capite et cauda rostratus 26. Amphisilien.

c. Notabiliter plani et oculata.

1. In dextro latere oculati
    - 27. Solea.
    - 28. Passer.
2. In sinistro latere oculatus 29. Rhombus.
3. Utrinque oculati
    - 30. Rhombotides.
    - 31. Tetragonopterus.
    - 32. Platiglossus.

d. Thoracici notabiliter armati.
- 33. Cataphractus.
- 34. Ceristion.
- 35. Centriscus.

e. Vel sterno vel capite notati instar ricini omnibus croporibus sibique invicem adhærentes.
- 36 Ocontion.
- 37. Echeneis.

f. Corpore teretiusculo anguillæ adspectum habentes 38. Enchelyopus.

B. Series II. Corpore spisso vel lati, vel carinati et castigati.

a. Tripterus . . . 39. Callarias.

b. Pseudodripterus . . 40. Pelamys.

c. Dipterus.

1. Pinna secunda cutacea vel adiposa 41. Trutta.
2. Pinnis ambabus radiatis
    - 42. Mullus.
    - 43. Cestreus.
    - 44. Labrax.
    - 45 Sphyræna.
    - 46. Gobio.
    - 47. Asperulus.
    - 48. Trichidion.

d. Pseudodipterus.

1. Pro prima pinna dorsali aculeis discretes 49. Glaucus.
2. Præter pinnam longam, processibus in capite quasi cristatus. 50. Blennus

e. Monopterus.

1. Pinna longa unica.
    - * Interrupta . . . . 51. Perca.
    - ** Sinuosa . . . 52. Percis.
    - *** Coæquata.
        - *α.* Dentibus acutis
            - 53. Maenas.
            - 54. Cicla.
            - 55. Synagris.
            - 56. Hippurus.
        - *β.* Dentibus latis et obtusis 57. Sargus.
        - *γ.* Edentuli .
            - 58. Cyprinus.
            - 59. Prochilus.
2. Pinna brevi.
    - * Ad medium dorsi.
        - *α.* Corpore lato spisso 60. Brama.
        - *β.* Corpore castigato.
            - † Barbatus . . 61. Mystus.
            - †† Imberbes .
                - 62. Leuciscus.
                - 63. Harengus.
    - ** Caudæ proxima . 64. Lucius.

f. Pseumonopterus . . 65. Pseudopterus.

We come now to consider the system of the celebrated Linnæus. At first this eminent naturalist adopted the views and arrangements of his friend Artedi. By degrees, however, he unfolded the principles of a new method, which appeared in its most perfect form in the 12th edition of the *Systema Naturæ*, 1766, as follows.

I. APODES.

Pinnæ ventrales nullæ.

Apertura branchiarum ad latera thoracis	1. Muræna.
Dorsum apterygium . .	2. Gymnotus.
Cauda aptera	3. Trichiurus.
Dentes rotundati . . .	4. Anarhichas.
Caput corpore angustius . .	5. Ammodytes.
Corpus ensiforme . . .	6 Ophidium.
Corpus ovatum . . .	7. Stromateus.
Rostrum ensiferum . . .	8. Xiphias.

II. JUGULARES.

Aperturæ branchiarum ad nucham	9. Callionymus.
Os simum	10. Uranoscopus.
Anus prope pectus . .	11. Trachinus.
Pinnæ pectorales elongatæ in acumen	12. Gadus.
Pinnæ ventrales dydactylæ muticæ	13. Blennius.

III. THORACICI.

Os simum, corpus ensiforme	14. Cepola.
Capitis dorsum planum transversim sulcatum	15. Echeneis.
Caput antice truncato-obtusum	16. Coryphæna.
Pinnæ ventrales coadunatæ inpinnam ovatam	17. Gobius.
Caput corpore latius . .	18. Cottus.
Caput cirris adspersum . .	19. Scorpæna.
Labium superius membrana transversa fornicatum . . .	20. Zeus.
Oculi ambo in latere altero capitis	21. Pleuronectes.
Dentes setacei confertissimi, flexiles	22. Chætodon.

Dentes validi incisores s. molares	23. Sparus.
Pinna dorsalis ramento post spinas notata	24. Labrus.
Pinna dorsalis in fossula recondenda	25. Sciæna.
Opercula branchiarum serrata	26. Perca.
Cauda lateribus carinata; spinæ dorsales distinctæ . . .	27. Gasterosteus.
Cauda lateribus carinata: Pinnulæ spuriæ plures	28. Scomber.
Squamæ, etiam capitis, laxæ .	29. Mullus.
Digiti distincti juxta pinnas pectorales	30. Trigla.

IV. ABDOMINALES.

Corpus vix ad caudam angustatam	31. Cobitis.
Caput nudum, osseum scabrum	32. Amia.
Radius 1. pinnæ dorsalis pectoraliumque dentatus . . .	33. Silurus.
Caput antice truncatum . .	34. Teuthis.
Corpus cataphractum . .	35. Loricaria.
Pinna dorsalis postica adiposa	36. Salmo.
Rostrum cylindricum operculo clausile . . .	37. Fistularia.
Mandibula inferior longior, punctata	38. Esox.
Mem. branch. duplex, exteriore minore	39. Elops.
Anus caudæ vicinus . .	40. Argentina.
Fascia lateralis longitudinalis argentea	41. Atherina.
Mandibula inferior intus carinata	42. Mugil.
Apertura branch. linearis absque operculis . . .	43. Mormyrus.
Pinnæ pectorales longitudine corporis	44. Exocætus.
Digiti distincti juxta pinnas pectorales	45. Polynemus.
Abdomen carinatum serratum .	46. Clupea.
Membrana branchiostega triradiata	47. Cyprinus.

The most remarkable change which we witness in this system is, the removal of the cetacei and cartilaginei of Ray from the class of fishes. The former he has inserted in the class Mammalia, while he has placed the latter among the Amphibia, under the order Nantes. He was induced to assign to these last such a position in his system, in consequence of trusting to the inaccurate observations of Dr Garden of South Carolina, who, from a dissection of the fish called *diodon*, concluded that it possessed both lungs and branchiæ. Subsequent systematic writers have in general restored them to their true place among fishes.

The ichthyologists who preceded Linnæus invariably endeavoured to employ those characters in the formation of their primary divisions, which indicate some peculiarity of organization, connected with the vital functions. In other words, they attempted to discover a natural method in ichthyology. Linnæus assumed, as the foundation of his system, the relation of the ventral to the pectoral fins, without attempting to point out the influence exercised on the animal economy by a change of position in these organs. Hence his Orders are all arbitrary and artificial. In the construction of his Genera, he was singularly happy in the choice which he made of characters. Those which are *essential* have been given in the Table; the *natural* character was employed in the system itself. He introduced the use of trivial names, and corrected the specific characters. His terms were classical and expressive, and the whole system bears the stamp of a mighty genius. His genera, it is true, have been divided, in order to form new ones; but how few have equalled this naturalist in the luminous brevity of his characters.

Gronovius, the cotemporary and friend of Linnæus, published his *Museum Ichthyologicum*, in 2 vols. folio, in the year 1754-6. In this work he attempted the following systematic arrangements.

I. CAUDA HORIZONTALI.

Whales.

II. CAUDA PERPENDICULARI.

A. Radiis pinnarum cartilagineis.

CHONDROPTERYGII.

a. Pinnis ventralibus præsentibus	5. Acipenser. 6. Callorynchus. 7. Squalus. 8. Raja.
b. Pinnis ventralibus nullis	9. Petromyzon.

B. Radiis pinnarum osseis.

1. Branchiarum aperturis, foramine exiguo tantum apertis.

BRANCHIOSTEGI.

a. Pinnis ventralibus nullis	10. Muræna. 11. Gymnotus. 12. Syngnathus. 13. Ostracion.
b. Pinnis ventralibus spuriis	14. Balistes. 15. Cyclopterus. 16. Cyclogaster.
c. Pinnis ventralibus veris præsentibus	17. Gonorynchus. 18. Cobitis. 19. Uranoscopus. 20. Lophius.

2. Branchiarum aperturis subter atque in lateribus laxe apertis.

BRANCHIALES.

a. Pinnis ventralibus in pectore sub pectoralibus.

* Pinna dorsi solitaria	21. Sciæna. 22. Cynædus. 23. Sparus. 24. Holocentrus. 25. Coracinus. 26. Scarus. 27. Chætodon. 28. Labrus. 29. Callyodon. 30. Pleuronectes. 31. Echeneis. 32. Blennius. 33. Erichelyopus. 34. Pholis.
** Pinna dorsi una pluribus	35. Cottus. 36. Amia. 37. Trachinus. 38. Gobius. 39. Eleotris. 40. Trigla. 41. Mullus. 42. Perca. 43. Scomber. 44. Zeus. 45. Gadus.

b. Pinnis ventralibus inter pinnas pectorales et analem sitis.

* Pinna dorsi solitaria

46. Clarius.
47. Silurus.
48. Aspredo.
49. Albula.
50. Cyprinus.
51. Clupea.
52. Argentina.
53. Synodus.
54. Hepatus.
55. Erythrinus.
56. Umbra.
57. Cataphractus.
58. Exocætus.
59. Anableps.
60. Esox.
61. Sofenostomus.
62. Belone.

** Pinnis dorsalibus duobus, posteriore spuria seu adiposa

63. Salmo.
64. Anostomes.
65. Charax.
66. Mystus.

*** Pinnis dorsalibus veres seu radiatis.

67. Callichthys.
68. Plecostomus.
69. Centriscus.
70. Mugil.
71. Polynemus.
72. Atherina.

c Pinnis ventalibus veris nullis.

73. Anarhichas.
74. Ophidion.
75. Mastacembalus
76. Ammodytes.
77. Gasterosteus.
78. Channa.
79. Gasteropelecus
80. Xiphias.
81. Leptocephalus.
82. Gynogaster.

In this system Gronovius has brought back the cetaceous and cartilaginous divisions of Ray. His primary characters are similar to those employed by that illustrious zoologist. Those of a subordinate rank are in part derived from the same source, and from Artedi and Linnæus. As a system, it is inferior to that of Linnæus, since the subordinate characters are liable to exceptions. Like that naturalist, he employs the number of the fins as a character subordinate to those furnished by their position.

Brunich attempted another system of fishes, which he published in his *Zoologiæ Fundamenta*, (Hafniæ, 1771). It is an attempt to unite the natural method of Ray, and his numerous followers, with the artificial system of Linnæus. It appeared at the time when the professor of Upsal was in the meridian of his glory, and was treated with neglect by the admirers of that great man. To us, whose opinions on the merits of these systems are not likely to be influenced by party feelings, the method of Brunich appears equally simple as that of Linnæus, and, in the first tribes, is certainly superior. We add it here, that the reader may judge for himself.

TRIBUS I.

Branchiis incompletis. Spiraculis thoracis lateralibus. Aurium foraminibus pone oculos. Pinnis cartilagineis.—CHONDROPTERIGII.

1. Petromyzon.
2. Raja.
3. Squalus.
4. Chimæra.
5. Acipenser.

TRIBUS. II.

Branchiis incompletis. Apertura thoracis linearis. Pinnis membranaceis radiatis. Corpore sæpius cataphracto vel muricato. BRANCHIOSTEGI.

A. Pinnis ventralibus nullis.

6. Syngnathus.
7. Ostracion.
8. Balistes.
9. Tetrodon.
10. Diodon.

B. Pinnis ventralibus presentibus.

11. Lophius
12. Cyclopterus.
13. Centriscus.
14. Pegasus.

TRIBUS III.

Branchiis completis. Apertura thoracis hiante, Pinnis membranaceis radiatis; ventralibus nullis; corpore sepius alepedoto.—APODES.

15. Xiphias.
16. Anarhichas.
17. Ammodytes.
18. Trichiurus.
19. Stromateus.
20. Muræna.
21. Ophidion.
22. Gymnotus.

TRIBUS IV.

Branchiis completis. Apertura thoracis hiante; pinnis membranaceis radiatis; ventralibus sub jugulo; corpore squamis minutis tecto vel nudo. JUGULARES.

23. Lepadogaster.
24. Blennius.
25. Gadus.
26. Uranoscopus.
27. Callionymus.
28. Trachinus.

TRIBUS V.

Branchiis completis. Apertura thoracis hiante; pinnis membranaceis radiatis; ventralibus in thorace; corpore sepius squamoso quam alepidoto.—THORACICI.

A. Malacopterigii.

29. Cepola.
30. Coryphæna.
31. Pleuronectes.
32. Echeneis.

B. Acanthopterigii.

33. Gobius.
34. Sparus.
35. Labrus.
36. Mullus.
37. Scomber.
38. Trigla.
39. Chætodon.
40. Perca.
41. Gasterosteus.
42. Scorpæna.
43. Cottus.
44. Zeus.

TRIBUS VI.

Branchiis completis. Apertura thoracis hiante; pinnis membraneceis radiatis, ventralibus in abdomine; corpore squamato loricato vel alepidoto.—ABDOMINALES.

A. Malacopterigii.	45. Salmo. 46. Argentina. 47. Amia. 48. Fistularia. 49. Esox. 50. Cobitis. 51. Cyprinus. 52. Exocætus. 53. Clupea. 54. Mormyrus. 55. Atherina.
B. Acanthopterigii.	56. Silurus. 57. Loricaria. 58. Theutis. 59. Elops. 60. Polynemus. 61. Mugil.

The four last tribes of this system are obviously those of Linnæus, with the introduction of a subordinate character from Ray. We must, however, observe, that among fishes whose fins have soft articulated rays, or are malacopterigious, several species have been inserted by ichthyologists, which were entitled to a place among those with spinous rays, termed Acanthopterigious. Thus many species of the genus Pleuronectes (but not all of them) have a strong spine in front of the anal fin; and in the genus Cyprinus, both the carpio and barbus have one serrated spinous ray in the dorsal fin. The species of these two genera are still retained among the malacopterigious fishes, and could not be far removed from their present situation, without destroying the natural links of the species. Such inconsistencies will be found in all systems, where characters are employed which exercise but a feeble influence on the animal functions.

Professor Gouan, of Montpellier, made another attempt on the classification of fishes, in his *Histoire des Poissons*. It is essentially the same as that of Brunich, with some slight alterations in the genera in the branchiostigous divisions. Scopoli in his *Introductio ad Historiam Naturalem*, (1777,) attempted a new system, founded on the position of the anus. Linnæus had previously employed the same character in the formation of two genera in his system, namely, Trachinus and Argentina. But Scopoli elevated it to the rank of a primary character and divided fishes into the three following classes. 1. Ano inferiore, sive caudæ plus minus approximato. 2. Ano superiore, capite plus, minus approximato. 3. Ano medio. The subordinate characters are those which had been employed by former authors. The efforts of these two naturalists to produce systems were never treated with much attention.

In the year 1785, the splendid work of Bloch on fishe made its appearance, both in German and French. The system is professedly that of Linnæus, with additions to the number of genera warranted by the researches of the author. The descriptions and figures, which are in general of the real size, are from nature, and the economical history of the species is given in detail. Walbaum with propriety stiles this work, *Opus sine pari*.

The ichthyological department of the *Encyclopedie Methodique* was undertaken by Bonnaterre, and published in the year 1788. This author, in the systematic part of the subject, followed the method of Linnæus. His introductory matter, however, is more valuable than the systematic part. He has collected, with care, the principal facts respecting the anatomy and functions of fishes, and has arranged and defined the characters which he employs. He has added a number of good figures of fishes, chiefly copies from other works.

In the year 1800, the "Lectures on Comparative Anatomy," by Cuvier, made their appearance. Independent of the important contributions to the physiology of fishes, this author has attempted a classification of those animals, which merits the consideration of naturalists. The following outline, in which the genera are omitted for want of room, may be acceptable to the systematic enquirer.

Cartilaginous Fishes . . .	Fixed Branchiæ, Chondropterigii .	Round mouth at the end of the nose or snout.	
		Transverse mouth under the snout.	
	Free Branchiæ, Branchiostegi . .	Transverse mouth under the snout; teeth.	
		——— no teeth.	
		Mouth at the end of the nose; no teeth.	
		——— teeth.	
		The bones of the jaws answering instead of teeth.	
		Mouth very wide; a number of small teeth.	
Osseous Fishes	Apodes	Mouth at the end of the nose.	
		Mouth under the nose.	
	Jugulares	Head unarmed.	
		Head armed.	
	Thoracici	Dorsal fins partly spinous; head armed.	
		Dorsal fins partly spinous; head unarmed . . , . . .	Two dorsal fins.
			One dorsal fin.
		Bones of the jaws naked, and answering instead of teeth.	
		Two eyes on the same side.	
		The body very long.	
		A furrowed discus on the head.	
	Abdominales	No operculum to the branchiæ.	
		No teeth.	
		Sharp teeth; no cirri.	
		Head depressed; cirri.	
		Spines free on the back.	
		Mouth at the end of the nose.	

Several natural families are formed by this author, and we hope he will add to the number in the second edition of his work.

In the year 1803, De la Cepede completed his *Histoire Naturelle des Poissons*, in five volumes. The opportunities of investigating the subject of ichthyology enjoyed by this author were valuable, and he has availed himself of these with very great diligence and success. He had access to the best furnished museum in Europe, formed from the spoils of the collections of those countries which France had subjugated. Before giving our opinion of the execution of the systematic part of the author's plan, we shall lay a sketch of it before our readers.

Le sang rouge, des vertèbres, des branchies au lieu de poumons.

Sous-Classes.		Divisions.		Ordres.
Poissons Cartilagineaux 1. L'epine dorsale composée de vertèbres cartilagineuses . . .	1.	1. Point d'opercule, ne de membrane branchiale	1.	1. Apodes.
			2.	2. Jugulaires. 0
			3.	3. Thoracins. 0
			4.	4. Abdominaux.
	2.	2. Point d'opercule, une membrane branchiale	5.	1. Apodes. 0
			6.	2. Jugulaires.
			7.	3. Thoracins.
			8.	4. Abdominaux.
	3.	3. Un opercule, point de membrane branchiale	9.	1. Apodes. 0
			10.	2. Jugulaires. 0
			11.	3. Thoracins. 0
			12.	4. Abdominaux.
	4.	4 Un opercule, et une membrane branchiale	13.	1. Apodes.
			14.	2. Jugulaires. 0
			15.	3. Thoracins.
			16.	4. Abdominaux.
Poissons Osseux. 2. L'èpine dorsale composée de vertébres osseuses	5.	1. Un opercule, et une membrane branchiale	17.	1. Apodes.
			18.	2. Jugulaires.
			19.	3. Thoracins.
			20.	4. Abdominaux.
	6.	2. Un opercule, point de membrane branchiale	21.	1. Apodes.
			22.	2. Jugulaires. 0
			23.	3. Thoracins. 0
			24.	4. Abdominaux. 0
	7.	3. Point d'opercule, une membrane branchiale	25.	1. Apodes.
			26.	2. Jugulaires. 0
			27	3. Thoracins. 0
			28	4. Abdominaux. 0
	8.	4. Point d'opercule, ni de membrane branchiale	29.	1. Apodes.
			30.	2. Jugulaires. 0
			31.	3. Thoracins. 0
			32.	4. Abdominaux. 0

The reader will perceive that the primary characters are those of Ray. The secondary characters, depending on the structure of the appendages of the gills may be considered as in a great measure his own; while those of a third rank belong to the Linnæan system. It may perhaps surprise an English reader to be informed, that of the thirty orders which are here constituted, only seventeen can be employed at present, the remaining fifteen having no examples in nature. To these last orders, I have added a cypher in the synoptical view.

Every ichthyologist will allow that many fishes must exist in nature which have never come under the inspection of the naturalist: many links in the chain are still wanting; so that our systems, for the present, must be imperfect. But we can assign no other motive, in thus constructing orders which have no ascertained existence, than a desire to anticipate discovery, and to exhibit a confident reliance on the perfection of the systematic principles employed.

The characters which he uses in the construction of his genera are derived from various sources. Thus, his genus Prionotus is separated from that of Trigla, by the serrated spines between the dorsal fins of the former. Serrasalmus is separated from Salmo, in consequence of a serrated abdomen. The number of the dorsal fins separates Lutanus from Centropomus. The size of the dorsal fins forms the distinction between Bodianus and Tænianotus. It is rather singular that this author takes no notice of the number of rays in the gill flap as the generic character, while the presence of that organ furnishes him with one of his primary characters.

The names of his genera are in many instances exceptionable, and appear to have been constructed in open violation of the acknowledged rules of the science of zoology. The following maxim of Artedi *Nomina generica, ex uno nomine generico fracto et altero integro composita exulent*, is overlooked in the following examples of hybrid names, among many which might be produced: Gobiesox, Scomberesox, and Murænoblenna. The propriety of adhering to this rule of Artedi, must appear evident, when we consider, that such names indicate ambiguity or doubt with respect to their characters, "innuunt enim ambiguitatem quandam, ut incertum sit ad quodnam genus piscis proprie pertinant." Another rule in ichthyology, "*Nomina generica desinientia in* oidés *non probari debent*," is equally despised, although Artedi justifies its value by saying, "quia aliud genus innuunt vel aliud alludunt, cui hoc in *oides* desinens, simile erit, et nullam ulteriorem originem vel causam suæ denominationis habent." Thus, Lacepede has the following genera: Mugil Mugiloides, Gobius Gobioides, Coryphæna Coryphænoides, Scomber Scomberoides, Muræna Muænoides. There is a third rule given by Artedi, and equally entitled to the attention of the ichthyologist, which La Cepede likewise overlooks.—"*Nomina generica, quæ non sunt originis Latinæ vel Græcæ proscribantur.*" Thus we have the following barbarous names, *Misgurnus*, formed from Misgurne, the Bavarian provincial name of Cobitis fossilis of Linnæus, and the only known species of the genus Makaira, the name of a fish known at

Rochelle. There is likewise a genus *Ompoke*, a name attached to a dried fish in the Dutch collection, and provincial. The similarity in the sound, between many of the genera of this author, will inevitably lead to confusion. Thus we have Holocentrus and Holocanthus, Pomacentrus and Pomacanthus, Callyonymus and Calliomorus, Acanthurus and Acanthopodus, and a host of other genera with names so nearly alike, that we might be led to suppose the author formed them purposely to perplex. We cannot close our observations on the genera of this author, without adding, that all generic names, taken from objects in the other classes of nature, ought to have been rejected ; such, for example, as Eques, Gallus, Hydrargirus.

In the construction of his species, there is perhaps too strong a desire to increase their number, in the absence of all prominent characters. This, we fear, has been the case in the genus Salmo, Labrus, and some others, where the limits of the species are ill defined. He has been too liberal in employing the names of individuals, as trivial names to his species. Thus we have three different species in the system named in honour of his wife, who does not appear to have been particularly attached to any branch of natural history. We can have no objections to an author dedicating his work to his wife, as La Cepede has done ; but we object to the naming of species, ascertained by the labours of others, in honour of any female friend. In France, an author may gain credit for his sensibility and love, by so doing, but to our colder temperament it seems to be affectation. In many instances, our author changes the received trivial names, bestowing upon them new ones of his own, without even assigning any reason for doing so. This takes place in almost every extensive genus of the system, and merits the severest censure. The French naturalists, it is true, have not scrupled to violate established maxims in science, in order to form a *French system*. This seems to have been the reason why La Cepede abandoned the principles of Artedi in the construction of his genera, and disregarded the dogmas of the Linnæan school. But the French systems, like all others, must submit to the test of sound principles; and when tried by these, whoever shall attempt to restore to its Linnæan purity this department of zoology, must cancel multitudes of the names of La Cepede. We may add, that the descriptions are often swelled by vague analogies, and are in too many instances destitute of precision.

These remarks have extended perhaps too far ; but as the system is at present the most popular in Europe, we have judged it expedient to state our undisguised sentiments as to it merits. It abounds in faults, but it is not destitute of excellence. A vast mass of facts is collected, many species are for the first time described, many new characters are unfolded, and the work upon the whole is the most complete view of ichthyology extant. Figures of the new or rarer species are given. These, however, are inferior in every respect to those of Bloch.

The ichthyological part of the *General Zoology* by Dr Shaw appeared in two volumes in the years 1803-4. We sincerely regret that it is not in our power to bestow any praise on this work. The text is a very meagre compilation, chiefly from the writings of Bloch and La Cepede; and the figures which accompany the work are principally copied from the same sources.

In the preceding historical review of ichthyological writers, in which we have endeavoured to mark the progress of the science, the reader must have perceived the great difference of opinion, with respect to the value of the characters employed in classification. The organs of motion are regarded by some as holding the first rank, while those of respiration are preferred by others. These circumstances indicate the infant state of the science, and point out the propriety of an anatomical investigation of the whole tribe.

We are still in want of accurate representations of many species of fishes. The figures which we meet with often bear but a remote resemblance to the objects themselves. When a painter, ignorant of natural history, is employed to delineate a fish, (or any other animal), he is apt to overlook the most important characters, unless these are very obvious. He rests satisfied if he produces a general resemblance. Hence the peculiar shape of the fins is often sacrificed to the desire of avoiding sharp angles, and spots, punctures, or streaks, are omitted as useless, or as spoiling the beauty of the drawing. These figures, in passing afterwards through the hands of the engraver, are still farther altered to suit professional taste, so that the figures in works on natural history are often imperfect representations. Hence naturalists should study the art of drawing, and carefully inspect the strokes of the engraver, if fidelity in representation be the object in view.

Before closing these short notices of the principal writers on fishes, we propose to add a few observations on the labours of those who have contributed to the advancement of British ichthyology. This branch of natural history has never been very popular in Britain, and at present is in a great measure neglected. Merret, in his *Pinax rerum Naturalium Britannicarum*, London, 1667, is the first who arranged systematically our native fishes. He distributed them into the following classes ; I. Pisces pelagii squamosi. II. Pelagii læves. III. Marini sexatiles. IV. Squamosi in mari et in fluminibus. V. Fluviatiles squamosi. VI. Fluviatiles læves. He has enumerated about 76 species. He acknowledges the assistance which he derived from Turner in his letter to Gesner. His references are chiefly to the works of Gesner and Aldrovandus ; and he has added a number of provincial names. Taking all circumstances into consideration, this little work deserves great praise.

The labours of Willoughby and Ray, which we have already mentioned with respect, contributed to advance the science of ichthyology in this country, by the introduction of a more determinate nomenclature, and a more accurate definition of species.

From the days of Ray until the appearance of Pennant, no systematic British ichthyologist had appeared. In the year 1776, that naturalist published his British Zoology. The third volume of this work treats of our native fishes, amounting to one hundred and fifty-two species, exclusive of the cetacea. The system which he follows is the Linnæan, with the addition of the cartilaginei of Ray. He does not confine himself to mere descriptions ; he notices the habits and uses of the particular species. The figures are upon the whole respectable. This work contributed to diffuse a taste for the study of zoology in this country, and still continues to maintain that reputation which its general accuracy and pleasing style deservedly procured. A second edition made its appearance two years ago, edited by a son of the author's. It contains a few additions, compiled from authentic sources.

The *Sinopsis of the Natural History of Great Britain and Ireland*, by Berkenhout, merits a place in this catalogue. The first edition appeared in the year 1769, and the second in the year 1795. In the first volume the British fishes are enumerated, amounting to 157 species, and arranged according to the Linnæan method. The specific characters are short, but judiciously selected.

In the year 1802, Mr Stewart of Edinburgh published *Elements of Natural History*, in which he enumerates the British species of fishes. This work has lately been revised by the author, and several new species have been added to his list.

Mr Donovan completed, in 1808, five volumes of his *Natural History of British Fishes.* This work contains coloured representations of 119 species. The figures are faithful representations, and the descriptions abound in sound criticisms and important illustrations. He is perhaps deficient in his account of the external characters of the species. This production is a valuable book of reference, and ought to be frequently consulted by the student. We may add, that he has swelled the list of British fishes by the discovery of many new and curious species.

The *British Fauna*, by Turton, was published in 1807, previous to the completion of the preceding work. In this small volume 168 species are described. It is a very useful compilation, chiefly on account of its convenient size for the pocket.

Besides these systematic writers on British ichthyology, several naturalists, by describing the fishes of particular districts, have rendered important service to the science.

The work of T. Caius *De Canibus Britannicis*, (Lond. 1570,) contains notices respecting a few species of British fishes, such as the xiphias, the trachurus, the acus, and a few others.

In 1684, Sir Robert Sibbald published his *Prodromus Historiæ Naturalis, sive Scotia Illustrata.* In this work the fishes of Scotland are described and enumerated; and, considering the state of the science at the time, the catalogue is an extensive one. The same author enlarges on the fishes of the Frith of Forth in his *History of Fife and Kinross.*

The topographical labours of Plott merit respectful mention; and in his *Histories of Oxfordshire and Staffordshire,* he has not overlooked the fishes of these districts. The history of the former county appeared in 1676, and that of the latter in 1686.

In 1698, Martin published his *Description of the Western Islands of Scotland*, in which he notices the ichthyological productions of those seas, but in a very cursory manner.

Wallace, in 1700, published his *Account of the Orkney Islands*, in which he noticed a few of the more common fishes of that country.

The British student of zoology must be familiar with the name of Borlase. His *Natural History of Cornwall*, published in 1758, is generally quoted as a book of reference, and contributed to advance our knowledge of British fishes. Several new species were published for the first time from the drawings of the Rev. Mr Iago, Minister of Loo.

Several remarks, illustrative of Irish ichthyology, apear in Rutty's *Natural History of the County of Dublin*, 1772. Smith, in his county histories of Kerry, Waterford, Cork, and Down, had communicated previously a few imperfect notices regarding the fishes of those districts.

In the year 1811, the first volume of the *Memoirs of the Wernerian Natural History Society of Edinburgh* appeared before the public, containing two papers illustrative of British ichthyology. The first is the production of the late eminent zoologist Montagu, in which he gives an account of five rare species of British fishes, to be afterwards taken notice of. The second paper is from the pen of the secretary, Mr Neill. It contains a list of the fishes of the Forth, and the lakes and rivers in the neighbourhood of Edinburgh, which have been observed by the author. The species amount to 76 in number, and among these there is one new British species.

The last author whom we shall mention, as having contributed to extend our knowledge of the distribution of British fishes, is the late Rev. George Low, minister of Birsa and Hara. The *Fauna Orcadensis*, which he left behind him in MS. was published in the year 1813, and contains an extensive list of the fishes which the author observed in the seas around the islands of Orkney.

CHAP. II.

STRUCTURE AND FUNCTIONS OF FISHES.

As fishes are destined to live in water, we may expect to find all their organs constructed in such a manner, as to accommodate themselves to the properties of that element. We propose to examine these organs in succession, and to bestow attention at the same time to the functions which they perform. By treating the subject in this manner, repetitions will be avoided, and the general reader assisted in comprehending the economy of this important class of animated beings.

SECT. I. *Organs of Support.*

THE bones of fishes vary in form, proportion, and number, according to the species. The skeleton is more complicated than that of man, and is difficult to prepare and preserve. Hence the osteology of fishes is a subject but little attended to by naturalists. Avoiding all minute details, we propose to consider the skeleton, as consisting of a cranium, spine, and ribs.

As the *cranium* of fishes is covered with skin only, its form is easily ascertained, and it exhibits remarkable differences in shape, according to the species. In all the species it is large in proportion to the size of the body. The cranium of osseous fishes consists of a great number of separate pieces. These amount to eighty in the perch. But as these bones are soon ossified together, it becomes very difficult to trace the original lines of separation in aged individuals. The occiput appears like a vertical truncation of the cranium, and is united to the spine by a single tubercle placed below the foramen. The motion of the head is very limited in every direction. In some of the cartilaginous fishes, the head is joined to the vertebral column by two condyles; but this articulation is equally incapable of extensive motion as the former.

The *vertebral column* is either cylindrical, angular, or compressed. The vertebræ may readily be distinguished from those belonging to the higher classes, by the peculiar form which they exhibit. The body of the vertebra is of a cylindrical figure, with a funnel-shaped depression at each end. It consists of concentric rings, which are supposed by some to increase in number with the age of the animal. The vertebræ are destitute of articular processes, and when in union form, throughout the whole column, cavities composed of two cones joined at the base. These cones contain a cartilaginous substance formed of concentric fibres, of which those next the centre are the softest. By means of this cartilage the vertebræ are united, and upon it they perform all their movements. In the cartilaginous fishes all the vertebræ are consolidated together, so that the spinous processes can only be distinguished.

The vertebræ may be divided into the cervical, dorsal, and caudal. In osseous fishes, the *cervical vertebræ* are in general wanting, although in some cases they exist, as in the herring, to the number of four. In the cartilaginous kinds, they are ossified into one piece. The *dorsal vertebræ* are easily recognised, by wanting processes on the inferior part. These have generally on the sides transverse processes, to which the ribs are attached. The *caudal vertebræ* are possessed of spinous processes, both on the superior and inferior surfaces. In those fish which are flat these are very long, as in the flounders. The first caudal vertebra is in general of a peculiar shape. The cavity of the trunk is terminated by its inferior process. In the flounders it is large, round in the fore part, and terminated below by a sort of spine. The last caudal vertebra is however more remarkable than the first. It is almost always of a triangular form, flat, and placed vertically. Upon its posterior extremity it bears articular impressions, which correspond to the small and delicate bones of the fin of the tail.

The number of the bones of the vertebral column in different species being exceedingly various, suggested to Artedi the use of this character in the separation of nearly allied species. Among the species of the genus Cyprinus, for example, a difference in the number of vertebræ has been observed to the amount of fourteen. In ascertaining this character, Artedi recommends the greatest circumspection. The fish should be boiled, the fleshy parts separated, and the vertebræ detached from one another, and these counted two or three times in succession, to prevent mistakes. This character is of great use, as it is not liable to variation, individuals of the same species exhibiting the same number of vertebræ in all the stages of their growth.

The number and size of the *ribs* are likewise extremely various. The cartilaginous fishes may be considered as destitute of true ribs. Where they exist, as in the osseous fishes, they are articulated to the body of the vertebræ, or to the spinous processes. They are forked in some fishes, and in others double; that is, two ribs proceed from each side of every vertebra. In the genus Cyprinus they are of a compressed shape; in the cod they are round; and in the herring like bristles.

The number of the ribs likewise furnishes a character in the discrimination of species, which may be safely relied on in the absence of more obvious characters.

Besides these bones which we have enumerated, there are many more osseous spiculæ, which serve to support the fins, and to strengthen the muscles. Indeed the existence of numerous bones, unconnected with the skeleton, is a distinguishing character of the osteology of fishes, and these we shall afterwards consider, in our account of the different purposes to which they are subservient.

The composition of the bones of fishes has never been investigated with sufficient care. It is well known, that they never acquire so great a degree of hardness and rigidity as the bones of the mammalia or birds: hence we may safely conclude, from the facts connected with the process of ossification in other animals, that the bones of fishes abound in gelatinous and cartilaginous matter, while the portion of earthy or saline matter is small. The earthy salts are phosphate and carbonate of lime, and the phosphate of magnesia, the former predominating in quantity. In one division of fishes, termed the *cartilaginous*, the proportion of earthy matter is so small, that the bones never become indurated, but continue in all the periods of the life of the fish soft and flexible. These animals are therefore supposed to grow during the whole course of their existence.

When the bones of some fishes are boiled in water, they undergo a change of colour. This circumstance is well illustrated in the case of the gar-fish, or sea pike (*Esox belone*,) whose bones by boiling become of a grass green colour; and in the bones of the viviparous blenny, which experience a similar change. This alteration of colour has fostered some of the prejudices of the vulgar, but has failed to arrest the attention of the chemist.

The bones of fishes, when reduced to powder, are mixed up with farinaceous substances, and used instead of bread by some of the northern nations. In Norway, and even in some of the remote districts of our own country, fish bones are given as food for cows, and are greedily devoured by them.

SECT. II. *Organs of Protection.*

UNDER this head, it is our intention to consider the skin, the scales, and the spines of fishes. The *skin* of fishes consists, as in the other vertebral animals, of a true skin, a rete mucosum, and a cuticle. The *cutis*, or true skin of fishes, is remarkably thick in those species which have small scales; while in those which have large scales, it frequently assumes the appearance of a thin membrane. It is much more closely attached to the muscles in this tribe than in any of the other vertebral animals. This organ in the *gadi*, for example, consists almost entirely of gelatine, and hence is much esteemed as an article of food, and is used also in fining, as a substitute for isinglass. Eel skins are likewise used in the manufacture of size, in consequence of the gelatine which they contain.

In the higher classes of vertebral animals, there is an organ termed the *corpus papillare*, or the villous surface of the skin, in which the sense of touch is supposed more particularly to reside. Fishes, however, are destitute of this organ; and hence anatomists have concluded, that these animals are possessed of this sense in a very imperfect degree.

Intermediate between the true skin and the cuticle is situated the *rete mucosum*. It consists of a mucous layer, in which the colouring matter of the skin resides. In the animals which we are now considering, this layer is remarkable for the brilliant tints which it exhibits, communicating to the scales all their metallic lustre.

The *cuticle*, or external layer of the skin, appears in fishes in a soft state, and, in many instances, is a simple mucous substance enveloping the body. It is detached at certain seasons of the year in large pieces.

The *scales* are implanted in the cuticle, and in their position and use resemble the hairs on the bodies of quadrupeds. They cover the body of fishes like tiles on the roof of a house, pointing backwards. The posterior edge, which in general is free, is usually crescent-shaped, fringed in some species, and smooth in others. By means of a lens, longitudinal ribs may be perceived finely decussated by transverse striæ. These ribs sometimes radiate from the centre, and the crossing striæ are concentric. When macerated in weak acids, they are found to consist of alternate layers of membrane and phosphate of lime, and hence are supposed to increase in every direction by the addition of new layers.

Instead of imbricated scales, some fishes are protected by *osseous plates*, covered, like the scales, by the cuticle, and presenting an even surface. Among some of the sharks, as the *Squalus acanthias*, instead of scales there are flat bent bristly laminæ; and in the remora there are hard rough tubercles. These osseous plates in the sturgeon resemble in shape the shell of a limpet.

These scales may be considered as the ordinary armature of fishes. They guard their bodies from external injury, and, when rubbed off by accident, they are reproduced.

The naturalist employs the appearances exhibited by the scales as a character in the discrimination of nearly allied species. The form, the surface, and the size of the scales, are chiefly used for this purpose, although the disposition of the longitudinal and the transverse rays, together with the condition of the margin, would furnish more permanent marks. The scales in the description of a fish are likewise considered in regard to their adhesion to the skin. Thus some scales, which adhere but slightly, are said to be deciduous; while others, which cannot be rubbed off but with difficulty, are termed tenacious or adhesive.

Besides the scales, many fishes are furnished with spinous processes. These sometimes accompany the fins; while in other instances they appear as the armature of the head and cheeks. They appear to be of the same consistence and composition as horn. Those found on the head are in general fixed; but those connected with the fins are moved by peculiar muscles. These organs may be considered as defensive weapons, and act, in some instances, not merely by their form and consistence, but by some *venomous* secretion by which they are covered. Thus the common weever (*Trachinus draco*) inflicts a wound with the spines of the first dorsal fin, often followed by violent burning pains, inflammation, and swellings; so that the fishermen are in the practice of cutting off the offensive organ before they bring the fish to market. The spines of the *Squalus acanthias*, or piked dog-fish, is likewise considered by fishermen as capable of inflicting a dangerous wound.

The fishes furnished with spinous rays in the fins were, at a very early period, separated from those with soft rays. They were termed *Acanthopterygii* by Artedi. The fishes furnished with spines on the head or cheeks have been subdivided by La Cepede into several genera, from the characters furnished by these organs.

SECT. III. *Organs of Sensation.*

In attending to the organs of sensation in fishes, the condition of the *brain* demands our first consideration. We have already stated, that the head is large in proportion to the size of the body; but with regard to the brain, the reverse of this appears to be the case. It does not completely fill the cavity of the cranium destined for its reception, the surrounding space being occupied by a salt fluid. It bears a much smaller proportion to the size of the body, than we find in the higher classes of animals. The following Table of these proportions in a few fishes is given by Cuvier.

White shark, (*Squalus carcharias*)	$\frac{1}{2493}$
Great dog-fish (*Squalus canicula*)	$\frac{1}{1344}$
Tunny	$\frac{1}{37440}$
Pike	$\frac{1}{1305}$
Carp	$\frac{1}{560}$
Silurus glanis	$\frac{1}{1837}$

The brain of fishes is of a less compact texture than that of the superior animals, and in some species is almost fluid. In structure, however, it is nearly the same, although characterised by a few constant marks. The subdivisions of the brain and cerebellum, or their tubercles and lobes, are more numerous than in the mammalia and birds. In one genus of fishes, the Gadus, Dr. Monro (*Structure and Physiology of Fishes*, Edin. 1785, p 44.) found spheroidal bodies between the dura and pia mater, and covering the greater part of their nerves, like a coat of mail, in their course towards the organs to which they are destined. He was unable to ascertain their use.

The *spinal marrow* in fishes, instead of being conveyed in a vertebral canal, as in the mammalia, passes through the space formed by the superior processes of the vertebra. Like the other nerves of fishes, the size of the spinal marrow is in proportion to the size of the body, not to the brain from which it proceeds.

Having offered these few observations on the brain, we now proceed to consider the organs of the five senses, adverting to their structure, their functions, and their importance in the classification of fishes.

1. *Organs of smell.* The external organs of smell present several remarkable differences, according to the species, varying in number, shape, and position. In many fishes the nostrils are single, while in others they are divided at the surface by a transverse membrane, and thus exhibit the appearance of being double on each side. They likewise vary in shape, being round in the cod-fish, oval in the conger-eel, and oblong in others. They are placed in the snout in many fishes, near the eyes in some, and between the eyes and the snout in others. Where the openings are double on each side, these are either placed contiguous to each other, as in the carp, or at a little distance, as in the perch. The nostrils in some instances appear like short tubes.

The nasal openings are furnished with a few muscular fibres, which are capable of executing a limited contractile motion. This motion, however, in living fishes, can seldom be perceived.

Proceeding to the examination of the inside of the nostril, we may observe, that in the sharks and skates the nasal laminæ are placed parallel to each other on both sides of a large lamina, which extends from one end of the fossa to the other, and consist of folds of the pituitary membrane. In the other fishes, whether cartilaginous or osseous, the laminæ proceed like radii from an elevated and round tubercle. The pituitary membrane in some fishes, as in the pike, is furnished with reticular ramifications of black vessels, but in the greater number of fishes these vessels are red. Between these are situated some small papillæ, which pour out a thick mucilage.

The *olfactory nerves*, at their origin, form swellings or knots, so large as frequently to have been mistaken for the real brain. These tubercles in skates and sharks are united into one homogeneous medullary mass, from each of the lateral parts of which the olfactory nerves arise. In the species of the genera Pleuronectes, Clupea, Esox, Perca, and Salmo, there are two pair of tubercles, the anterior of which is smaller than the other.

In the cartilaginous fishes, as the skate and shark, the olfactory nerve is very soft. It is, in them, a bulb which passes obliquely forward towards the nares, which are at a greater or less distance from the brain according to the species. The spinous fishes have the olfactory nerve very long and slender. In those which have the snout elongated, this nerve is received into a cartilaginous tube. In those with short snouts, the nerve is surrounded by a fine membrane only, which appears to be the same as that which contains the fat or oily humour that covers the brain. In the haddock, and some other fishes, the olfactory nerve, in its course from the brain to the nose, passes through a cineritious ball, which resembles the cineritious matter connected in our body to the olfactory nerve within the cranium.

When the olfactory nerve arrives behind the folded membrane which we have described, it is dilated, to be applied to the whole of its internal and convex surface. In some fishes no previous enlargement takes place, while in others the nerve swells into a real ganglion. When expanded, it has been compared to the retina, but the filaments of which it is composed are more distinct.

The sense of smell in fishes is supposed by many to furnish them with the most delicate tests for searching after and distinguishing their food. Dr Shaw (*General Zoology*, vol. iii. p. 9.) states, that "if you throw a fresh worm into the water, a fish shall distinguish it at a considerable distance; and that this is not done by the eye is plain from observing, that after the same worm has been a considerable time in the water, and lost its smell, no fishes will come near it; but if you take out the bait, and make several little incisions into it, so as to let out more of the odoriferous effluvia, it shall have the same effect as formerly. Now it is certain, that had the animals discovered this bait with their eyes, they would have come equally to it in both cases. In consequence of their smell being the principal means they have of discovering their food, we may frequently observe them allowing themselves to be carried down with the stream, that they may ascend again leisurely against the current of the water; thus the odoriferous particles swimming in that medium, being applied more forcibly to their organs of smell, produce a stronger sensation." We do not presume to dispute the accuracy of these observations, but we may observe, that the well known voraciousness of fishes, the eagerness with which they will seize a metal button, or any glittering object, the whole art of artificial bait and fly-fishing, all seem to point out the organ of sight as the principal instrument by which they discover their food. Besides, the organs of smelling are by no means favourably situated for receiving quickly the impressions new objects are calculated to produce. In the chondropterygii the nares communicate by a groove with the angles of the mouth, but in general the organs of smell have no communication with those of mastication or respiration; and as the external openings are narrow, and but ill supplied with muscles, we are at a loss to conceive in what manner the water impregnated with odoriferous particles is thus rapidly applied to the extremities of the olfactory nerve. Alternate absorption and ejection of the water have never been observed. The same water we know must pass through the mouth, and be spread over the extended surface of the gills; so that we may presume, until farther light be thrown on the subject, that these latter organs may likewise contribute to warn the fish of the presence or absence of salutary or noxious impregnations.

The organs of smell furnish the ichthyologist with some important characters in the description of the species. These have hitherto been too much neglected, as they have the advantage of being permanent.

2. *Organs of sight.* The eyes of fishes, like all other red-blooded animals, are two in number. They vary greatly in position, both being, in some species, on the same side of the head, as in flounders, while in others they are nearly vertical. In general, however, they are placed one on each side of the head. The eyes of fishes are larger in proportion to the size of their bodies than in quadrupeds, as we find the eye of the cod-fish equal in size to that of an ox.

Fishes in general are destitute of *eye-lids*, and are seldom even furnished with projections in place of eye-brows. In the moon-fish, (Tetraodon mola) however, the eye may be entirely covered with an eye-lid, perforated circularly. In the greater number of fishes, the skin passes directly over the eye without forming any fold, and in some cases it does not adhere very closely to the eye. Thus the common eel may be skinned without producing any hole in the situation of the eye, the skin only exhibits at that place a round transparent spot. In the trunk fish, (Ostracion,) the conjunctiva, or external covering of the eye, is so similar to the rest of the skin, that we observe lines upon it, which form the same compartments as on the body of the fish. Some fishes may be considered as blind, as the Gastrobranchus cœcus, in consequence of the uniform opacity of the skin in passing over the eye.

The form of the eye in this tribe of animals is nearly that of a hemisphere, the plane part of which is directed forward, and the convex backward. In the Ray, the superior part is also flattened, so that the vertical diameter is to the transverse as 1 to 2. This flatness of the anterior part of the eye is compensated by the spherical form of the *crystalline lens.* This body is more dense in fishes than in land animals. Monro found the crystalline lens of an ox to be 1104, while that of a cod was 1165, water being reckoned at 1000. The crystalline lens projects through the pupil, and leaves scarce any space for the aqueous humour. The *vitreous humour* is proportionally small. The portion of the axis occupied by each of the three humours of the eye, in the herring, for instance, may be expressed in fractions as follows: aqueous humour $\frac{1}{7}$, crystalline lens $\frac{3}{7}$, and the vitreous humour $\frac{1}{7}$. The spherical form of the crystalline lens has been already stated; but the following Table, from the observations of Petit and Cuvier, will exhibit more clearly the proportion between the axis and the diameter in a few species.

The axis is to the diameter in the

Salmon as	9 to 10
Sword-fish	25 : 26
Shad	10 : 11
Pike	14 : 15
Barbel	11 : 12
Carp	14 : 15
Mackarel	12 : 13
Whiting	14 : 15
Shark	21 : 22
Ray	21 : 22
Herring	10 : 11
Tench	7 : 8
Eel	11 : 12
Conger	9 : 10

The *sclerotic coat* of the eye of fishes is more firm and dense than in the higher animals. It is here cartilaginous, semitransparent, and elastic, and sufficiently solid to preserve its form of itself. In the salmon it is of the thickness of a line posteriorly, and of an almost bony hardness before. This is frequently the case in other fishes, especially near its junction with the cornea, where it sometimes appears like an osseous ring. The outer layer of the *choroid coat* is either white, silvery, or gold-coloured, and is very thin and little vascular. The inner coat, to which the term *membrana Ruyschiana* has been applied, is in general black, and covered everywhere by mucous substance. In the ray, however, it is transparent. Between these two membranes of the choroid coat there is a body of a brilliant red colour. Its form is usually that of a thin cylinder, formed like a ring round the optic nerve; the ring, however, is not complete, a segment of a certain length being always wanting. Sometimes, as in the *Perca labrax*, it consists of two pieces, one on each side the optic nerve. It is considered by some as muscular, and enabling the eye to accommodate its figure to the distance of the objects; while others regard it as glandular, and destined to secrete some of the humours of the eye. This gland, we may add, does not exist in the *Chondropterygii*, as in the rays and sharks.

The *iris* is in general distinguished by its golden and silver brilliancy. This arises from its transparency, allowing the natural colour of the choroid coat to be discerned. The pupil is different in form in the different species, but in general it approaches to circular or oval; in some genera, as the salmon, it projects into an acute angle at the anterior part. In the *Gobitis anableps* of Linnæus, the cornea is divided into two portions, and there is a double pupil with a single lens. In the ray, the superior edge of its pupil is prolonged into several narrow stripes disposed in radii, gilded externally, and black internally. In their ordinary state they are folded between the superior edge of the pupil and the vitreous humours: but when we press the superior part of the eye with the finger, they unfold themselves, and cover the pupil like a window-blind. In the torpedo, the pupil can be completely closed by means of this veil. No other fishes possess any thing similar to this conformation, although in most osseous fishes, there is at each corner of the orbit a vertical veil which covers a small part of the eye.

In general, the eyes of fishes are placed in a conical cup, and repose on a mass of gelatinous matter contained in a loose cellular substance. This trembling elastic mass affords the eye a point of support in all its motions. In the *Chondropterygii*, however, as the rays and sharks, the eye is joined to the extremity of a cartilaginous stalk, which is itself articulated in the bottom of the orbit. In this manner the muscles act on a long lever, and have therefore great power in moving the eye.

The *optic nerves* arise under the cerebrum, and are very large. They are composed either of distinct filaments, or of a single flat band, which is sometimes folded longitudinally on itself, and contracted into the figure of a cord. They cross each other without being confounded, and we plainly see that the nerve of the left side proceeds to the right eye, and that of the right side to the left eye. This crossing is less apparent in the cartilaginous fishes, although in the ray the right nerve passes through an opening in the left. These nerves pass directly through the membranes of the eye by a round hole. Internally they form a tubercle, which is papillated in the ray, sharks, and carps. The radiating fibres which arise from the edges of these tubercles to form the retina are very obvious. In other genera the retina is formed from the edges of two long white caudæ, in the same manner as it arises in birds from the single white line.

The eye is one of the most important organs which fishes are known to possess. It enables them to perceive the approach of their foes, and it is the principal instrument by which they obtain their food. The amateur in artificial fly-fishing often tempts the fish with one kind of fly, but in vain; and upon substituting another in its place of a different form or colour, he succeeds in the capture. These motions of the fish are all regulated by the eye; hence some fish will bite as readily at a bit of red cloth as at a piece of flesh.

As this organ exercises a very powerful influence on the habits of fishes, it should be carefully attended to by the systematic ichthyologist. The characters which are furnished by its form and position are not liable to variations, and they are sufficiently obvious. Those furnished by the colours of the different parts hold a secondary rank. They are not very liable to vary, but they experience great changes after death, and should be used with very great caution.

3. *Organs of hearing.* It was long known to naturalists, that fishes possessed some means of distinguishing the vibrations of sonorous bodies. Trouts and carp have been taught to come to a particular place of the pond for food upon a bell being rung; and a drum has sometimes been employed to drive fishes into a net. In general, however it was supposed that the vibrations communicated to the water became sensible to the fish, through the medium of the organs of touch.

The Abbé Nollet (in the *Hist. de l'Acad. R. des Sciences*, 1743, p. 26.) ascertained, by conclusive experiments that the human ear was susceptible to the impressions of sound, even when immersed in water. This discovery excited the attention of anatomists to the structure of the organs of hearing, and Camper, Geoffroi, and Vicq d'Azyr, succeeded in pointing out the nature of the different parts. Our illustrious countryman Dr Monro, in his work on the structure and physiology of fishes, contributed to enlarge our knowledge of the organs of hearing by numerous accurate dissections.

In the osseous fishes, no external ear has hitherto been detected, and the same remark is applicable to those cartilaginous fishes which have free branchiæ. But in the cartilaginous fishes with fixed branchiæ, small apertures have been discovered leading to auditory organs. These were first observed by Monro in the skate and the angel shark. In the former fish they occur in the back part of the occiput, near the joining of the head with the spine. They are two in number, not larger than to admit the head of a small pin; and in a large fish are found at the distance of an inch from each other.

In fishes that have free branchiæ, the internal organs of hearing are situated in the sides of the cavity of the cranium, and fixed there by a cellular tissue, consisting of vessels, and osseous or cartilaginous fræna. In the fishes with fixed branchiæ, those organs are inclosed in a particular cavity formed in the substance of the cranium. This cavity is situated on the side and posterior part of that which contains the brain, with which it does not communicate, except by the holes that afford passages for the nerves. The sac exhibits many differences as to size and form in the different species. Besides the ordinary viscid fluid, there are some small cretaceous bodies suspended by a beautiful plexus of nerves. These, in the osseous fishes, are three in number, and are hard and white like porcelain in the cartilaginous fishes with free branchiæ; these bodies are in general fewer in number, and of a softer consistence, being seldom harder than moistened starch. It is supposed that these bodies assist in communicating to the nerves the vibrations produced in the water by sound. With the sac are connected three semicircular canals, filled with a viscid fluid similar to that in the large sac. The *auditory nerves* arise so near to the origin of the fifth pair, that they have been considered as the same. In the genus Raja these pass into the cavity of the ear by a particular foramen; in the osseous fishes, they are distributed directly into that organ.

As the ear of fishes is much less complicated in its structure than in the higher orders of animals, we may conclude that the sense of hearing is weak in proportion. Indeed the difficulty of detecting any natural movements of fishes, occasioned by sound, led the ancients to conclude that they did not enjoy this sense. We have, however, demonstrated its existence, but we are unable to ascertain the advantages which these animals derive from it, or the influence which it exerts on their habits and economy. In systematic ichthyology, the characters of the organs of hearing are too minute, and difficult of detection, ever to be employed. They vary in different species, it is true, and may be resorted to in cases of difficulty; but for their investigation they require a dexterous hand and an experienced eye.

4. *Organs of Taste.* As the tongue of fishes (the organ in which the sense of taste resides in the higher orders of animals) is but imperfectly developed, naturalists are in general disposed to conclude, that the sense of taste can scarcely be said to belong to this class of beings. It presents no visible distinct papillæ, and its skin is analogous to the common integuments of the mouth. The nerves which supply it are branches of the same nerves which proceed to the branchiæ. In the present state of our knowledge it is impossible for us to assign the precise influence which the sense of taste exercises on the economy of fishes. If noxious ingredients exist in the water, it appears probable

that some warning will be given the animal of their presence, either by the nerves of the mouth during the passage of the water to the gills, or by the latter organs. It does not appear that this sense is ever used in the discrimination of food, and does not furnish any characters, as such, to the systematic ichthyologist.

5. *Organs of Touch.* We have already observed that the skin of fishes is destitute of the corpus papillare, and hence anatomists have concluded, that they possess the sense of touch in a very limited degree. Besides, few nerves have hitherto been traced to the skin; and as its surface is in general coated with scales, it appears but ill adapted for receiving very delicate impressions. In some species, such as the common trout, (*Salmo fario*,) the sense of touch is well displayed, if, under a stone or bank, the hand be moved gently towards it, and its sides titillated. It will exhibit the pleasure it derives by leaning on the hand, and if the operation be performed with care, every part of the body may be gently stroaked, and the fearless fish in part raised above the water.

From these observations on the organs of sensation, the reader will readily perceive that fishes hold a much lower place in the chain of being than quadrupeds or birds. The organs of smell and sight appear to be more completely developed than those of hearing, taste, or touch, and therefore claim the attentive consideration of the student in his enquiries after a natural method in ichthyology.

Fishes possess no voice by which they can communicate their sensations to others. Some species utter sounds when raised above the water, by expelling the air through the gill opening when the flap is nearly closed. While others, even under water, as the salmon, utter certain sounds while in the act of depositing their spawn; but for what purpose these sounds are uttered, or by what organs they are produced, we are still ignorant.

SECT. IV. *Organs of Motion.*

If we attend to the vast variety of forms, exhibited by different kinds of fish, we shall be disposed to conclude that *shape* exercises but little influence on their movements. While some are cylindrical and lengthened, others are nearly globular: some are depressed, while others are compressed. The general form, however, approaches to ovate, the body being thickest at the thorax, and tapering a little towards the head and tail.

The *fins* of fishes correspond with the wings of birds, the former being calculated to give the motion to the body in the water, the latter in the air. These organs vary in number, size, situation, and structure, in different species.

The *number* of fins varies according to the genera, and even according to the species. It is difficult to fix on those fins which exercise the greatest influence on the habits of the animal, as there is not any one fin common to all fishes, although all fishes have at least one of these organs. The *size* of the fins is equally various in the different species, as it bears no constant proportion to the figure or magnitude of the fish, nor to its habits or instincts.

The *situation* of the fins furnishes the ichthyologist with some of the most obvious and useful characters. Those fins which are situated on the back are termed *dorsal*, and vary greatly in number and shape. The fin which surrounds the extremity of the tail is termed the *caudal* fin, and is always placed perpendicularly. It is forked in some, even or rounded in others. Between the caudal fin and the anus are situated the anal fins, which vary in number and shape according to the species. Between the anus and throat are placed the ventral fins. When they do exist, they never exceed two in number, and are parallel to each other. The *pectoral fins* are usually two in number, and are placed on each side, a short way behind the gill opening. By Linnæus and others, the ventral fins are considered as analogous to the feet of quadrupeds, and the characters furnished by their position are employed as the basis of his classification. Those fishes which are destitute of ventral fins are termed, in his system, *apodal;* those which have the ventral fins placed nearer to the anterior extremity than the pectoral fins are termed *jugular;* those having the ventral fins beneath the pectoral he calls *thoracic*, and when the ventral fins are placed behind the pectoral fins they are termed *abdominal*. These distinctions are of great importance in an artificial system, and may be employed with success in the inferior divisions of a natural one.

The *structure* of the fins of fishes has long occupied the attention of naturalists. In general these organs consist of numerous jointed rays, which are subdivided at their extremities. These are covered on each side by the common integuments, which form in some instances soft fibres projecting beyond the rays. These fins, with articulated rays, were considered by the older ichthyologists as furnishing characters for arrangement of great importance. Fishes possessing these were termed *malacopterygii.* Besides these articulated rays, there exist in the fins of some fishes one or more rays made up of a single bony piece, enveloped like the former by a common membrane. Some fishes have one or more fins, consisting entirely of these bony rays. Fishes with such rays are termed *acanthopterygii.* In a few genera the posterior dorsal fin is destitute of rays, and has obtained the name of *pinna adiposa*, or flesh-fin.

As these rays serve to support the fins, and are capable of approaching or separating like the sticks of a fan, we may conclude that they move upon some more solid body as a fulcrum. Accordingly we find in the sharks, for example, that the rays of the pectoral fins are connected by a cartilage to the spine. In the osseous fishes the pectotoral fins are attached to an osseous girdle, which surrounds the body behind the branchiæ, and which supports the posterior edge of their aperture. This osseous girdle is formed of one bone from each side, articulated at the posterior superior angle of the cranium, and descending under the neck, where it unites with the corresponding bone. Between the rays of the fin and this bone, which resembles the scapula, there is a range of small flat bones separated by cartilaginous intervals, which may be compared to the bones of the carpus. The rays of the ventral fins are articulated to bones which correspond to the pelvis in the higher classes of animals. The pelvis is never articulated with the spine, nor does it ever form an osseous girdle round the abdomen. In the jugular and thoracic fishes it is articulated to the base of the osseous girdle which supports the pectoral fins. In the abdominal fishes, the bones of the pelvis are never articulated to the osseous girdle, and are seldom connected with each other. They are preserved in their situation by means of certain ligaments. The rays of the caudal fin are articulated with the last of the caudal vertebræ, which is in general of a triangular form and flat. The rays of the dorsal fin are supported by little bones, which have the same direction as the spinous processes, and to which they are attached by ligaments.

As connected with the fins, we may here take notice of those organs which are termed cirri or tentacula, according as they are placed about the mouth, or on the upper part of the head. They are in general soft, but often contain one jointed ray. They do not differ in structure from the fins, and are so closely connected with them, that it is difficult to point out their use. It is not probable that they are organs of touch, but rather peculiar modifications of fins.

The muscles which move the fins, and all the other organs of the body, are of a paler colour than in the animals of a higher order. They are also more uniform in their substance, being in general destitute of tendinous fibres. In the greater number of fishes there are no muscles peculiar to the head. The sides are furnished with the most powerful ones, to execute the lateral movements of the animal. These muscles are disposed in layers or arches, with the convexity towards the head. The different muscles are strengthened by small detached spines, imbedded among the fibres of the muscle, and giving them additional strength. Between the layers there is in general a quantity of viscid albuminous matter interposed. After death this fluid speedily undergoes a change, and can seldom be observed in fishes which have been kept a few days. But in recent fish, when boiled, the albumen appears coagulated in the form of white curd between the layers of the lateral muscles.

The motions of a fish are performed by means of its fins. The caudal fin is the principal organ of progressive motion. By means of its various flexures and extensions, it strikes the water in different directions, but all having a tendency to push the fish forward; the action resembling, in its manner and effects, the well known operation of the sailor termed *skulling*. The ventral and pectoral fins assist the fish in correcting the errors of its progressive motions, and in maintaining the body steady in its position. Borelli cut off with a pair of scissars both the pectoral and ventral fins of fishes, and found, in consequence, that all its motions were unsteady, that it reeled from right to left, and up and down, in a very irregular manner. The dorsal and anal fins serve to maintain the body in its vertical position. But from the circumstance of some of these fins being wanting, and others evidently too small to produce the desired effects, those fins which do exist appear to be capable of executing all the movements for which the others, when present, are designed.

The medium in which fishes reside prevent us from making any accurate observations on the velocity of their motion. Mackrel, and some other marine fishes, will seize a bait moving at the rate of six or eight miles an hour; and some of the voracious sharks will keep up with a vessel in her voyage across the Atlantic. The darting of a salmon or trout in the water resembles the rapidity of an arrow; but such motion cannot be kept up for any length of time. This the angler is well aware of, who, with his hook fixed on very slender gut, will kill by fatigue the strongest salmon in the course of an hour or two, and a large trout in the course of two or three minutes. These facts seem to indicate, that however numerous and powerful the muscles of a fish may be, they are incapable of supporting a continued exertion.

Besides the action of swimming, fishes are likewise capable of *leaping*. They accomplish this by a violent effort of the caudal fin, or, according to some, by bending the body strongly, and afterwards unbending it with an elastic spring.

A few species are capable of sustaining themselves in the air for a short interval, and are termed *Flying-fish.* Such fish have the air bag, an organ to be noticed hereafter, of uncommonly large dimensions; hence the body has great buoyancy. The pectoral fins are likewise of an extraordinary size. Having by a leap raised themselves above the surface of the water, they continue in the air and move forwards, seldom farther than a hundred yards, by the action of their pectoral fins. The continuance of their flight is interrupted by the drying of the membrane of these fins, when they again fall into the water.

There is one species of fish (Perca scandens of *Lin. Trans.* vol. iii. p. 62.) which appears capable of *climbing*. By this motion, according to Lieutenant Daldorff of Tranquebar, it sometimes raises itself five feet above the surface of the water, mounting up the crevices of trees. The spines of its gill-covering retain it in its position; and when the body is bent to one side, the spines of the fin fix themselves in the bark; and when the body is then brought back to its ordinary shape, the head has reached a higher elevation. The spines of the expanded gill-covers again keep a firm hold, and a similar twisting of the body takes place in another direction. The spines of the dorsal fin contribute likewise to this extraordinary progression. The flying fish leave the water to escape from other fishes which prey upon them; but the object to be gained by these movements of this fish has not been ascertained, nor has even a conjecture been offered on the subject.

The organs of motion, we have already hinted, are extensively employed by the systematic ichthyologist in the formation of his divisions. It does not appear, however, that naturalists have determined the exact value of the characters which they furnish, either for generic or specific distinctions. La Cepede, in some instances, has formed genera from a difference in the number of the dorsal fins; while into the genus Gadus, species with one, two, and even three fins, are admitted. As the number of the fins is invariably the same in the same species, and as these organs may be supposed to exercise considerable influence on the habits of fishes, the character thus exhibited may be safely employed in generic distinctions. The characters furnished by the structure of the fins have not been overlooked, especially the rays. The circumstance of being bony or jointed is often noticed in specific distinctions, although well entitled to regulate divisions of a higher kind, as the character furnished is permanent. The characters furnished by the fins, which are employed exclusively in the construction of species, are derived from their form and the number of their rays. But as these characters are liable to vary in different individuals of the same species, they should be employed with great caution. In many fishes there are numerous rays on each side the different fins so concealed under the skin, that it is impossible to count them, while others do not reach the extremity of the organ. Hence the number of rays must vary with the mode of enumerating, and perhaps with the age of the animal. The extent of variation occasioned by the last cause has not been satisfactorily determined.

SECT. V. *Organ of Adhesion.*

The organ here referred to, generally termed *sucker*, is only found on a few fishes. In some of these it is situated on the upper part of the head, while in others it is placed on the thorax. In the celebrated fish called the Remora, it is of an oval form, and consists of transverse rows, of cartilaginous plates, connected by one edge to the surface of the head, and in the other edge free, and finely pectinated. A longitudinal partition divides the plates in the middle of the head. In the spaces between the plates, and on each side of the partition, a row of fleshy tubercles may be observed. In the cyclopteri this organ is of a circular form, and consists of numerous soft papillæ. It is situated on the thorax. Instead of a separate organ of adhesion, the ventral fins in the goby are united, and are capable of adhering to rocks and stones, while in the lampry the mouth contracts, and acts as a sucker.

The existence of a sucker is equally common to some cartilaginous and osseous fishes. Its use to the fish is difficult to ascertain. When, by means of this organ, the fish attaches itself to the sides of other fishes, or to the bottom of ships, it is carried forward without any exertion of its own; and, during storms, adhesion to rocks by means of it may save a weak fish from being tossed about by the fury of the waves; but there may perhaps be other purposes to which it is subservient, which still remain to be discovered.

The sucker furnishes to the ichthyologist characters for the discrimination of the species, which are obvious and permanent; but these have seldom been described with accuracy or minuteness.

Sect. VI. *Organs of Respiration.*

As the organs of respiration appear in fishes under a new form, very different from the lungs of the higher order of animals, they demand our attentive consideration. Many quadrupeds, birds, and reptiles, reside in water, but are obliged to come to the surface frequently in order to respire. But as fishes live immersed in the water, they are furnished with certain organs called gills, instead of lungs, to enable them to exercise the functions of respiration in the fluid in which they reside. In many of the inferior animals, respiration is performed by the same apparatus; but as it appears in its most perfect form in fishes, its examination will be the more interesting.

These organs of respiration in fishes consist of four parts, a gill-lid, a gill-flap, the gill-opening, and the gills themselves. The two last are always present, but one, and sometimes both, of the two first are wanting. We propose to examine these parts in succession, beginning with those which are exterior.

1. *Gill-lid.* The gill-lid, or as it is also termed *operculum*, is situated behind the eye on each side. It is scaly, membranaceous, or bony, and is articulated to the bones of the head. It consists sometimes of one piece, or of two or more, and is therefore termed monophyllous, diphyllous, or tryphillous. The surface in some is smooth, in others rough, or tuberculated, or striated, or spinous. Its use is to give support to the gill-flap, and act as a cover to the opening of the gills. It is absent in fishes which have fixed branchiæ, and in a few with free branchiæ. When it does exist, the characters which it exhibits in its structure are subject to little variation, and have been employed by La Cepede in the construction of his orders.

2. *Gill flap.* This is the *membrana branchiostega* of Linnæus, and was considered by him as a true fin. It consists of a definite number of curved bones or cartilages, with a membrane. Its posterior edge is generally free, and its anterior edge or base is united with the gill-lid. It is capable of extension and contraction, and when at rest it is generally folded up under the gill-lid. It is wanting in the chondropterygii, and likewise in a few genera of osseous fishes. When present, it appears to assist the mouth in promoting the current of water through the gills, or perhaps forms a current over the gills when the mouth is occupied in seizing prey.

The gill-flap furnishes to the systematic ichthyologist some of his most useful characters. He seldom pays attention to its form, but its rays are eagerly counted, as he finds that they are not subject to vary. Species of the same genus have, in general, the same number of rays, and many of the Linnæan genera depend on this circumstance for their character. Artedi, on this subject, draws the following conclusion: "Quod numerus ossiculorum in membrana branchiostega primum et præcipuum characterem in distinguendis generibus piscium catheturorum et osteopterygiorum suppeditet." But in counting their number, care must be taken to examine the structure of the gill-lid at the same time as the student sometimes enumerates among the rays of the gill-flap the posterior divisions of that organ, when present, and hence finds his observations at variance with the description of authors.

3. *Gill-opening.* This division of the organs of respiration presents many remarkable differences. In the osseous fishes, and among the branchiostegi, this opening is a simple aperture behind the gills on each. It is sometimes round, or semilunar, and in relative position it differs according to the species or genera. In the cartilaginous fishes, the opening on each side is subdivided into as many apertures as there are gills, the gills in this tribe being fixed to the membranes, which act as partitions in the opening. In such fishes these openings are on the summit, at the sides, or underneath, according to the genera.

4. *Gills.* In the fishes with gills or branchiæ, these organs are in general eight in number, four on each side. Each gill consists of three parts, a cartilaginous or bony support, and its convex and concave sides. The support of each gill consists of a crooked bone or cartilage, in general furnished with a joint. At its base it is united with the bones of the tongue, and above with those of the head. At both extremities it is moveable, and throughout is flexible like a rib. Its position is nearly vertical. From its exterior or convex side issue a multitude of fleshy leaves, or fringed vascular fibrils, resembling plumes, and closely connected at the base. These are of a red colour in almost all fishes in a healthy state. The internal or convex side of the support next the mouth exhibits many singular differences. It is always more or less furnished with tubercles. These in the genus Cyprinus are smooth—in the Cottus rough. They are lengthened into slender spines in the herring and smelt, but in the former these are serrated, while in the latter they are smooth. This concave part of the gill is of a white colour, and forms a striking contrast with the colour of the convex side.

In some osseous fishes, the number of gills exceeds four on each. In the herring, for example, there is a small imperfect gill on each side attached to the inner side of the gill-lid, on which all its motions depend. It has no bony arch nor concave side. At the entrance to the gullet, there is a cartilage on each side, studded with tubercles resembling in appearance the concave side of the last gill. In the *plaise*, a similar gill may be observed on the inside of the gill-lid, but no distinct appearance of a sixth gill at the entrance to the œsophagus.

In the chondropterygii, the gills are far from being so perfect. They are fixed to partitions which serve the purposes of the bony arches in the osseous fishes. These partitions extend from the mouth to the gill-opening, and vary in number according to the genera. They are destitute of the inner or concave white side, but the fleshy leaflets are of the same structure with those on the convex part of the gills in osseous fishes.

We are indebted to that acute anatomist, Sir Everard Home, for some important observations on the respiratory organs of the lamprey and myxine, the apodal chondropterygious fishes, and the least perfect in the system. "In the lamprey, (he says), the organs of respiration have seven external openings on each side of the animal; these lead into the same number of separate oval bags, placed horizontally, the inner membrane of which is constructed like that of the gills in fishes. There is an equal number of internal openings leading into a tube, the lower end of which is closed, and the upper terminates by a fringed edge in the æsophagus. These bags are contained in separate cavities, and enclosed in a thorax resembling that of land animals, only composed of cartilages instead of ribs, and the pericardium, which is also cartilaginous, is fitted to its lower extremity like a diaphragm." In the myxine, the external openings are two in number, but there are six lateral bags on each side, placed perpendicularly, to which there are six tubes from each of the openings, and close to the left external opening there is one which passes directly into the œsophagus. (*Phil. Trans.* 1815, Part II. p. 256.)

The characters furnished by the gills are of the first importance in arranging the species. They are easily examined, and the distinctions are obvious. But by some strange conceit, ichthyologists seldom look into the gills, or point out to us the peculiarities which they exhibit. Indeed the characters furnished by the organs of respiration should be regarded as occupying the highest rank. Without the aid of any other characters, fishes might be classified with ease, and even species might be determined with certainty.

Sect. VII. *Organs of Circulation.*

The organs of circulation are not so obvious as those which we have been considering, and are seldom attended to by the mere ichthyologist. Without entering into the minute details of comparative anatomy, we trust the following observations may not prove uninteresting to the general reader. The *heart* of fishes is situated in the fore-part of the body, in a cavity between the gills and a little behind. The pericardium or membrane which lines this cavity, is similar to the covering of the cavity of the abdomen, and, like it, is often spotted or silvery. In the skate, Dr Monro found the bottom of the pericardium lengthened into the shape of a funnel, which divides into two branches. These are tied closely to the lower part of the œsophagus, and open into the cavity of the abdomen. Into this cavity there is secreted a liquor, afterwards to be taken notice of. The heart itself is small in proportion to the body of the animal, and varies greatly in figure in the different species. It is quadrilateral in some, and semi-circular in others. It consists, as we have already mentioned, of a single auricle and a single ventricle, corresponding to the right side of the heart of warm-blooded animals. The auricle is in general larger than the ventricle, and of a thinner texture in its coats. It receives the blood from the body, and transmits it to the ventricle. This last division of the heart has walls of considerable thickness. It sends forth an artery, which, at its separation from the heart, forms a bulb, varying in shape according to the species. This artery subdivides, and proceeds directly to the gills, over whose leaves it is spread in the most minute ramifications.

The blood, in passing through the gills of fishes, undergoes similar changes as the blood of quadrupeds in passing through their lungs. It is likewise now well established, that the atmospheric air contained in the water furnishes to the blood those materials which are necessary for its purification, and a continuance of the life of the animal.

The water for this purpose is taken in at the mouth, and sent to the gills, where, after being in a great measure deprived of the oxygen of its atmospheric air, the water is ejected through the gill opening.

"In the lamprey," according to Home, "the water is received by the lateral openings of the animal into the bags which perform the office of gills, and passes out by the same opening; the form of the cavities being fitted to allow the water to go in at one side, pass round the projecting parts, and out at the other. A part of the water escapes into the middle tube, and from thence either passes into the other bags, or out at the upper end into the œsophagus. There is a common opinion that the water is thrown out of the nostril: this, however, is unfounded, as the nostril has no communication with the mouth."—"In the myxine, the elasticity of the two tubes, and the bags into which they open, admit of the water being received; and the pressure produced by the action of the external muscles forces it into the œsophagus, from whence it is thrown out by the opening at the lower end of that tube."

If the ejection of the water from the gills of a fish be prevented, by the gill cover being tied down with a string, it soon expires in convulsions. Similar fatal consequences follow, when fish are placed in water previously deprived of its atmospheric air by boiling or freezing: and when fish are kept in a small pond, whose surface is frozen over, and where the water in that case cannot obtain a fresh supply of air, they speedily perish. If a small opening be made in the ice, before it be too late, the fishes will come near it for a fresh supply. In this manner, fishes are frequently taken during winter in ponds and lakes.

The extent of surface presented by the gills of a fish, to enable the blood to come in contact with the air in the water, is much greater than one would, without attentive consideration, be led to suppose. Dr Monro calculated, that the whole gills of a large skate presented a surface equal to 2250 square inches, or equal to the whole external surface of the human body.

The process of respiration for the supply of the gills is carried on even during sleep. The number of respirations in a minute is seldom above thirty, or below twenty. In the same individual it is liable to a considerable variation, depending on the will of the animal.

The blood, after being renovated in the gills, is reabsorbed by a multitude of minute vessels, which unite together; but, instead of returning the blood to the heart again, to be afterwards distributed through the body, this aorta exercises that function, and descends along the inferior side of the spine, in a canal fitted for its reception, giving off arteries, during its course, to the adjacent parts. The blood is absorbed again by veins, which have extremely thin coats. These are much larger in their course than in their termination; and besides form, in different parts of their course, considerable receptacles for blood.

Any injury received by the gills of fishes is attended with much pain, and a considerable effusion of blood. Some fishermen seem to be well aware of this last circumstance, and cut the gills with a knife as soon as the fish is taken. A copious bleeding takes place; and they find that a fish so killed will keep much longer in a fresh state, than one on whom this operation of bleeding has not been performed.

Sect. VIII. *Organs of Nourishment.*

In attending to the organs of nutrition, it will be necessary to consider the structure of the mouth, and afterwards the gullet, stomach, and intestines.

The *mouth* of fishes exhibits many remarkable differences according to the species, in regard to position, figure, and size. In general, it is situated at the extremity of the head, and is then said to be terminal. In some species, and even genera, it is placed beneath a snout, or on the under side of the head. Wherever situated, it is always transverse with respect to the body, unless in the genus Pleuronectes, in which it occupies an oblique position. When the mouth is opened, it is in general of an oblong or oval shape. In some fishes, its capacity is less than the size of the head; but, in general, it is capable of opening to a great width, sometimes superior to the thickness of the body.

The *lips* of fishes are seldom regularly formed. In a few species, however, these surround the mouth, and are of a firm, fleshy consistence. In other instances, the lips are of an osseous texture, divided into plates which fold over one another. Such kind of lips give to the mouth increased dimensions, as they are capable of being exerted or folded up at the pleasure of the animal.

The *jaws* are moveable, and both are attached to the bones of the palate. They are seldom equal, the one exceeding the other in length. They furnish, by their position and mode of union, many important characters in the classification of fishes. These characters have been lately investigated by Cuvier with his usual success; and he is of opinion, that the maxillary and intermaxillary bones will furnish characters, not for genera merely, but likewise for orders.

The *teeth* of fishes exhibit remarkable differences, with regard to number, situation, and structure. In the higher orders of animals, the number of teeth in the mouth is almost always constant in the same genera and species. But among fish, the teeth are often so numerous that it is difficult to count them, especially as they occupy so many different positions. The jaws are not exclusively employed to support these organs, as in quadrupeds; the tongue, the palate, the throat, being often furnished with them. In the saw-fish, the teeth are inserted on each side of its flattened and projecting snout. In the genus Sparus, the front teeth resemble those of the human species. They are provided with fangs, which are contained in alveoli. In many fishes, the teeth are formed of processes of the jaw bones covered with enamel. Those of the shark tribe adhere merely to the gums, or at least to a firm cartilaginous substance which covers the jaw. They are not formed, as in the mammalia, by the addition of new layers, one within the other, but apparently in a manner resembling the formation of bone. They are at first soft and cartilaginous, and pass, by successive gradations, into a state of hardness and density not inferior to that of ivory. In the skate, the teeth consist of an assemblage of tubes, covered externally by enamel, and connected to the jaw by a softer substance, which probably sends processes or vessels into those bony tubes.

The teeth of fishes are in general bent inwards, to enable them to retain their prey. As few fishes masticate, they have seldom any teeth which resemble grinders, although those which live on the harder shell-fish have teeth fitted for triturating these.

In the classification of fishes, the teeth furnish several important characters, which are little liable to variation. In the genus Squalus, in particular, the teeth exhibit many remarkable differences in form, sufficient, in the absence of other characters, for the discrimination of the species.

The *gullet* or œsophagus, on account of the absence of a neck, is in fishes remarkably short. In some, indeed, the stomach seems to open directly into the mouth. Where it exists, it exhibits few peculiarities of structure. In some of the branchiostegi it is beset with tufts of hair resembling a fine net-work. It is in general capable of great dilatation, and when the stomach is unable to hold the whole of the prey which has has been seized, a part remains in the gullet until the inferior portion gives way.

The *stomach* of fishes is in general thin and membranaceous, differing little in its structure and appearance from the gullet. It frequently contains the remains of crustaceous animals, still retaining their form, but greatly altered in consistency. Hence naturalists have concluded, that the food is reduced by solution, and not by trituration. But in some fishes, particularly those which subsist principally on shell-fish, the stomach has thick muscular coats. Its shape is considerably different in the different species, but the characters furnished by this organ are seldom regarded.

The *intestines* exhibit many remarkable peculiarities. Sometimes they proceed directly from the stomach to the anus in nearly a straight line. In other instances, they form in their course one or more flexures. In some instances, the gut is widest towards the stomach, and gradually becomes smaller as it approaches the anus, while in others the reverse of this is the case. It is furnished internally in some species with spiral valves, in others with lozen-shaped hollows, while in a few it has numerous fringed laminæ. Between the great and small intestines, in the chondropterygii, there is a kind of cœcum or appendix vermiformis; but in osseous fishes there is no appearance of any such organ. In the last division, however, there are bodies which have been termed *Appendices*, or Intestinula-cœca. These are situated at the origin of the gut, in a double or single row. They vary in number, shape, or size, according to the species; but continue the same in all the individuals of the same species. In place of these in the chondropterygii, there is a glandular body, which has been compared to the pancreas of warm-blooded animals. The character for the discrimination of the species furnished by the appendages is of importance, as being easily investigated and permanent.

These intestines, and the rest of the viscera situated in the cavity of the abdomen, are contained in a membranaceous sac or peritonæum. This is silvery in some fishes, black or spotted in others. We are informed by Willoughby, that this sac opens externally near the anus by means of two small holes. These openings were afterwards examined by Monro, who found in each of these passages a semilunar membrane or valve, so placed as to allow liquors to get out from the abdomen readily, but to resist somewhat their entry into it.

The anus in fishes occupies many different positions according to the species. This circumstance was seized upon by Scopoli, in the system which we have noticed above, and was raised to the dignity of a primary character in his system. This orifice is not merely the opening whence issue the fæces, but in general the spawn also.

SECT. IX. *Organs of Absorption.*

THE vessels of the absorbent system of fishes are analogous to those of quadrupeds. They are, however, destitute of valves, unless at their termination in the red veins, and do not appear to possess conglobate glands. Dr Monro, to whom we are indebted for the first illustration of this class of vessels, gives the following view of their arrangement in the cod and the salmon. " The chief branches," he says, " of the lacteal vessels of the great and small intestines, and which are smaller in proportion to the blood vessels than in the nantes pinati of Linnæus, run upwards in the mesentery, almost parallel to each other, and near the mesenteric arteries. In their whole course, they communicate by a vast number of small transverse canals. At the top of the abdomen, near the gall bladder, the lacteals of the stomach, and lymphatics of the spleen, liver, and intestinula cœca, are added. The chyle, mixed with the lymph of the assistant chylopoietic viscera, passes upwards and towards the right side into a large receptacle contiguous to the gall bladder, and between it and the right side and back part of the lower end of the œsophagus. From the receptacle of the chyle, large canals pass upwards to the right and left, receiving in this course the lymph from the organs of urine and generation. Those on the left side are chiefly behind the œsophagus.

The chyle, mixed with the abdominal lymph, having ascended above the bones, which resemble our clavicles, is poured into large cellular receptacles, situated chiefly between the clavicles and the undermost of the gills, and which also receive the lymph from all the other parts of the body.

Four lymphatic vessels, which terminate in these receptacles, and which have their extremities contracted by a doubling of their internal membranes, chiefly merit attention. The first conveys the lymph from the middle of the belly, from the ventral and pectoral fins, and from the heart. The second runs up the side of the fish, parallel to the great mucous duct, and brings the lymph from the principal muscles of the tail and body. The third is deep seated, and conveys the lymph from the spine, spinal marrow, and upper part of the head. The fourth lymphatic vessel, or rather plexus of vessels, brings the lymph from the brain and organs of the senses, and from the mouth, jaws, and gills.

These receptacles may therefore be called the common receptacles of the chyle and lymph. The right receptacle communicates freely with the left by large canals, which pass chiefly behind the heart and œsophagus.

From each of these receptacles in the salmon, a canal runs downwards and inwards, and opens into the upper end of its corresponding vena cava inferior, contiguous to, and on the fore and outer side of the internal jugular vein. The termination of these canals are contracted, and their internal membranes are doubled, so as to serve the purpose of valves, in preventing the passage of the blood from the venæ cavæ into the receptacles. In the cod kind, the receptacles are proportionally larger than in the salmon; and, besides transmitting the muscles of the gills, and their several nerves, contain the upper cornua of the air bladder." (Monro, *Struct. and Phys. of Fishes*, p. 31.)

The termination of the lymphatic veins in the skin may be readily ascertained in this class. Coloured liquors injected into them are discharged by numerous pores, chiefly situated on the upper parts of the body. These orifices are placed at regular intervals. As Dr Monro did not observe any appearance of extravasation in the cellular substance, he considered that these orifices were the natural beginnings of the lymphatic veins.

SECT. X. *Organs of Secretion.*

In considering the organs of this class, we propose to examine the structure of the liver, pancreas, kidneys, air, and mucous ducts.

1. *Liver.* This organ in fishes, is remarkable on account of its size in proportion to the rest of the body. It commonly lies almost wholly on the left side. Its colour exhibits various shades of brown, frequently mixed with yellow. It is entire in some fishes, as the lamprey, flounder, and salmon, or divided into two or more lobes, as in the perch and carp. These varieties of form are constant in all the individuals of the same species, but frequently differ somewhat in the species of the same genus.

The *gall bladder* is present in the greater number of fishes; but in a few species, as the lamprey, its presence has not been detected. The *bile* varies greatly in colour according to the species. In the thornback and salmon it is yellowish white, and when evaporated, leaves a matter which has a very sweet and slightly acrid taste, containing no resin. The bile of the carp and eel is very green and very bitter, contains little or no albumen, but yields soda, resin, and a sweet acrid matter similar to that which may be obtained from salmon bile. The biliary ducts open separately into the intestine.

The liver appears to be the only organ of the body of fishes which contains oil in abundance, or is sought after on that account. This oil is lodged in cells, and cannot be completely obtained by the boiling of the liver. To accomplish the extraction of the whole oil, fishermen in general allow the livers to putrify a little, and in this manner the cells are ruptured, and a greater quantity of oil obtained. But gelatinous matter and bile are likewise among the products, and as these afterwards putrefy, they communicate a fœtid smell to the oil. This disagreeable smell is common to all kinds of fish oil thus prepared; but it may be removed by various processes. Perhaps the best are those which were communicated to the Society for the encouragement of arts, manufactures, and commerce, in the year 1761, and published in the twentieth volume of their Transactions, to which we refer the reader. The liver of the cod, cut into small pieces, boiled in the stomach of the same animal, and eaten with vinegar and pepper, is a favourite dish in the northern islands of Scotland.

2. *Pancreas.* In the chondropterygii, there is a pancreas resembling that in the higher classes of animals, of an irregular form, and placed at the origin of the intestines. The substance appears compact, but gelatinous when cut. In the osseous fishes, the intestinula cœca, already described, appear to serve instead of a pancreas. They send two large canals into the intestines; and when these are wanting, as is the case in the carp, the walls of the intestines discharge abundance of humour from glands placed upon their inner surface. In the sturgeon, an organ is found, in its internal structure similar to these intestinula; but in its outward form resembling the pancreas of the skate. It is inclosed in a muscle, evidently intended to express its contents. It opens into the intestine by three large orifices, and has internally a singular reticular appearance, as exhibited by Monro in the work on fishes so often referred to, page 84. tab. ix.

3. *Spleen.* This organ varies greatly in its form and position in the animals of this class. In some it is nearly triangular, while in others it approaches to a spherical figure. It is in general entire; in some instances, however, it is divided into lobes, which adhere by very slender filaments. In the sturgeon, these lobes are seven in number. It is placed in some species on the stomach, or to the first part of the intestines; in others between the stomach and liver; and in a great number it is under the air bag, and above the other bowels. It is always of a darker colour than the liver.

4. *Kidneys.* It was the opinion of Rondeletius and others, that fishes were destitute of kidneys and the bladder of urine; but the observations of Willoughby and others have demonstrated their existence. The kidneys of fishes are uniform in their substance, and of a reddish brown colour. They are in general long and narrow, and apparently united into one mass. The peritonium covers their under surface, and they are placed longitudinally under the spine. The ureters begin by numerous roots, and run along the under surface of the kidney. They terminate either in a vesica urinaria, or a cloaca; or unite together to form a dilation, which supplies the place of a bladder of urine.

In the chondropterygii, the ureters terminate in the cloaca, but in the other cartilaginous fishes the bladder of urine is present, although very small and thin in its coats.

The urethra in most fishes is short, and commonly opens behind the anus by an orifice, which also gives issue to the sexual evacuations. Renal glands are wanting in this class.

5. *Air bag.* This organ is called by some the swimming bladder, by others the air bladder. It is the vesica natatoria of Willoughby, and the vesica aerea of Artedi. In this country it is called the *sound.* When present, it is situated in the anterior part of the abdominal cavity, and adheres to the spine. It is wanting in the chondropterygii, and even in some of the osseous fishes, as the flounder and mackrel.

It is very different in shape according to the species. In the herring and some other fishes it is oblong and pointed at both ends. In the salmon it is obtuse at both ends. In the burbot it is obtuse in the lower end, and bifid at its superior extremity. In the carp it is divided transversely, and in the silurus longitudinally, into two lobes.

In general there is a duct (*ductus pneumaticus*), by means of which this air bag communicates with the œsophagus, or the stomach. In the sturgeon there is a round hole, nearly one inch in diameter, in the upper and back part of the stomach, communicating with the air bag. The hole is surrounded by thin muscular fibres placed between the membranes of the stomach and air bag, which decussate at opposite sides of the hole. These are considered by Monro as having the effect of a sphincter muscle. In the salmon, the last quoted author found a hole so large as to admit readily the largest sized goose quill, leading directly through the coats of the œsophagus into the air bag. The œsophagus in this fish has a thick muscular coat, but the fibres of that coat do not seem to form a distinct sphincter around the hole. In other fishes the duct of communication is of considerable length. In the common herring the under part of the stomach has the shape of a funnel; and from the bottom of the funnel a small duct is produced, which runs between the two milts, or the two roes, to its termination in the middle of the air bag. In some fishes, as the cod and haddock, Monro could not perceive any ductus pneumaticus, or opening into any of the abdominal viscera. The air bag was not enlarged by blowing into the alimentary canal, nor could he empty the air bag without bursting it.

In the air bag of the cod and haddock, the same acute observer examined the red coloured organ noticed by Willoughby, and considered by him as a muscle, the surface of which is very extensive, as it is composed of a vast number of leaves or membranes doubled. In those fishes, however, in which the air bag communicates with the alimentary canal, this red body is either very small and simple in its structure, as in the conger eel, or entirely wanting, as in the sturgeon, salmon, herring, and carp.

Naturalists, in general, are disposed to regard the air bag as accessory to the organs of motion. Having observed that flat fish, which reside always at the bottom, are in general destitute of this organ, they have assigned to it the office of accommodating the specific gravity of fishes to the density of the surrounding element, and thus enabling them to suspend themselves at any depth. A very simple experiment has likewise countenanced the opinion. When the air bag of a fish is punctured, the animal immediately falls to the bottom, nor is it able, by any exertion of its fins, to elevate itself again. When in a sound state, the external skin of the air bag (regarded as possessing strong muscular power) is supposed capable of contraction, so as to condense the air, and enable the animal to sink, or of extension, so as to allow the air to expand, and aid the animal in rising in the water.

The air bag of some fishes soon loses its muscular power, in consequence of the air being expanded by the action of the sun, when the fish has remained too long at the surface. In this situation the fish continues at the surface. When some fish are suddenly brought up from deep water, the diminished pressure occasions the expansion of the air contained in the bag. The organ sometimes bursts in such cases, and the contents, rushing into the abdomen, push the gullet sometimes out of the mouth of the fish. We have witnessed this effect produced in the cod fish.

The above theory fails in explaining all the phenomena. The eel, which resides always at the bottom, is yet possessed of an air bag; while the sharks, which roam about in all depths, and the mackrel, which pursues its prey at the surface, are destitute of this reputed organ of equilibrium.

Various opinions have been advanced with regard to the manner in which this air bag is filled. By some it has been supposed, that a portion of the air, which fishes are capable of abstracting from the water, is transmitted through the gullet and stomach into the air bag when necessary, and expelled and renewed at the pleasure of the animal. Needham long ago considered that the air, or, as he termed it, a vaporous exhalation contained in the air bag, was generated in the blood, secreted into this organ, to be afterwards thrown into the stomach or intestines, to promote the digestion of the food.

The nature of the air contained in the air bag was never investigated until pneumatic chemistry had opened up new fields of discovery. In 1774, Dr Priestley turned his attention for a short time to the subject; and in the air bag of the roach he found azote in one instance unmixed, and in another in company with oxygen. Fourcroy afterwards examined the gaseous contents of the air bag of the carp, and found them to consist of almost pure azote.

The most accurate and extended experiments on this subject are those of M. Biot, published in the *Mem. d'Arcueil*, i. 252. and ii. 8. He found the proportion between the oxygen and the azote (for he was unable to detect the presence of hydrogen, or any sensible quantity of carbonic acid) to vary according to the species, as may be seen in the following table.

Names of the Fish.	Proportion of Oxygen.
Mugil cephalus	quantity insensible
Ditto	ditto.
Murænophis helena . . .	very little.
Sparus annularis, female . . .	0.09
Ditto, male . . .	0.08
Sparus sargus, female . . .	0.09
Ditto, male . . .	0.20
Holocentrus marinus . . .	0.12
Labrus turdus	0.16
Sparus melanurus	0.20
Labrus turdus var.	0.24
Sciæna nigra, female . . .	0.27
——————— male	0.25
Labrus turdus, female . . .	0.24
——————— male	0 28
Sparus dentex, female . . .	0.40
Sphyræna spet (Esox sphyræna, Lin.)	0.44
Sparus argenteus . . .	0.50
Holocentrus gigas	0.69
Gadus merluccius	0.79
Trigla lyra	087.

The depth at which the fishes had been caught increases from the beginning to the end of the table, and the proportion of oxygen observes the same rule. This last circumstance induced Biot and his friend De La roche to endeavour to ascertain the proportion of oxygen contained in sea water at different depths. They were unable to perceive any difference. M. Configliachi has more lately repeated these experiments, and found that the proportion of oxygen in sea water bore no relation to the depth from which the water had been obtained.

These experiments lead to the conclusion, that the air contained in this sac is a secretion of the organ; that in fishes which live near the surface azote is secreted; but in fishes which live at great depths, the quantity of oxygen is proportionally increased. The purposes accomplished by this arrangement have never been explained in a satisfactory manner. The red organ, which we have already taken notice of as existing in some fishes, is now generally considered as the part which separates this air from the blood. But as this organ is not always present when there is an air bag, we are still left in doubt on the subject.

To the systematic ichthyologist, the characters furnished by the air bag are of considerable importance, although seldom sufficiently attended to. They are easily traced, and they are not subject to variation.

To the economist, the air bag or sound is considered as an article of value. This organ in the cod or ling, when salted, forms a nourishing and palatable article of food, held in high estimation in the northern islands of this country. But it is chiefly in the manufacture of the substance called Isinglass that the sounds of fishes are extensively employed. The sounds of various kinds of sturgeon are chiefly made use of for this purpose. The external membrane is removed, and the remaining part is cut lengthwise, and formed into rolls, and then dried in the open air. The sounds of cod and ling are frequently employed as a substitute for those of the sturgeon. They require some dexterity to separate them from the backbone. But when the membranes are well scraped on both sides, steeped for a few minutes in lime water to absorb the oil, and then washed in clean water and dried, they form an isinglass of considerable value.

Isinglass consists almost entirely of gelatine, and is used either as food, or for the purpose of fining liquors; 500 grains of it yielded to Hatchet by incineration 1.5 grains of phosphat of soda, mixed with a little phosphat of lime. An inferior kind is manufactured from the bones, fins, and useless parts of fishes. These materials are boiled in water, the fluid skimmed and filtered, and afterwards concentrated, until it readily gelatinizes on cooling. This kind is much used in various manufactures, and might be obtained in considerable quantity at all the fishing stations in this country where the materials abound, but which are at present left as a nuisance on the adjoining beach.

6. Mucous Ducts. The surface of the skin of fishes is almost always covered with a slimy fluid, to protect them from the penetrating influence of the surrounding element. This mucus is poured out from small pores, situated under the scales in every part of the body of some fishes, while in others these excretory ducts are arranged in a determinate order. These ducts were first observed and described by Steno, in his works, "*De Musculis et Glandulis*, p. 42, *and Elementorum Myologiæ Specimen*, 1669, 8vo. p. 72. The subject was afterwards investigated by Perrault, Lorenzini, and Revinus, and more recently by Monro. To this last author we are indebted for many excellent observations and sketches. "In the skate," (he says, *Struct. and Phys.* p. 21.) "numerous orifices, placed pretty regularly over the surface, have been observed by Steno to discharge this slimy matter. With respect to these last, I have remarked some memorable circumstances. First, I have discovered one very elegant serpentine canal between the skin and muscles, at the sides of the five apertures into the gills. Farther forwards it surrounds the nostrils; then it passes from the under to the upper part of the upper jaw, where it runs backwards as far as the eyes. From the principal part of this duct, in the under side or belly of the fish, there are not above six or eight outlets; but from the upper part near the eyes there are upwards of thirty small ducts sent off, which open upon the surface of the skin. The liquor discharged from these has nearly the same degree of viscidity as the synovia in man. But, besides the very picturesque duct I have been describing, I have remarked on each side of the fish, a little farther forwards than the five breathing holes, a central part, from which a prodigious number of ducts issues, to terminate on almost the whole surface of the skin, excepting only the snout or upper jaw. At these centres all the ducts are shut; and in their course they have no communication with each. In these two central parts, or on the beginning of the mucous ducts, a pair of nerves, nearly as large as the optic, terminate; and, which is a curious circumstance with respect to them, they are white and opake in their course, between the brain and their ducts; but when they divide, they become suddenly so pellucid, that it is impossible to trace them farther, or to distinguish them from the coats of the ducts."

In the osseous fishes, the openings of the mucous ducts are chiefly observable in the fore part of the head, and in the *lateral line*. This line extends from the head to the tail, along each side of the fish, and exhibits several striking peculiarities. It is not observable in the lamprey; in general it is single, but in the sandeel it has the appearance of being double. It is usually of a different colour from that of the sides, and varies according to the species in position and direction. After death it sometimes disappears, and hence some difficulties have arisen with regard to the discriminating marks which it furnishes.

The mucus which is poured out upon the skin by these ducts, in some cases appears to be the liquid known by chemists under that name, while in other instances it appears to be of the nature of albumen. Chemists, however, have not turned their attention to the subject.

Besides this liquid, secreted on the external surface of the body, many physiologists have detected liquors in the cavity of the brain, the pericardium, and the abdomen, which we may take notice of in this place. Dr Monro found the liquor surrounding the brain of a skate to be of a saltish taste; and his friend Dr. Rutherford found that it contained one sixty-fifth part of its weight of sea salt dissolved in it. The liquor in the cavity of the abdomen contained only one seventy-eighth part.

Sect. XI. *Organs of Reproduction.*

The reproduction of fishes is a subject involved in great obscurity. The element in which they reside conceals from us the actions which they perform, and hence we are unable to point out with certainty the uses of the different organs, or the functions which they exercise. Even in the days of Aristotle the difference in the mode of reproduction between the cartilaginous and the osseous fishes had been observed; and although many accurate observations have been made by modern zootomists, much still remains to be done both in the field of observation and dissection.

In the general view which we propose to give of this subject, fishes may be divided into two classes, distinguished by their reproductive organs. Thus, some have the sexes distinct, while in others they are united. Those with the sexes distinct may be subdivided into the oviparous, or ovoviviparous.

1. *Oviparous fishes, with the sexes distinct.* The fishes included under this division are by far the most numerous. They have all free branchiæ. Some of them possess a cartilaginous skeleton, while others belong to the division termed osseous. In all, the egg is impregnated externally, and arrives at maturity without the aid of the mother.

In the *males* of this division, the testes, known by the name of *milts*, are two in number, of a white colour, and lengthened form. The surface is usually irregularly tuberculated. They are situated on each side of the abdomen, and consist of glandulous sacs destined for the preparation of the impregnating fluid. Through the middle of each milt there passes a ductus deferens, uniting with each other at the posterior part of the abdomen, and forming a kind of vesicula seminalis. The external opening for the issue of the semen is in some in the cloaca, while in others there is a small orifice situated behind the anus, which gives vent to the sexual evacuations.

In some of the oviparous abdominal fishes, there are two cartilaginous fins situated between the ventral fins, and supposed by La Cepede to be the external openings of the sexual organs. They are termed by him *Appendices genitals.*

We possess few accurate experiments on the chemical composition of the seminal fluid of fishes. Fourcroy published in the *Annales de Chim.* vol. lxiv. p. 3. some experiments on the milt of the carp. It was neither acid nor alkaline. It appears to consist of albumen, gelatine, phosphorus, phosphat of lime, phosphat of magnesia, and muriat of ammonia. More recently, Dr John subjected the milt of a tench to a chemical analysis, and obtained the following ingredients: water, insoluble albumen, gelatine, phosphat of ammonia, phosphat of lime, phosphat of magnesia, and alkaline phosphat. He could not detect the presence of any phosphorus, which had been given as a constituent by Fourcroy and Vauquelin. In all these examples, however, the seminal fluid was mixed with the substance of the testes.

In the *females* of this division, the ovary, usually termed the *roe*, is double in the greater number of fishes, but in a few it appears to be single. It occupies nearly the same position as the milt in the males. It consists of a thin delicate membrane inclosing the ova. These are generally disposed in transverse layers, connected by means of blood vessels. There is no distinct oviduct. The external openings are similar to those in the male.

Previous to the deposition or ejection of the roe or eggs by the female, a union has been formed with a male. But this connection is merely temporary, and is dissolved immediately after the impregnation of the egg has taken place. In the Cyclopterus lumpus, however, it is stated that this connection is of longer duration, that they continue to watch over the eggs with tender solicitude, and defend them from the rapacity of other fishes. The pleasure derived from the belief in this singular example of parental care is in a great measure destroyed by the hint which has been thrown out, that they defend the eggs from the attack of other fishes, that they may appropriate them as a feast to themselves.

The ova are first deposited by the female, and then the male pours upon them the impregnating semen. In many instances, they form a hole in the sand, by their mutual assistance, and place therein the roe; in other instances, the roe is deposited in the crevices of rocks, or on sea weeds or aquatic plants. But it would be endless to detail the various ways (even were we better acquainted with them than we profess to be) in which fishes perform this curious function of their nature.

The eggs of fishes are very various with respect to colour, but agree in being of a spherical form. The integument is more or less firm according to the species. The yolk, instead of occupying the centre, as in the eggs of birds, is placed laterally, and is surrounded by the glaire, or albuminous matter. Between the yolk and the glaire is situated the germ or embryo. The germ becomes ready for exclusion at very different periods, according to the species. Thus the egg of the carp is said to be perfected in the course of three weeks, while that of the salmon requires as many months. But in the eggs of the same species, a great deal depends on the temperature to which they are exposed. In the same pond, those eggs are soonest hatched which have been deposited in the shallowest water.

As the embryo is developed, the heart first appears, afterwards the spine, eyes, and tail. The organs of motion are evolved in the following order. The pectoral fins first make their appearance, and afterwards those of the tail; the dorsal fins follow; and then the ventral and anal fins.

2. *Ovoviviparous fishes, with the sexes distinct.* In this division are included the chondropterygii, and likewise a few osseous fishes. Sexual intercourse takes place, and the eggs are hatched in the uterus, and excluded along with the fry.

In the *males* of this division, at least in those of the chondropterygii, the testes are two in number, flat, of great extent, and situated between the spine and the stomach and intestines. Each is divided into two portions; the first resembles the soft milt of oviparous fishes, and the second consists of small spherical glandular bodies. From these an epididymis is produced, chiefly composed of convoluted tubes, which terminate in a vas deferens, the under part of which is greatly dilated, and forms, as in birds, a considerable receptable, or vesicula seminalis. Contiguous to the outer side of the dilated end of the vas deferens, there is a bag of considerable size, filled with a green liquor, which is discharged into the same funnel with the semen, and probably at the same time with it. By some, this is considered as a vesicula seminalis, while by others it is regarded as supplying the place of a prostate gland. The funnel through which the seminal fluid is poured opens near the cloaca.

In the males of the chondropterigii there are certain organs situated near the anus, consisting of bone, cartilage, and muscles. These were long regarded as the external organs of reproduction. But Rondeletius was of opinion that these were only accessory organs, and enabled the males to retain the females more closely during coition. The celebrated ichthyologist Bloch, from dissections, arrived at the same conclusion.

The late Mr Montagu has observed some peculiarities in the sexes of the skate, which deserve to be noticed. These are enumerated in the *Memoirs of the Wernerian Natural History Society*, vol. ii. p. 414. After speaking of the appendages at the base of the tail, he says, "Accompanying this truly masculine distinction are series of large reclined hooked spines, never to be found on the other sex, and which begin to shew themselves early in all the species hitherto examined; these are placed in four distinct series, one on each shoulder or fore-part of the wing, or pectoral fin, and one on each angle of the wing. These spines are complete hooks, resembling those used for fishing, and lie with their points reclined inwards in two or three, and sometimes four parallel lines, but the number of rows, and number in each row, depends on age; for in very young specimens I have noticed only four or five spines in a single row. For what purpose this formidable armoury is given exclusively to the males is not known, but as the hooks are extremely sharp, and lie partly concealed, with their points a trifle reflected, the fishermen's hands are frequently lacerated by incautiously handling the fish. These formidable spines, peculiar to the masculine gender, have occasionably been fixed on as a specific character; and as it does not appear to be generally known, that it is only a sexual distinction, it has been thought proper to notice it for the advantage of others who may be pursuing the same track. There is another circumstance which perhaps, in the discrimination of species, requires more attention than usual: that is, the teeth of both sexes of each species. The necessity of this is particularly evinced by the great difference observable in the teeth of the two sexes of the thornback, *Raia clavata*.

In search of both sexes of this species. I was naturally led by the usually described essential character of the teeth being blunt, and I was not a little surprised when, amongst several hundreds examined, not one male could be found; but I noticed a ray, not unfrequently taken with the thornback, that was in every other respect similar, except that the wings were generally not so rough, and sometimes quite smooth about the middle. A variety also of this fish had an oblong dusky spot surrounded with white, in the middle of each wing. The teeth of these fishes were not above half the size of those of the female thornback, and except a few of the outer series on the lips were sharp pointed. For a long time I was puzzled to discover to what species of Raia these belonged, till, after an examination of a great number, I began to be as much surprised at not finding a female amongst such a quantity of these, as I was at not finding a male amongst those with blunt teeth. These circumstances naturally induced me to conclude, that the sexes of *clavata* had not been accurately defined, and that the leading character of blunt teeth might have been drawn from the female only. The fishermen had not noticed the distinction of the teeth in these fishes, and had considered all of them to be thornbacks. After much attention to the subject, and after having offered a premium for a male thornback with blunt teeth, an intelligent fisherman assured me, he had examined a vast number since I pointed out the distinction of the teeth, and that he could not find one instance of a male with blunt teeth, nor a female with sharp teeth. It may therefore be fairly inferred, that the sexes of the thornback actually differ in this particular, and that the male has probably been described as a different species, but under what title it is difficult to ascertain, unless it be Raja fullonica of some authors."

The male organs of the sharks and rays are such as we have now described; but few accurate observations have been made on the male organs of those ovoviviparous fishes, which belong to the branchiostegous and osseous tribes, such as the syngnathus, blennius, and muræna.

In the *females* of the sharks and rays, the ovaria, two in number, are situated at the sides of the spine, and contain ova of different sizes. From each of these proceeds an oviduct, the anterior extremities of which are united to the diaphragm and spine. Internally, these ducts are covered with glandular papillæ, and pass through a large glandular body. After passing this body, they dilate into a large sac, which is the uterus.

When the ova pass into the oviduct, they are carried to this glandular body, which is supposed to secrete the glaire or albuminous part, and afterwards conveyed to the uterus, where they receive the shell. At what period the egg becomes impregnated, or in what manner the operation is performed, are questions to which no satisfactory answers can be returned.

The eggs are of a quadrangular form, with processes at the four corners. By some they are called sea-mice, but by our fishermen they are known by the name of *skate* or *shark purses*. The shell has a horny consistence, and may often be observed, at certain seasons, among the rejectamenta of the sea.

When the young fish have been perfected in the uterus, where they derive their nourishment exclusively from the egg, and not from the mother, they are ejected through the openings of each uterus, at the sides of the cloaca; and, upon escaping from the shell, enjoy immediately an independent existence, and begin to search after new nourishment.

3. *Oviparous fishes which are hermaphrodite.* Instances of hermaphroditism among fishes were for a long period considered rare, and always as accidental. Baster detected such an arrangement in the whiting, and Duhamel observed the same in the carp. But it was reserved for that able anatomist, Sir Everard Home, to point out a particular tribe of fishes, in which the organs of both sexes are always present in the same individual.

Having been unsuccessful in obtaining any male lampreys, although he got what were considered as females in abundance, Sir Everard began to suspect that the individuals of the species were hermaphrodites, and his observation on these fish at different periods justified his conjectures.

"I found, (says he, *Phil. Trans.* A. D. 1815, Part II. p. 266), upon examination, that the two glandular bodies projecting into the belly, one on each side of the ovarium, which have always been supposed to be the kidneys, varied very much in size and appearance at the beginning and end of the season. When the ova are so small that the animal is reputed to be a male, these glandular bodies, and the black substance upon which they lie, appear to form one mass, and the duct upon the anterior part is thin and almost transparent, containing a fluid equally so; but in the end of May, when the ova increase in size, these glandular bodies become larger, more turgid, and have a distinct line of separation between them and the black substance behind; their structure is more developed, being evidently composed of tubuli running in a transverse direction, and the ducts leading from them are thicker in their coats, and larger in size.

"On the 5th of June, the ova were found to be of the full size; and a small transparent speck, not before to be observed, was seen in each; at this time the tubular structure had an increased breadth, and the duct going from it contained a ropy fluid, which, when examined in the field of the microscope, was found to be composed of small globules in a transparent fluid. On the 9th of June, neither the ova nor the tubular structure had undergone any change. On the 11th of June, the ova were of the same size, but the slightest force detached them from the ovarium; the tubular structure had increased still more in size, the fluid in the ducts was thicker, more ropy, and when water was added to it in the field of the microscope, it coagulated, and what was before made up of globules had now the appearance of flakes. The ova do not pass out at an excretory duct, as in fishes, but drop from the cells in the ovarium in which they were formed into the cavity of the abdomen, and escape by two small apertures at the lower part of that cavity, into a tube common to them and to the semen in which they are impregnated." In the lampern or pride, and in the gastrobranchus cœcus, a similar structure is observable."

Although these observations leave little room to doubt that the animals in question are hermaphrodites, still it remains to be determined at what precise period, or in what position, the eggs are impregnated.

Although the sexual organs of fishes had been long known, it was not until the middle of the 18th century that any experiments were performed to ascertain the effect of their abstraction. Tully appears to have been the first person who performed the operation, and an account of his experiments has been published in the *Gent. Mag.* vol. xxv. p. 416. and in *Phil. Trans.* vol. xlviii. When the abdomen of the fish is laid open, and the milt or roe carefully separated, and the wound sewed up again, the fish appears to experience but little pain, and the wound heals in a few weeks. These experiments have frequently been performed on the carp, and they are attended with little risk. The fish grows to a larger size, and its flesh is said to have a more delicate flavour. But castration has never come into general use among the proprietors of fish ponds, being seldom performed but from motives of curiosity or science.

We have already stated, that the impregnation of the egg takes place without the body of the female, and the experiments which have been conducted to establish this point have likewise made us acquainted with the existence of *hybrid fishes*. Even in a common fish-pond, where carp and trout are permitted to live in company, the carp sometimes impregnates the eggs of the trout, or the trout those of the carp. The limits, however, within which this irregularity is confined, have never been investigated with care.

Fishes exhibit very remarkable differences in regard to the *number of eggs* which they produce. The rays and sharks seem to prepare but a very limited number. Rondeletius states the number in the Squalus acanthias at six; other observers have found in other species 26, and even 30. But the number of eggs in other kinds of oviparous fish exceeds almost our powers of reckoning. The following table (*Phil. Trans.* 1767,) may convey to the general reader some idea of their prolific powers.

Fish.	Weight.		Weight of spawn.	Number of eggs.	Season.
	Oz.	Dr.	Grains.		
Carp	25	5	2571	203109	April 4.
Cod-fish . . .	0	0	12540	3686760	Dec 23.
Flounder . . .	24	4	2200	1357400	March 14.
Herring . . .	5	10	480	36960	October 25.
Mackrel . . .	18	0	1223½	546681	June 18.
Perch	8	9	765½	28323	April 5.
Pike	56	4	5100½	49304	——25.
Roach	10	6½	361	81586	May 2.
Smelt	2	0	149½	38278	March 21.
Sole	14	8	542½	100362	June 13.
Tench	40	0	—	583252	May 28.

It appears evident, from this table, that there is no regular proportion between the weight of the fish and the weight or number of eggs produced. Nor is there any estimated proportion between the number of eggs deposited, and the number of fish which arrive at maturity. The eggs are eagerly sought after by other fishes, by aquatic birds, and reptiles. In the young state, they are pursued even by their own species, as well as by beings belonging to other classes. But for the numbers of eggs thus produced, the very race of fishes would soon be extinguished by enemies while young; and we may add, that the diminution of the number of eggs would cut off a large supply of food, and destroy that dependence which we observe in the polity of nature, of the different races of animals on one another.

The season in which fish deposit their eggs varies according to the species, and even the habit of the individual. It is well known that among salmon, even in the same river, a difference of some months is observable, and we believe that the same remark is applicable to all other kinds of fish. In general, before spawning, fish forsake the deep water, and approach the shore, that the roe being placed in shallow water, the influence of the solar rays may vivify it. At that season, some fish forsake the salt water, and ascend rivers, and after spawning retreat again to the ocean.

The eggs of various species of fish belonging to the oviparous order, with distinct sexes, are used as articles of food. Where circumstances permit, they are consumed while in a recent state. In other situations they are salted, and form the well known article of trade *caviar*.

The characters which the organs of reproduction furnish in the discrimation of species have been hitherto too much neglected. Connected as they are with the existence of the animal, and exercising a powerful controul over its habits, they ought to be examined with care, and their appearances recorded in detail.

SECT. XII. *Organs of Electricity.*

FROM the remotest periods, the benumbing powers of the torpedo have been the subject of popular admiration. In the days of Aristotle and Pliny, some of its curious properties were ascertained; but it was not until the year 1772, that any accurate observations were made on the animal, conducted on scientific principles

The resemblance between the sensation produced by the torpedo, and that occasioned by the discharge of a jar charged with electricity, was first pointed out by John Walsh, Esq. who determined, at the same time, many of the phenomena which accompany this action of the animal. Nearly about the same time, and in consequence of examples furnished by Walsh, Mr Hunter dissected this animal with care, observed the appearances of its electrical organs, and pointed out their relation to one another. Previous to these observations of Walsh and Hunter, Borrelli, Lorenzini, and Reaumur, had each of them examined the fish, and arrived at some accurate general conclusions. Since that time the subject has attracted the attention of other investigators, and may now be considered as having received more ample illustration than any other branch of the physiology of fishes.

The structure of the electrical organs of the torpedo, and the other fishes which possess them, has been already fully explained under the article ELECTRICITY, to which we refer our readers. Since the publication of that article, Mr Tod (*Phil. Trans.* 1816, Part I. p. 120.) has investigated the influence of the nerves in the production of the electricity which these organs exhibit, and added some new facts to those which had been given to the public by preceding writers. He observes that the columns, when separate and uninfluenced by external pressure, appear to be of the form of cylinders, as is shown as nearly as possible by suspending them by one of their extremities. The different forms which they exhibit in a horizontal section of the whole organ are produced by their unequal attachment to one another, by the intermediate reticulate substance. He adds, that the electrical organs are so placed within the curvature of the semilunar cartilages of the large lateral fins, as to be entirely under the influence of the muscles which are inserted into these organs.

In order to ascertain the share which the nerves have in producing the phenomena, he made an incision on each side of the cranium and gills of a lively torpedo, and pushed aside the electrical organs so as to expose and divide their nerves. The animal was then placed in a bucket of sea water. On examining it in about two hours afterwards, he found it impossible to elicit shocks from it by any irritation; but it seemed to possess as much activity and liveliness as before, and lived as long as those animals from which shocks had not been received, and which had not undergone this change. Two of these animals being procured, the nerves of the electrical organs of one of them were divided after the manner above described. They were placed each in separate buckets of sea water, and allowed to remain undisturbed. This was performed in the morning, and when examined in the evening, it was impossible to distinguish between the liveliness or activity of either. Of other two of these animals, the nerves of the electrical organs of one of them were divided. Being placed each in separate buckets of sea water, they were both irritated as nearly alike as possible. From the perfect animal, shocks were received; after frequent repetition, it became weak and incapable of discharging the shock, and soon died. The last shocks were not perceptible above the second joint of the thumb, and so weak as to require much attention to observe them. From the other, no shocks could be received; it appeared as vivacious as before, and lived until the second day. This experiment was frequently repeated with nearly the same results. The nerves of one electric organ only being divided in a lively torpedo, from which shocks had been previously received, on irritating the animal, it was still found capable of communicating the shock. Whether there was any difference in the degree of intensity could not be distinctly observed. One electrical organ being altogether removed, the animal still continued capable of discharging the electric shock, and the same circumstance took place when only one of the nerves of each electrical organ was divided. When a wire was introduced through the cranium of a torpedo, which had been communicating shocks very freely, all motion immediately ceased, and no irritation could excite the electrical shock.

The shock is communicated through the same conductors as common electricity, and intercepted by the same nonconductors. The sensation may be communicated to several persons at the same instant; and it is of no consequence whether the animal be insulated or not. The shock, however, is much stronger in air than in water; in summer than in winter; when the animal is in vigour, than when in an exhausted state. The shocks generally follow simple contact or irritation; but, in some instances, when caught by the hand, no shock is discharged until muscular energy has been exerted in vain to extricate itself.

This electrical discharge is in general accompanied by an evident muscular action. There appears a swelling of the superior surface of the electrical organs, particularly towards the anterior part opposite to the cranium. The eyes also appear at the time somewhat retracted. If this action of the fish be too much excited, the animal becomes debilitated, and soon expires.

Spallanzani, while prosecuting his experiments on this subject, ascertained, that the young fish as well as the old possessed this power; and, what appears still more surprizing, even those still in the egg in the uterus were able to communicate a sensible shock.

Besides the torpedo, there are other fish which possess the same apparatus, and exhibit the same singular phenomena. One of these, the *gymnotus electricus*, has been carefully examined by Hunter; and the result of his observations, communicated in the 65th volume of the *Phil. Trans.* A third fish, the Silurus electricus, possesses the same property; and probably many more with which we are as yet unacquainted; although to this list there can only be added at present the *Trichiurus Indicus* and *Tetraodon electricus*.

The use of this singular faculty has often been pointed out both by ancient and modern naturalists. As an instrument of defence, the exercise of such a power will protect the fish from many of its foes; and when used in the offensive, it will be equally formidable. Such animals may be able to benumb their smaller and defenceless prey, and employ their electrical energies in procuring food.

The characters furnished by the organs of electricity were for a long time overlooked, and were not even permitted to constitute a generic distinction. The torpedo was long classed with the rays; and in many systems fishes with electrical organs, and such as are destitute of them, still belong to the same genus.

CHAP. III.

CONDITION OF FISHES.

The subjects which we propose to discuss in this Chapter are rather of a miscellaneous nature, and embrace a variety of circumstances connected with the natural and economical history of fishes. We shall divide the whole into eight sections, and in these treat of the distribution, migrations, education, naturalization, dietetical uses, and diseases of fish; and conclude with some observations on the geological data which they furnish, and the various methods which have been employed to preserve them in a museum.

SECT. I. *Distribution of Fishes.*

We have already stated, that fishes naturally reside in the water; but as this element is found to differ in its constitution and temperature according to its situation, we may expect to find the finny tribes that dwell in it influenced by these circumstances. At a very early period, the diversity in the distribution of fishes attracted the attention of observers. Rondeletius at last attempted a division of this class of animals, from the different situations in which they are found, into marine, fluviatile, lake, and pond fish. It will be more suitable to our present purpose, to consider them as inhabitants of the sea or of fresh water.

The salt-water fishes are much more numerous than those which reside in fresh water. They cannot be distinguished from fresh water fishes by any peculiarity of structure, or external form. They are always found in the greatest numbers in tideways, and on those banks which are formed at the junction of opposite currents. They in general resort to a certain kind of bottom, in which we may suppose they find a plentiful supply of food. Some are always found near rocky shores, while others prefer the sandy bays. Some are found only in the open ocean, and are termed *pelagic;* others keep within a short distance of the coast, and are termed *littoral.* M. Risso, in the introduction to his *Ichthyologie de Nice*, (8vo. Paris 1810, p. xiv.) has the following interesting notices respecting the distribution of the fishes of the Mediterranean, which we shall give in his own words. "Ces grandes profondeurs sont hérissées de rochers, et ne sont fréquentées que par les *Squales*, les *Balistes*, les *Chimères*, les *Ziphias*, les *Gades*, les *Caranx*, les *Centronotes*, les *Lepidolèptres*, les *Trigles*, les *Centropomes*, les *Holocentres*, les *Bodians*, les *Tetragonures*, les *Pomatomes*. A cent mètres de profondeur, en avançant vers la terre, le fond de la mer est recouvert de fange et de limon, sejour impur de *Raies*, des *Lophies*, des *Cepoles*, des *Zees*, des *Pleuronectes*, des *Oligopodes*, enfin de tous les poissons à chair molle et baveuse. En continuant de s'élever à cent cinquante mètres de profondeur, a peu pres, la végétation se manifeste: les algues, les caulinies, les ulves, les conferves, les varecs, et les zoophytes qui tapissent ce séjour, y appellent les *Ophidies*, les *Stromatées*, les *Murènes*, les *Uranoscopes*, les *Vives*, les *Scorpenès*, les *Peristedions*, les *La-*

bres, les *Spares*, les *Lutjans*, les *Esoces*, les *Murénophis*, &c. Viennent ensuite les rochers du rivage, où les *Syngnathes*, les *Centresques*, les *Blennies*, les *Batrachoides*, les *Gobies*, les *Notoptères* ſont leur demeure accoutumée. Enfin les belles plaines de galets et de sable ou se nourrissent les *Lépadogastères*, les *Ammodytes*, les *Callionymes*, les *Lepidopes*, les *Gymnetras*, les *Osmères*, les *Scombrésoces*, les *Argentines*, les *Atherines*, les *Stolephores*, les *Mugil*, les *Clupées*, et les *Serpes*."

These different depths at which fishes reside in the sea may be regulated by the presence of suitable food in those places. When fishes live at a great depth, the air bag secretes more oxygen than when residing near the surface; but this is a circumstance over which the fish perhaps can exercise controul; and although the pressure upon the body must increase with the depth in the water, we are ignorant of the effect produced on the sensations of the animal by the change. Even many pelagic fish become littoral during the breeding season, and the littoral fish retreat to the deep on the approach of a storm.

The fresh-water fishes are not so important, in an economical point of view, as those which inhabit the ocean. Some species frequent rivers, and seem to require, for the preservation of their health, a continued current of water. Others live in lakes, and seem contented to spend their days where the water is still. Like salt-water fishes, they appear to prefer particular altitudes; and in ascending mountains, we may observe that the fish in the lakes and rivers have their boundaries, as well as the vegetables which cover their surface. Thus Wahlenberg found, that the pike and perch disappeared from the rivers of the Lapland Alps along with the spruce fir, and when 3200 feet below the line of perpetual snow. Ascending 200 feet higher, the gwiniad and the grayling, are no longer to be found in the lakes. Higher up still, or about 2000 feet below the line of perpetual snow, the char disappears; and beyond this boundary all fishing ceases.

When a salt water fish is put into fresh water, its motions speedily become irregular, its respiration appears to be affected, and unless released it soon dies. The same consequences follow, when a fresh water fish is suddenly immersed in salt water. In what manner they are influenced by the change has never been satisfactorily determined.

There are not a few fish which may be said to be *amphibious*, or capable of living either in fresh or salt water at pleasure. Such fish, in an economical point of view, are extremely valuable, as they furnish to the inhabitants of this and other countries an immense supply of food. The salmon may be given as an instance in this country, where, from one river, (Tay) 50,000 head of full sized fish have been obtained. To the Greenlanders, their Angmarsæt, or Salmo arcticus, is perhaps more valuable, as it is formed into bread, as well as consumed in a fresh or salted state.

All these fishes seem to reside chiefly in the sea. There they grow and fatten; but when the time of spawning approaches, they forsake the salt water, and return to rivers and lakes. But this desertion of the ocean is only temporary, and regulated by the circumstancees connected with reproduction. The instant the spawning is finished, they repair with equal rapidity to the ocean, to repair their exhausted strength, and fit them for obeying again the laws of their existence. Some of these fishes appear to be capable of living exclusively in fresh water, when confined in a lake or river. We are informed in the statistical account of the parish of Lismore, when speaking of the fresh water lakes of that island, (*Stat. Acc.* vol. i. p. 485.) "That about 50 or 60 years ago, there were some sea trouts carried to these lakes, the breed of which preserve their distinction perfectly clear to this day. They retain their shining silver scales, though they have no communication with the sea; their flesh is as red as any salmon, and their taste is totally different from that of the yellow trouts."

The circumstance of some fish being capable of living either in fresh or salt water has suggested the idea of attempting to modify the constitution of salt water fishes, so as to enable them to subsist in fresh water. If the change is attempted to be produced in young fish by degrees, and with caution, the experiment may prove successful, especially with those fish that reside chiefly near the sea shore. But in the case of fishes which live in deep water, a change not only in the respiratory organs must be produced, but likewise in those of digestion, as they must subsist on a new kind of food. We regard such experiments as curious, but can scarcely bring ourselves to believe that they will be productive of an advantage to society. In attempting to improve our fisheries, we should prefer the prudent advice of Virgil to the dreams of the theorist—*et quid quæque ferat regio, et quid quæque recuset.*

We possess but few accurate observations on the distribution of fishes, with respect to *temperature*. Living in an element subject to little variation from the change of the seasons, fishes, like sea-weeds, have an extensive range of latitude as well as longitude through which they roam. But they appear to abound in the greatest variety of species in the equatorial regions, and to diminish in numbers with regard to species as we approach the poles. In this country we may observe a certain arrangement of some of the species with respect to latitude. Thus the fresh water fishes of England are much more numerous than those in Scotland. In the sea, at the south of England, the pilchard is found in abundance, while it is rare in Scotland. In the seas in the north of Scotland, the tusk (*Gadus brosme*) abounds; in the south of Scotland it is very rare, and in England it is unknown.

While some fishes living in the northern seas, or in alpine lakes, seem to prefer cold water, there are fish which appear to dwell even in the waters of tepid springs. La Cepède informs us that Desfontaines found the *Sparus Desfontaines* in the warm waters of the two fountains which supply the town of Cassa in the kingdom of Tunis. The waters raised Reaumur's thermometer 30° above the freezing point, or about 100° of Fahrenheit. The waters contained no mineral impregnations, and, when cooled, were used by the inhabitants.

SECT. II. *Migration of Fishes.*

THOSE fishes which enter rivers for the purpose of spawning perform their migrations annually, but do not appear at any very precise period. Their motions appear to be regulated by the condition of their generative organs, and these are in their turn controuled by the temperature of the water in which the fishes remain, or the supply of food. In rivers, where salmon spawn, it is observed that these fish continue entering the river for the space of seven or eight months. Those marine fishes, such as the herring, pilchard, and many others, which leave the deep water, and approach the shores for the purposes of spawning, are equally irregular with respect to their periods of appearing and disappearing.

Besides these movements, which depend on the generative impulse, many marine fishes appear to migrate from one shore to another, influenced by laws which have never been satisfactorily explained. Thus haddocks have been known to visit a coast for many years in succession, and then suddenly to disappear, and at the same time all those predaceous fish which fed upon them. Perhaps these movements may depend upon the supply of food, and be regulated by circumstances over which we can exercise no controul. Accurate observations, however, would probably ascertain the limits of these migrations, and enable us to derive advantage from motions which at present we regard as calamitous.

In the summer season, all the fresh water fish are active and lively; but during the winter, many species bury themselves in the mud, and, in a state of quiescence similar to natural sleep, outlive the vicissitudes of that variable season. While active they require a copious supply of food; but in this state of hybernation they continue fasting, and without inconvenience.

Sect. III. *Education of Fishes.*

The element in which fishes reside removes them so far from our influence and observation, that it is difficult to estimate the amount, or the qualities of the immaterial principle which they possess. We witness them fly from danger, obey the impulse of appetite, and provide a suitable place for the eggs of their future offspring. These, however, are in general regarded as the lowest marks of mind, or as mere blind instinctive motions.

Fishes, we have seen, possess in a greater or less degree of perfection all those external senses, by means of which the other animals acquire a knowledge of external objects. Hence we we find that they speedily become acquainted with the hand that feeds them, and know the face of a stranger. They may be taught to come to the edge of a pond when called by their usual name, or to assemble at the sound of a bell. Baster even informs us of a trout, which had been kept fourteen years and seven months, which would come and repose on the hand of its master while he removed the water of the vessel in which it was kept.

That they possess some powers of deliberation, appears evident from the artifices which they employ to escape from the nets in which they have been inclosed, or from the hook which they have incautiously swallowed. Salmon have been known to lie close on the ground in some hollow place, to permit the net to pass over them, or by a sudden spring to leap out of the net. The fishing frog, or angler, as it is also called (*Lophius piscatorius*,) has two long tentacula on the head, resembling in appearance small worms. Having buried its body in the sand, leaving only these tentacula exposed, it moves them backwards and forwards, until the eye of some young fish is attracted by the deceitful appearance, and falls a prey to its lurking foe.

With regard to their social instincts, fishes present very remarkable differences. Some are gregarious at all seasons, while others are solitary, unless during the breeding season. The sexual union is merely temporary, and no feelings of affection subsist between the parent and the offspring. Indeed the life of a fish is one continued scene of suspicion and fear, no leisure being left for the improvement of its faculties. Hence we are disposed to rank fish as the lowest link of the chain of vertebral animals,—to regard the powers of their immaterial principle as controlled by the dangers to which they are exposed; and as almost exclusively occupied in supplying the wants which are connected with the first laws of existence.

Sect. IV. *Naturalization of Fishes.*

In tracing the history of those attempts which have been made to subject this portion of the creation to our controul, we trace at the same time the progress of civilization and luxury. In Egypt, they had their sluices and their fish ponds in the days of Isaiah, (chap. xix. 10.) and from this early seat of the arts and sciences the Romans probably acquired the knowledge of rearing and feeding fish. During the more prosperous days of that refined people, almost every wealthy citizen had his fish ponds. In modern times, the Chinese bestow more attention on the cultivation of fish than perhaps any other nation. And in Europe, the importance of the subject has been duly appreciated by the Swedes, Prussians, and Germans. In the latter countries, a considerable part of the revenue from property is derived from the carp ponds.

In general, the rearing of fresh water fish in artificial ponds has hitherto been chiefly attempted, few trials having been made to rear the salt water fish in confinement. In the construction of a pond for fresh water fish, care should be taken to have a regular supply of water, free from mineral impregnations, to cover the deepest parts of the pond at least six feet. The more extensive the shallow ground at the sides is, especially if it be covered with marsh plants, so much more abundant is the supply of those minute animals, on which many fish chiefly subsist. Care should likewise be taken to introduce those small fish, which, by multiplying, may furnish a constant supply of food.

When fish ponds are formed, it is in general the wish of the proprietor to have a certain number of his stock in good condition, that he may have a regular supply for his table. For the accomplishment of this object, there is usually one pond set apart for the purpose, into which are introduced those full grown fish which he wishes to feed. During the winter season little food is required, but along with the heat of spring fishes acquire a keen appetite, and at that period a constant supply of food should be given them. They should be fed morning and evening at a stated time, and always at the same place in the pond. The food should consist of any kind of corn, boiled or steeped in water for some time until it swells. Malt is esteemed a very fattening food, and the crumbs of bread steeped in ale; but peas are considered as little inferior to either. Pikes must have an abundant supply of eels, otherwise they require a long time to fatten. Some recommend the laying of dead carrion upon stakes in the middle of the water, that it may breed maggots, which, falling into the water, furnish an abundant supply of very acceptable food.

In the construction and management of fish ponds, there are many circumstances of a local nature which it is impossible to specify. The methods employed to stock these ponds are at present more deserving of our attention. The first, and certainly the most obvious method, is to obtain living fish from similar situations. In catching these, the utmost care should be taken not to bruise them, or to rub off their scales, and to keep them as short a time out of the water as possible. The vessels in which they are to be carried should be full of water, as when the barrel is not entirely full, the fish are liable to be driven by the currents against the lid or sides. The transportation should take place only in cold weather, and in the winter season, (as fishes can bear cold better than heat,) and should be performed with as much expedition as circumstances will permit.

The second method of stocking fish ponds is in some respects preferable to the preceding, especially when the waters are at a distance from which the supply is to be obtained. This consists in ascertaining those places in which the spawn of the wished for species is deposited, and conveying the impregnated eggs to a similar situation in the new ponds. In this manner a vast number of individuals may be obtained at once, and with great certainty of success, provided they are supplied during the journey with fresh water, and but little agitated. The impregnated eggs may be known by a small aperture, which may be detected on one side by means of a good microscope, and which is scarcely perceptible previous to impregnation. By means of this method, however, a much longer period must elapse ere fish are obtained for the table than by the former, although this objection is in a great measure obviated, by obtaining from the eggs a race of fish with constitutions accommodated to your waters.

The last method, which has been rather absurdly termed *artificial fecundation*, we owe to the ingenuity of M. Jacobi, (*Mem. de l'Acad. de Berlin.* 1764, p. 55.) It is founded on a knowledge of the mode of reproduction in oviparous fishes, and in its turn serves to illustrate the function of generation in fishes. In those places where the fish are easily procured, a female is obtained, whose roe is nearly ready for exclusion, and having prepared a proper box with water, the fish is held by the head, with its tail downwards, and gently squeezed on the belly. The eggs which are perfect readily run out into the vessel. A male fish is next obtained, and being held in a similar situation, the milt is poured upon the eggs. The eggs thus impregnated are conveyed to a proper situation, as in the second method, and protected from those enemies which we have already enumerated.

The advantages which result from the translation and feeding of fishes have been felt and appreciated in other countries, but in our kingdom they have been in a great measure overlooked. In Scotland and Ireland, and we may likewise include England, there are multitudes of ponds and lakes, which are at present mere useless wastes, but which, if properly stocked with fish, would greatly contribute to the prosperity of the country, by furnishing an additional supply of food. To our forefathers we owe the introduction of two useful species of fish into the country, namely, the *carp*, which was translated (probably from France or Spain) into England about the year 1496, and the *pike*, which was naturalized about the beginning of the fifteenth century. The gold and silver fishes of China have likewise been naturalized in England, as objects of beauty. We wish this catalogue had been more extensive; we fondly hope that it will soon increase.

The formation of ponds for salt water fish has often been the subject of speculation, but in few instances has it ever been reduced to practice. Indeed the motives for constructing such a pond must originate chiefly in curiosity, as those who are situated on a sea-coast, where such ponds can only be constructed, have access to that great storehouse of life, and may at all seasons derive from it an inexhaustible supply. Besides, there are few situations favourable for the construction of such a pond, and, even where most favourable, an expensive barrier must be constructed to separate it from the sea. Some ponds of this kind have been constructed in Scotland. These are well described in the Scots Mazagine for June 1816, p. 412.

" A good many years ago, a small fish pond, into which sea-water could be easily introduced, was constructed by an enterprising individual at Peterhead, in Aberdeenshire, (Mr Arbuthnot). A few sea fish were occasionally kept in it; but it soon fell into disuse, and it has of late been neglected. This however was, as far as we know, the first attempt of the kind in this country.

Since that time two sea-fish ponds, of greater dimensions, have been formed by private gentlemen in Scotland, for the conveniency of supplying their families. One of these is at Valleyfield, the seat of Sir Robert Preston, Bart. on the shore of the Frith of Forth; the other is situated in Wigton-shire, in an inlet called Portnessock, on the peninsular ridge of country called the Rins of Galloway, nine or ten miles south from Portpatrick, and is the property of Mr Macdowall of Logan.

At the spot where it is formed, there had originally been a small natural basin, communicating with the sea by means of a narrow sinuous fissure, or perhaps an empty vein in the rock. This basin has been enlarged and deepened, by working away the solid rock, which is grey wacke slate. At flood-tide, the water covers, to the depth of two or three feet, a ledge or walk which passes round an interior or deeper pond, and, at this time allows tolerably ample space for the rapid motions of the fish.

The pond is replenished with fishes by the keeper, whose house is hard by. In easy weather, this man rows out in his fishing coble, to the mouth of Logan Bay, in which the inlet of Portnessock is situated. For catching the fish, he uses the common hand line, and the usual baits. He is provided with a wide tub, into which he puts a convenient quantity of sea water: to this tub he immediately commits such part of his capture as happen to be a little hurt by the hook. He finds it necessary, during summer, to cover the tub with a cloth; and in sultry weather he experiences difficulty in keeping the fishes alive in the tub till he reach the shore. This, it seems evident, cannot be ascribed either to mere heat, or to the exhausting of the air contained in the water, by the respiration of the fishes. In all probability, it depends on the influence of the electric fluid of the atmosphere. De La Cepede, in his essay on the culture of fresh-water fishes, particularly mentions the powerful effect of this fluid on them, when confined in small portions of water, in the course of their transference from one place to another.

As might naturally be supposed, the fisherman prefers for the pond young fish, or at most those of middle size to those of large growth. In selecting cod-fish, for example, he rejects all that exceed 6lb. giving the preference to what he styles *lumps*, or young cod-fish, weighing 4 lb. or 5 lb. In the pond, the fish are not only preserved alive till wanted for use, but, being regularly fed, are found to be fattened. They are taken for use, however, merely by the line and hook; and it is probable, that the fish in best condition will not always be the first to catch at the bait.

The fishes we observed in the pond were the following:

1. Cod (*Gadus morhua*). They were lively, and caught greedily at shell-fish, which we threw into the pond. They kept chiefly, however, in the deep water, and, after approaching with a circular sweep, and making a snatch at the prey, descended out of sight to devour it. It has often been doubted, whether the red ware codling of Scotland was the young merely of the common cod, or a distinct species, *Gadus callarias*. Here one would think the question might easily be decided. Upon describing this red ware codling, we were assured that it occurs on the coast of Galloway, and that it had sometimes been caught and placed in the pond; but that, after a year, it became as large and as pale in colour as a common grey cod. This accords with our own observations, made in less favourable circumstances.

2. Hadock (*G. æglefinus*). These, contrary to expectations, we found to be the tamest fishes in the pond. At ebb tide, they come to the inner margin, and eat limpets from the hand of a little boy, the son of the keeper. They appeared white, and rather sickly. One was diseased about the eyes.

3. Coalfish (*G. carbonarius*). Some of these were of a large size, exceeding in dimensions the largest cod in the pond. No fish has received so many different names as the

coalfish. When young, it is called at Edinburgh, podley; in the northern islands, sillock; in Galloway, blochan. When a year old, it is styled cooth, or piltock, in the north; and glasson in the south-west of Scotland. When full grown, it is named sethe in the north; and stenlock in the south-west. Accordingly we were now told, that "these stenlocks were mere blochans when they were put in." They were become of a fine dark purple colour. They were bold and familiar, floating about slowly and majestically, till some food was thrown to them: this they seized voraciously, whether it consisted of shell-fish, or ship biscuit. We were informed, that they too occasionally approach the margin, and take their food from the keeper's hand.

4. Whiting (*G. merlangus*). These were scarce in the pond, and very shy.

5. Pollack (*G. pollachius*). This was pretty common, and has been found to answer very well as a pond fish. It is generally called layde or lythe.

Besides these five species of gadus, we were told that the ling (*G. molva*) had occasionally been kept in the pond.

6. Salmon (*Salmo salar*). This was the wildest and the quickest in its motions of all the inhabitants. When a mussel or limpet, freed from the shell, was thrown on the surface of the water, the salmon very often darted forward and took the prey from all competitors, disappearing with a sudden jerk and turn of the body. I suspected this to be the salmon-trout (*S. trutta*); but was assured that it was the real salmon, which is occasionally taken in the bay.

7. Flat-fish, or flounders, of two sorts, were also in the pond; but they naturally kept at the bottom, and we did not see them. From the description given by the people, we concluded that they were dab and young plaise.

The food given to the fishes consists chiefly of sand-eels and of shell-fish, particularly limpets and mussels. In the herring-fishery season, they cut herrings in pieces for this purpose.

It is remarkable, that all the kinds of sea-fish above enumerated seem to agree very well together.. No fighting had ever been observed by the keeper, and seldom any chasing of one species by another.

None of the fish have ever bred; indeed, no opportunity of breeding is afforded to them. A warm and shallow retreat, laid with sand and gravel, would have to be prepared for some species; and large stones, with sea-weed growing on them, would have to be transferred to the pond, and placed so as to be constantly immersed in the water for the use of others. The dimensions of the present pond, however, are too circumscribed to admit of its being used as a breeding place. An addition for this purpose might, without much difficulty, be formed, and here some curious observations might be made. The spawn of various sea-fishes is frequently accidentally dredged up by fishermen, and could therefore no doubt be procured by using a dredge: its degree of transparancy indicates whether it will prove prolific. This might be placed in a protected corner of the breeding pond, and its progress watched. On this branch of the natural history of sea fishes little is known."

Sect. V. *Dietetical Uses.*

Fish, considered as an article of food, is regarded as light, and easily digested, and therefore well suited for the young, the weak, and the sedentary. But for the same reason it is unsuitable food for those engaged in laborious occupations. Among the Romans, he who fed on fish was regarded as effeminate. It has often been considered, though perhaps without cause, as promoting the fertility of the human species; and the immense population of China has been ascribed to the abundant use of this kind of nourishment. Its tendency to encourage diseases of the skin appear to be universally acknowledged, and is indeed very evident in the remote islands of this country, of Faroe, of Iceland, and of Norway, where fish forms so great a proportion of the food of the inhabitants.

Previous to using fish as food, they have frequently to undergo some sort of preparation, varying according to the situation, the necessities, or the taste of the consumers. Where circumstances permit, they are in general used in a *fresh* state; and even in large cities, where the supply must be brought from a distance, various expedients are resorted to, to prevent the progress of putrefaction. By far the best contrivance for this purpose is the well-boat, in which fish may be brought to the place of sale even in a living state. Placing the fish in boxes, and packing them with ice, is another method, and has been extensively employed, particularly in the supply of the capital with salmon.

In many maritime districts, where fish can be got in abundance, a species of refinement in taste, at least a departure from the simplicity of nature, prevails, to gratify which, the fish are kept for some days, until they begin to putrefy. When used in this state, they are far from being disagreeable, unless to the organs of smell. Such fish are termed by the Zetlanders *blawn-fish.*

Where fish are to be found only at certain seasons of the year, various methods have been devised in order to preserve them during the periods of scarcity. The simplest of these processes is to *dry* them in the sun. They are then used either raw or boiled, and not unfrequently in some of the poorer districts of the north of Europe, they are ground into powder, to be afterwards formed into bread.

But by far the most successful method of preserving fish, and the one in daily use, is by means of salt. For this purpose they are packed with salt in barrels, as soon after being taken as possible. When boiling them for the table, if the water be repeatedly changed, a great portion of the salt will be abstracted, and the fish rendered more palatable. In this manner are preserved herrings, pilchards, cod, salmon, and many other kinds of esculent fish.

In many instances, after the fish have been salted in vessels constructed for the purpose, they are exposed to the air, on a gravelly beach, or in a house, and dried. Cod, ling, and tusk, so prepared, are termed in Scotland *salt-fish.* Salmon in this state is called *kipper*, and haddocks are called by the name of the place where they have been cured.

After being steeped in salt, herrings are in many places hung up in houses made for the purpose, and dried with the smoke of wood. In this state they are sent to market, under the name of *red-herrings.*

Although salt is in general employed in the preservation of fish, whether intended to be kept moist or to be dried, vinegar in certain cases is added. This is practised in this country, at least chiefly with the salmon sent from the remote districts to the London market. It can only be employed in the preservation of those fish, to which this acid is served as a sauce.

The flesh of fish is always in the highest perfection, or *in season*, as it is called, during the period of the ripening of the milt and the roe. After the fish have deposited their spawn, the flesh becomes soft, and loses a great deal of its peculiar flavour. This is owing to the disappearance of the oil or fat from the flesh, it having been expended in the function of reproduction. When in season, the thick muscular part of the back, as it contains the smallest quantity of oil, is inferior in flavour, or richness, to the thinner parts about the belly, which are esteemed by epicures as the most savoury morsels.

There are some kinds of fishes, especially those which inhabit the shores of warmer countries, which are reputed *poisonous*. These are, the Tetraodon ocellatus, sceleratus, and lineatus, and the Sparus pagurus, and a few more. It is generally supposed, and with some probability, that the poisonous quality of these fish proceeds from the food on which they have subsisted. This conjecture is supported by the history of the mussel and the oyster, which owe their occasional noxious qualities to the zoophytes on which they feed. Perhaps the poisonous quality of these fishes might be considerably diminished, if not entirely removed, were the intestines carefully taken away, and the fish placed for a short time in salt brine.

SECT. VI. *Diseases of fishes.*

FISHES, in a domesticated state, are subject to various diseases, the cause and cure of which are not satisfactorily ascertained. Trouts, carps, and perches, are subject to various cutaneous diseases. During severe winters, when the surface of the ponds in which they are kept are frozen over, the various kind of fish seem to contract diseases, and, in such cases, great mortality often prevails. This seems to arise from want of air in the water, and can only be prevented by removing the fish to a deeper pond, through which there is a constant current. In some rigorous seasons, the extent of this mortality is most alarming, as between 1788 and 1789, in some districts of France the inhabitants lost nearly all their stock of carp, pike, and tench. *Journal de Physique*, November 1789.

In the very same year, an epidemic distemper affected even those fish which live in the sea, as the following fact, communicated by the late Mr Creech of Edinburgh, in the Appendix to the sixth volume of the *Statistical Account of Scotland*, satisfactorily proves: "On Friday, the 4th December 1789, the Ship Brothers, Captain Stewart, arrived at Leith from Archangel. The captain reported, that on the coast of Lapland and Norway he sailed many leagues through immense quantities of dead haddocks floating in the sea. He spoke several English ships, who reported the same fact."

Fishes are greatly tormented with intestinal worms. The common stickeback may be quoted as a remarkable instance. Its death is often occasioned by the increase of the *Tænia solida* of Gmelin; and it is even supposed, that the extinction of its existence by this parasite follows the function of reproduction with regularity. *Annals of Philosophy*, February 1816.

Fishes exhibit remarkable differences with respect to their *vivaciousness*. Thus some fishes expire almost the instant they are taken out of the water, as the herring, the smelt, &c. Others are capable of surviving hours and even days, when removed from their native element, as the eel, carp, and some others. It sometimes happens that vivacious fishes are conveyed to a distance by birds, and left, without being killed, on rocks or fields. This has given rise to many of the absurd stories which have been told of showers of fishes. Rondelitius observes with propriety, that those fishes whose gill-openings are but imperfectly covered expire soonest when taken from the water; and those fish whose branchia are protected by a gill-lid which shuts close, or by a narrow opening, are most vivacious. The air soon dries the fine plumes of the branchiæ, and obstructs the process of respiration and of circulation.

Few accurate observations have been made to determine the *age* of fishes. The element in which they reside is supposed to preserve them from the pernicious influence of sudden changes of temperature; the slowness of the process of ossification; the coldness of their blood; and the tardiness of all their primary movements, are considered as indicating a lengthened existence. Accordingly we find, the age of the carp has been known to reach to 200 years, and the pike to 260.

The marks by which the age of fishes may be determined, have never been pointed out in a satisfactory manner. As the age of trees may be guessed at by the number of concentric circles in the wood, so it has been supposed that the age of fishes may be ascertained by the number of concentric circles in the scales or in the vertebræ. Such analogical reasonings are hurtful to science, as they occupy the place of observation. They have done so in this instance at least.

It is seldom that a fish is permitted to die a natural death, from old age. During every period of its existence it is surrounded by foes; and when no longer able to exercise its wonted watchfulness, or exert its powers of defence, it falls an easy prey to its more powerful adversaries. In a domesticated state, previous to death, the dorsal fins lose the power of maintaining the body in a vertical position, the levity of the belly, and the extraordinary distension of the air bag, reverse the natural position, so that the back becomes undermost, and the animal floats on the surface. Similar appearances present themselves, when the waters are contaminated by noxious mineral or vegetable impregnations.

SECT. VII. *Fossil Fish.*

The investigation of those changes which have taken place in the race of fishes since the formation of the globe, is attended with peculiar difficulty. The external form, on which in general the specific distinction is founded, is destroyed by pressure. All distinct traces of the softer parts have disappeared, and the geognost is left to draw his conclusions from the form of the teeth, or the outline and structure of the skeleton. Hence the conclusions which have been drawn respecting the particular species should be received with caution. In the newer rock formations, which have been termed *local*, such as the strata at Eningen, the remains of fishes have been observed, belonging to existing races, and still natives of the neighbouring lakes. But in the rocks of those formations which are called *universal*, the skeletons of fishes which have been found, in all probability belong to species now extinct. In examining the organic remains which we consider of this sort, it would appear that the teeth of unknown sharks are more numerous than those of any other description of fish. They are found in all the floetz limestones of this country, in company with the ancient camerated shells. Vertebræ of osseous fishes are chiefly found in the strata connected with the chalk formation, seldom in those of an older date.

Before concluding this chapter, it may not be unacceptable to the reader to be presented with a few observations on the *preservation of fishes for a museum.*

The simplest method consists in dividing the fish vertically and longitudinally, taking care to preserve attached to one side the anal, dorsal and caudal fins. From this side the flesh is then to be scraped off, the bones of the head reduced in size, the base of the fins made thinner, and the specimen then stretched out on pasteboard and dried. By this means a lateral view of the fish is preserved, and if the fins and gill-flap are cautiously spread out, the specimen will furnish sufficient marks for recognizing the species. A collection of such fishes may be kept in a portfolio, similar to an herbarium.

Many species may be well preserved, by extracting the contents of the body at the mouth, or skinning the fish with the skin entire from the mouth towards the tail, in the same way as eels are prepared for cooking. Let it then be restored to its former position, fill the whole with fine sand, and having spread out the fins, let it be dried with care. Almost all wide-mouthed cylindrical or tapering fishes may be preserved in this manner. Some recommend filling the skin with plaster of Paris, while others employ cotton. Preserved fishes are usually covered with a coat of varnish, to restore in part the original lustre. But no means of this sort can retain many of the brilliant colours which the animals of this class possess; and even the form of some of the soft parts cannot be preserved. Hence fishes are in general preserved in bottles of spirits of wine. In this way, it is true, they take up much room, but they can be subjected to examination at pleasure, and all their characters satisfactorily exhibited.

CHAP. IV.

CLASSIFICATION OF FISHES.

In the last chapter, when treating of the structure and function of fishes, we endeavoured to point out the relative value of those characters which systematic ichthyologists have hitherto employed. We there gave it as our opinion, that the organs of respiration furnish characters which are obvious, permanent, and natural. By means of these characters fishes may be divided into two great classes, viz. those with *fixed* and those with *free* gills; and the inferior divisions might depend on circumstances connected with the number, position, and structure of the accessory organs. But instead of attempting, in this place, to give a new system of ichthyology, we propose to lay before our readers a condensed view of the genera, according to the system of La Cepede, the outlines of which have been already given in the historical part of this article. We propose to add occasional observations on the characters of these genera, and on the history of rare or useful species. In the account of species it is necessary to be concise, as an enumeration of all the known species of fishes, amounting to upwards of 1470, would swell the article to an inconvenient length.

SUB-CLASS I. CARTILAGINOUS FISHES.

In the fishes belonging to this sub-class, the skeleton never becomes so much indurated as to deserve the name of bone, but continues in the form of cartilage, more or less compact. As this internal character cannot be discovered without the use of the dissecting knife, its employment in the formation of the primary divisions of a systematic arrangement has been justly condemned by many naturalists, and ought to be relinquished. The genera which are included under this division exhibit great differences in the structure of their organs of respiration and reproduction.

DIVISION I.

The cartilaginous fishes of this division are destitute of a gill-lid and gill-flap. The gills are likewise fixed.

ORDER I. APODAL. *No ventral Fins.*

The structure of the animals of this very natural order has been ably investigated by Sir Everard Home, as we have already pointed out, while describing the organs of respiration and reproduction. They constitute the last link in the chain of fishes, and form the transition to the molluscous animals.

GENUS I. PETROMYZON. *Lamprey.*

Seven gill-openings on each side of the neck, and an aperture on the top of the head.

The species of this genus possess an organ of adhesion on the lips, by which they attach themselves to stones; hence the name Petromyzon, from *πετρος*, *lapis* and *μυξαω*, *sugo*. La Cepede enumerates nine species, three of which are British. They are distinguished by characters drawn from the form of the dorsal and caudal fins. All the species are vivacious, and may be kept in life for a considerable time when out of the water. The P. Planeri, found in the rivulets of Thuringia, when plunged into diluted alcohol, will survive upwards of a quarter of an hour; but it indicates, by its convulsive movements, the painful effects produced by the fluid on its organs of respiration. Some of the species are used as food, but principally for baits.

GENUS II. GASTROBRANCHUS. *Hag.*

Gill openings two in number, situated under the belly.

This genus was formed by Bloch from the Myxine glutinosa of Linnæus. This last author placed it among his Vermes intestina; and the former, upon restoring it to its proper place among fishes, bestowed upon it a new name. Only two species are known.

ORDER IV. ABDOMINAL.

This is a very natural order. The species are ovoviviparous, and are distributed by Lacepede into three genera.

GENUS III. RAIA. *Ray.*

Body depressed, five gill-openings on each side placed beneath, mouth under the snout.

This is a very extensive genus, including, according to La Cepede, thirty-six species. Some naturalists, however, are disposed to regard a few of these as hybrid animals. Several new genara have been separated from it, particularly the genus CEPHALOPTERUS, which includes those species with a divided snout, and the torpedo, the characters of which we shall shortly notice. The species have been divided into several sections, from the form of the teeth, and the spines on the body; but the observations of Montagu appear to indicate these characters, as pointing out the differences of the sexes, not as sure marks by which the species may be distinguished. His remarks on this subject we have already stated under the head of *reproduction*. Many of the animals of this genus grow to a large size. They furnish a wholesome and palatable food, and are used either when fresh, salted, or dried. The spines of some are considered by the fishermen as venomous. One species, the R. Sephen of La Cepede, furnishes, according to this author, the well known article of commerce termed shark's skin, or shagreen. This skin is covered with round hard tubercles, and, when dressed, is used to cover boxes or cases. The squalus canicula furnishes an inferior sort of skin, which is often used as a substitute, but the tubercles are smaller, and not so regular in shape.

GENUS IV. TORPEDO. *Cramp-Fish.*

Body smooth, depressed, and obtuse before; five gill-openings on each side, placed beneath; electrical organs single on each side.

This genus, which has been lately revived, contains at present four species according to Risso; but the characters which separate them are far from being determinate. The best known species is the Raia torpedo of Linnæus, whose electrical organs have been already described under the article ELECTRICITY of this work.

GENUS V. SQUALUS. *Shark.*

Body round, tapering; gill openings from five to seven on each side of the neck.

This genus contains upwards of thirty species, whose characters and organs have not been described with sufficient attention. They exhibit very obvious differences in the structure of their organs of respiration, and on that account ought to be separated into several genera. The characters furnished by the organs of motion should be employed in forming the genera into sections.

The sharks are voracious and formidable; they possess great strength, and swim with considerable velocity. The smaller species are salted and dried, and used as food. The liver yields a considerable quantity of oil, and the skin of some species is used, on account of its roughness, to polish wood, brass, or ivory. It is likewise employed to make thongs and tackle for carriages. The teeth are employed by savages to point their arrows, and as a substitute instead of knives.

The species are all inhabitants of the sea, and are very widely distributed. Their teeth are found imbedded in limestone rocks of different ages, and seem to indicate that the sharks of the first ages were of a much larger size than those which now exist.

GENUS VI. PRISTES. *Saw-Fish.*

Snout produced, depressed, and furnished with a row of teeth on each side.

This genus, which Latham (*Lin. Trans.* ii. p. 273.) separated from Squalus, in imitation of the older naturalists, contains five species, distinguishable from one another by the appearances of the teeth in the snout. The most remarkable species is the Squalus pristes of Linnæus, now the P. antiquorum: the snout is frequent in collections. This animal grows to the length of fifteen feet. It is a native of the seas of both hemispheres. By means of its formidable snout, it attacks with success various kinds of whales, which it lacerates in a dreadful manner with its lateral teeth.

GENUS VII. SQUATINA. *Angel-Fish.*

Body depressed, snout rounded, mouth terminal.

This genus was long recognized by naturalists. Linnæus united it to Squalus, and recently it has been revived. It contains only one species, the Squalus squatina of Linnæus. This is the *mermaid-fish* of Artedi, which, according to some naturalists, has given rise to those stories which we read and hear concerning mermaids. It is, however, more probable that there is a fish, not yet described by naturalists, of an amphibious nature, which has been occasionally seen on our coasts, and whose appearance, at a distance, bears some resemblance to the human form. For a description of one seen on the coast of Caithness, see the *Scots Magazine* for the year 1809, p. 734.

GENUS VIII. AODON.

Gill-openings, five on each side; mouth destitute of teeth.

La Cepede separated this genus from Squalus. It contains three species, whose characters have been but imperfectly described. Two of these were observed by Forskael in the Red Sea, and the third was observed by Brunich at Marseilles.

At the conclusion of this account of the cartilaginous fishes with fixed branchiæ, we deem it expedient to direct the attention of the reader to the sea snake which was cast ashore on Stronsa, one of the islands of Orkney, in September, 1808. The anatomical characters, furnished by the mutilated fragments which were sent to the Wernerian Society, seem to point out a connection with the genus Squalus. But the articulated fins on the sides, the form of the dorsal fin, and the lengthened neck, clearly prove the propriety of the new genus constituted for its reception, and termed HALSYDRUS, or sea snake. *Scots Mag.* 1809, p. 7.

The structure of the vertebræ of this animal has been explained with great precision by that celebrated anatomist Dr. Barclay, and figures of some of the parts have been published from the accurate drawings of Mr Syme. These, and the various descriptions of the animal sent from Orkney, have been given to the world in the first volume of the *Memoirs of the Wernerian Natural History Society of Edinburgh.*

DIVISION II.

Cartilaginous fishes, destitute of a gill-lid, but furnished with a gill-flap.

ORDER VI. JUGULAR.

GENUS IX. LOPHIUS. *Angler.*

One gill opening on each side; mouth large and terminal.

This genus contains about eight species. Some naturalists appear disposed to leave in this genus those species in which the mouth is somewhat contracted, and to form another genus (Batrachus) of the wide-mouthed species. The L. histrio might in that case be considered as the type of the former, and the common fishing frog (L. piscatorius) as the representative of the latter. The flesh of the different species is soft, and seldom used as an article of food. Pliny remarks of the common angler, "that it puts forth the slender horns it has beneath its eyes, enticing by that means the little fish to play round, till they come within reach, when it springs on them." The skin of this animal, rendered transparent by oil, is sometimes used as a mask, with a candle burning in it, to represent the devil.

ORDER VII. THORACIC.

GENUS X. BALISTES. *File-Fish.*

Head and body compressed; about eight teeth in each jaw; gill-openings narrow.

In this genus La Cepede enumerates twenty-nine species. They chiefly inhabit the seas of warm countries. They are remarkable for the brilliancy of their colours, which are often gracefully disposed. The flesh is considered as poisonous.

ORDER VIII. ABDOMINAL.

GENUS XI. CHIMERA. *Sea-Monster.*

One gill-opening on each side of the neck; tail produced, and ending in a filament.

This genus consists of two species, a southern and a northern. The last of these has been repeatedly found in our seas.

DIVISION III.

Cartilaginous fishes, with a gill-lid, but destitute of a gill-flap.

ORDER XII. ABDOMINAL.

GENUS XII. POLYODON.

Teeth in the jaws and palate.

We owe this genus to La Cepede. It contains only one species, found preserved in spirits in the Parisian museum.

GENUS XIII. ACIPENSER. *Sturgeon.*

Mouth bearded before, without teeth, retractile, and placed under the head.

This genus contains only four species, but these are of considerable importance in an economical point of view; the sounds furnish isinglass and the roe caviar. They live in the sea, and at times ascend the rivers in troops. Their flesh is excellent and highly prized.

DIVISION IV.

Cartilaginous fishes, furnished with a gill-lid and gill-flap.

ORDER XIII. APODAL.

GENUS XIV. OSTRACION.

Body covered with an osseous coat of mail; cutting teeth in each jaw.

This genus contains fifteen species. They are easily recognized by the body being covered with an osseous plate, somewhat resembling a tortoise. They are all natives of the seas of warm countries. They feed upon the crustaceous animals, and some of the testaceous mollusca. The flesh is excellent, but small in quantity. La Cepede recommends the *O. triqueter* as a fish which he thinks might easily be naturalized in our seas. The *O. cubicus*, a native of the Indian seas and the Isle of France, is often kept in pools, where it soon becomes so familiar as to come to the surface and eat from the hand. Its flesh is esteemed a great delicacy.

GENUS XV. TETRODON. *Sun-Fish.*

Jaws bony, extending, divided at the tip into two teeth; gill-opening linear; body round.

The fishes of this genus have obtained their present name from the double teeth with which their jaws are furnished. La Cepede describes nineteen species, some of which are natives with us. They have the singular power of inflating their abdominal cavity at pleasure. The inflation is produced by air sent from the gills, into a sac formed of a duplicature of the peritoneum, and from thence into the abdomen. The inflation aids the animal in rising in the water, and as the abdomen is in some species covered with spines, it brings these organs of defence into a more favourable position for resistance.

GENUS XVI. OVOIDES.

Jaws bony, extended, divided at the tip into two teeth, destitute of dorsal, anal, or caudal fins.

The single species, for the reception of which La Cepede formed this genus, was found described among the manuscripts of Commerson. It is an inhabitant of the Indian seas.

GENUS XVII. DIODON. *Globe-Fish.*

Jaws bony, extended, undivided.

The globe fish are but few in number, La Cepede having described only six species. They are natives of warmer seas. They are covered with long and formidable spines, like a hedgehog, and often exhibit a rich variety of colours. The *D. atinga*, a native of the tropical seas, is one of those fish considered by navigators as noxious. According to Pison, the gall is so virulent as to produce nearly instantaneous death in those that eat the parts of the fish where any of it has been spilt. The sound of the same fish, however, produces an isinglass, equal in quality to that which is obtained from the Acipenser huso.

GENUS XVIII. SPHEROIDES.

Body globular, four teeth or more in the upper jaw, no dorsal, anal, or caudal fins.

La Cepede formed this genus, for the reception of a species drawn by Plumier, and supposed to live in the sea on the east coast of America.

GENUS XIX. SYNGNATHUS. *Pipe-Fish.*

Head produced, mouth small and terminal, furnished with a lid, no teeth; gill-openings on the neck.

The species of this genus have never been determined in a satisfactory manner. Even the British species are in confusion. There are eight species described, and some varieties; but it is probable that the characters of the sexes have been hastily considered as marks of distinct species.

It appears, from the observations of naturalists, that the species of this genus belong to the ovoviviparous division of fishes, or those which hatch their eggs internally. Their bodies are covered with osseous plates like a coat of mail.

ORDER XV. THORACIC.

GENUS XX. CYCLOPTERUS. *Sucker.*

Mouth furnished with sharp teeth; ventral fins united; between these there is an organ of adhesion.

There are upwards of twelve species of this genus known. They may be distributed into sections from the union, or separation of the caudal, dorsal, and anal fins. They inhabit the sea, but are occasionally found in the mouths of large rivers. Their flesh is soft and oily, and eagerly sought after by seals. Some of the species, in a few hours after death, dissolve into a homogeneous gelatinous mass.

Genus XXI. Lepadogaster.

Tentacula four before the eyes; organs of adhesion double.

We are indebted to Gouan for a knowledge of the only species of the genus, which he found in the Mediterranean. It has since been observed, in other seas, by many naturalists.

Order XVI. ABDOMINAL.

Genus XXII. Macrorinchus.

Snout produced; jaws furnished with teeth; scales on the body small.

This genus was formed by La Cepede, and contains one species, discovered by Osbeck in his voyage to China, and described by him.

Genus XXIII. Pegasus.

Snout produced; jaws furnished with teeth; body covered with large osseous plates.

The first notice of this genus was given by Ruyschius. It now contains three species. These have the pectoral fins uncommonly large, and are capable of supporting themselves for some time in the atmosphere. They are all of a diminutive size, and live in the seas of warm climates.

Genus XXIV. Centriscus. *Trumpet-Fish.*

Jaws without teeth, snout produced; body compressed; ventral fins united.

La Cepede describes three species belonging to this genus, viz. C. scutatus, velitaris, and scolopax.

Sub-Class II. OSSEOUS FISHES.

All the osseous fishes have free branchiæ. With a few exceptions, they are oviparous. They appear to be the most numerous, as well as the most perfect of those animals which breathe by means of gills.

Division V.

Osseous fishes furnished with a gill-lid and a gill-flap.

Order XVII. APODAL.

Genus XXV. Cæcilia.

No fins; opening of the gills under the neck.

This genus was instituted by La Cepede, for the reception of the Muræna cæca of Gmelin. It is destitute of eyes on the exterior, and its true place in the system has not been satisfactorily determined. It is probable that it has fixed branchiæ, and is nearly related to the Gastrobranchus.

Genus XXVI. Monopterus.

A caudal fin, but destitute of all others; gill-openings situated between the eyes.

The only species of this genus is described by La Cepede from the manuscripts of Commerson. It is a native of the Indian seas.

Genus XXVII. Leptocephalus.

Anal and dorsal fins, but no pectoral or caudal ones; head small, body greatly compressed.

This genus was instituted by Gronovius, from an examample sent to him by Pennant. This last author obtained it from Holyhead, through the kindness of Mr Morris. Donovan seems disposed to consider this as a spurious genus, and to conclude that the Leptocephalus morrisii is nothing more than a young and mutilated example of the Blennius gunnellus. But the late additions which have been made to the history of the L. morrisii in the new addition of the British Zoology, and by Montagu in the Memoirs of the Wernerian Society, vol. ii. p. 437, have removed all doubts on the subject. M. Risso is inclined to add another species to this genus, termed L. Spallanzani; but the shape of the body is so dissimilar, being cylindrical, that we fear it does not belong to this genus.

Genus XXVIII. Gymnotus.

Destitute of dorsal and caudal fins, but furnished with pectoral and anal fins.

This genus includes six species, the most remarkable of which is the G. electricus, which possesses the same benumbing power as the torpedo, and whose history has been given in detail under the article Electricity, vol. viii. p. 472.

Genus XXIX. Trichiurus. *Blade-Fish.*

No caudal fin; body compressed; gill lids placed near the eyes.

This genus contains two species. The first, T. electricus, is distinguished by its electrical properties. It is a native of the Indian seas, and was first described by Willoughby under the title Anguilla Indica. The second species, T. lepturus, inhabits the fresh waters, and probably ought to be separated from the former, as it is destitute of electrical organs.

Genus XXX. Notopterus.

Pectoral, anal, and dorsal fins present, no caudal fin; body very short.

The two known species which constitute this genus were formerly included among the Gymnoti; but the presence of pectoral fins is a sufficiently obvious line of distinction. The first species, N. kapirat, of La Cepede, is a native of the seas at Amboyna. It is there named Pengay, or Kapirat. This last has been employed as the trivial name in the system, in defiance of the established maxims of the science. The second species is the N. squamosus, a native likewise of the Indian seas.

Genus XXXI. Ophisurus.

No caudal fin; body and tail cylindrical, and long in proportion to the thickness; head small; nostrils tubular.

The three species of this genus have been called by fishermen sea serpents, from their form and motions. They twist themselves in various directions with astonishing facility, and, when swimming, perform all their evolutions like the serpents. the O. ophis is a native of the European seas. The second, O. serpens, is found in greatest abundance in the Mediterranean.

Genus XXXII. Triurus.

Snout extended like a tube; one tooth in each jaw: caudal fin very short.

The only known species of this genus was found by Commerson in the south seas, and termed by La Cepede, T. Bougainvillianus. In its general aspect and size it bears a considerable resemblance to the common herring. He first observed them in the stomach of other fishes of the genus Scomber, which he had opened immediately upon being caught. We mention this fact, for the purpose of informing the inexperienced ichthyologist, that in such situations he may often meet with some of the rarest object of his pursuit, and in a condition still fit for a minute examination.

Genus XXXIII. Apteronotus.

Jaws fixed; no dorsal fin; possessing a caudal fin.

La Cepede formed this genus for the reception of the Gymnotus albefrons of Gmelin, whose trivial name he has changed for that of Passan, by which it was designated by Daubenton. It presents some peculiarities of structure, which merit an attentive examination. From the upper part of the body, between the dorsal fin and the head, there issues a fleshy filament, which, after diminishing somewhat in size, and describing an arch, becomes again united with the body near the organ of the caudal fin. The filament is convex above and concave below, and is connected throughout its whole length by twelve short oblique filaments to the subjacent furrow into which it is received.

This curious species was first described by the celebrated Pallas, from a specimen in the collection of the Petersburgh Academy. Afterwards La Cepede added to its history, having had an opportunity of examining a more perfect specimen in the museum at Paris.

Genus XXXIV. Regalecus.

With pectoral, dorsal, and caudal fins; no anal fin, nor spines in place of it; body and tail lengthened.

There are two species belonging to this genus. The one inhabits the northern seas, and in Norway is called King of Herrings. It was first particularly described by Ascanius. It is very nearly related to the genera Ophisurus and Trichiurus. The other species, R. lanceolatus, has been described from a Chinese drawing of a fish in the Dutch collection.

Genus XXXV. Odontagnathus.

On each side of the upper jaw a long curved jagged plate. This genus contains only one species, the O. mucronatus. It was obtained from Cayenne, where it is known under the name of Sardine. It lives in salt water, and is considered as good food.

Genus XXXVI. Muræna. *Eel.*

Body furnished with pectoral, dorsal, caudal, and anal fins; nostrils tubular; eyes covered with the common integuments; body serpentine and viscous.

It is a matter of regret, that the history of the species of this genus should still be involved in obscurity. The common eel is considered by some as oviparous, by others as ovoviviparous, and the opinion of ichthyologists is equally divided with regard to the reproductive organs of the conger. The species are very extensively distributed, being found in various parts of the new and old world. Their flesh is used as food, but is considered as difficult to digest. The skins are employed in place of ropes.

Genus XXXVII. Ammodytes. *Launce.*

Head slender; caudal fin distinct from the dorsal and anal ones; upper lip doubled in.

This genus contains only one species, which is a native of the European seas. Its trivial name tobianus has been changed by La Cepede into *alliciens*, from its being a tempting bait, we presume, to other fishes. We cannot censure too severely such unnecessary innovations, as they perplex the student, and encumber the science with a load of useless synonymes.

Genus XXXVIII. Ophidium.

Head covered with large scales; body and tail compressed and covered with small scales; gill-flap very large; dorsal, anal, and caudal fins united.

According to La Cepede, there are three species belonging to this genus, two of which are natives, and the third was found by Fabricius in Greenland. He distributes them into two sections. In the first is placed the *O. barbatum*, having a beard; and, in the second, the *O. imberbe* and *unernak*, which are destitute of a beard. Risso, in his *Ichthyologie de Nice*, has described a fourth species which belongs to the first section, which he terms O. vassali. It differs from the O. barbatum in the four filaments of the beard being equal.

Genus XXXIX. Macrognathus.

Upper jaw produced; body and tail compressed; caudal fin distinct from the dorsal and anal fins.

La Cepede instituted this genus for the reception of the Pentophthalmus of Ray, and another fish which was found in the Dutch collection. The name of Ray ought to have been employed from its claims to priority. The M. aculeatus is found in the Indian seas, and its flesh is considered good.

Genus XL. Ziphias. *Sword-Fish.*

Upper jaw produced; blade-shaped; equal at least to one-third of the length of the body.

There are two species described by La Cepede as belonging to this genus, viz. *Z. gladius* and *ensis*. Some circumstances appear to favour the supposition that a third species exists, which has been confounded with the gladius. After having, however, examined the figures and descriptions of several authors, in connection with this subject, we feel ourselves at a loss to offer a decided opinion. The reader will find some judicious remarks on the subject in the *Scots Magazine for July* 1811, and in the *Memoirs of the Wernerian Society*, vol. ii. p. 58. In the last work there is a figure of what is considered as the new species, which will, we hope, create the curiosity of naturalists to examine the subject.

Genus XLI. Makaira.

Snout produced; two osseous lanceolate shields on each side of the extremity of the tail.

La Cepede formed this genus for the reception of a fish thrown ashore at Rochelle. The fishermen called it Makaira.

Genus XLII. Anarchicas. *Wolf-Fish.*

Head rounded; upwards of five conic fore-teeth in each jaw; grinders flat and round; one long dorsal fin.

Three species of this genus are known to naturalists. They inhabit chiefly the boreal regions, and furnish a palatable food to the inhabitants.

GENUS XLIII. COMEPHORUS.

Body long and compressed; head and mouth large; rays of the second dorsal fin furnished with long filaments.

The only known species of this genus was found by the celebrated Pallas in the Lake Baikal.

GENUS XLIV. STROMATEUS.

Body greatly compressed and oval.

This genus contains five species, some of which are found in the Mediterranean, and others in the equatorial seas. The S. fiatola is the one which has been longest known, and is remarkable for the agreeable brilliancy of its colours. It inhabits the Mediterranean and Red Seas. The *S. paru*, which is frequent on the coast of Tranquebar, is esteemed delicate food, its flesh being white and tender.

GENUS XLV. RHOMBUS.

Body compressed and short; each side of the animal appears like a rhomboid; rays of the dorsal and anal fins not articulated.

The only known species of this genus was brought to Linnæus from Carolina by Dr Garden, and by him inserted in the genus chætodon. The skin appears to the naked eye to be entirely destitute of scales.

ORDER XVIII. JUGULAR.

GENUS XLVI. MURÆNOIDES.

Ventral fins consisting of one ray; gill-flap of three rays; body lengthened and compressed.

This genus was formed by La Cepede for the reception of the Blennius murænoides of Gmelin. It forms a sort of connecting link between the apodal and the jugular fishes of this division.

GENUS XLVII. CALLIONYMUS. *Dragonet.*

Head larger than the body; eyes near each other; gill-openings on the neck; ventral fins distant; scales minute.

There are five species of dragonets described by naturalists; but it is probable that this number will be reduced when the sexual differences are better known. Mr Neill, to whose ichthyological labours we have already alluded, has ascertained that the Linnæan Cal. Dracunculus is merely the female of the Cal. Lyra. "In the course," says he, "of dissecting and preserving some of each, (viz. the sordid and gemmeous dragonet,) it struck me, as remarkable, that the gemmeous dragonets were all males, and the sordid dragonets all females. I now considered it as a fortunate circumstance that numbers were brought to me, presuming that if I should find the gemmeous dragonets to be uniformly *milters*, and the sordid dragonets to be uniformly *spawners*, I might be permitted to conclude that they are only male and female of one and the same species. I accordingly opened every specimen which I received, to the amount of some dozens, and the result entirely supported that opinion. Both sorts were brought to me nearly in equal numbers; and from the fishermen I learned that they were taken promiscuously on the same lines." *Memoirs of the Wernerian Natural History Society*, vol. i. p. 530.

GENUS XLVIII. CALLIOMORUS.

Gill-openings on the sides; head larger than the body; ventral fins distant; scales minute.

The Callionymus Indicus of Gmelin is the only known species of the genus. It is a native of Asia.

GENUS XLIX. URANOSCOPUS. *Star Gazer.*

Head depressed; eyes on the head contiguous; edges of the gill-lid ciliated.

The position of the eyes in the fishes of this genus is very remarkable, and has procured for them the generic names which are prefixed. There are two species. The first species, *U. mus* of La Cepede, the *U. scaber* of Gmelin, is an inhabitant of the Mediterranean. It lives near the shore, and, concealing itself in the mud, moves the filaments of the beard, so as to imitate the motions of a worm, and in this manner entices the small fish to their destruction. Its flesh is white, but dry and disagreeable. Its bile was considered by the ancients as useful to heal wounds. The U. Japonicus, first described by Houttuyn, is found in the seas near Japan.

GENUS L. TRACHINUS. *Weever.*

Head compressed and spinous; gill covers spinous; anus near the breast.

This genus contains three species, two of which are found in the British seas. The spines of the dorsal fin of the common weever are supposed by our fishermen to contain a venomous fluid, as the wounds occasioned by them are exceedingly painful, and attended with a considerable degree of inflammation.

GENUS LI. GADUS. *Cod.*

Head smooth, compressed; gill-lid, of many pieces, margined with a smooth border; ventral fins slender, and ending in a point.

This is the most important genus, in an economical point of view, in the whole system. All the species are esculent and palatable, and furnish to the human race a valuable supply of nourishment. Besides the flesh, the liver is used, to extract the oil which it contains; the roes are salted as a kind of caviar; and the air-bladder yields isinglass. They are gregarious, and are chiefly to be met with in the temperate and cold climates. The species exceed twenty in number, and exhibit such remarkable differences in the number and form of their organs of motion, that we are surprised at still finding them included in the same category.

GENUS LII. BATRACHOIDES.

Head depressed and large; opening of the mouth wide; around and below the under jaw, a beard.

This genus was formed by La Cepede, for the reception of two species from the genera Gadus and Blennius. The first is the Gadus tau of Gmelin. It is found in the Atlantic ocean, and was first accurately described by Bloch. The second is the Blennius raninus of Gmelin, the Gadus raninus of Muller.

GENUS LIII. BLENNIUS *Blenny.*

Body and tail lengthened and compressed; head blunt and steep: ventral fins consisting of from two to four united rays.

This genus contains, according to La Cepede, twenty-three species. Some of the species at least are ovoviviparous, or hatch the eggs internally, and exclude them along with the young fish, while others appear to be simply oviparous. The genus formed by Artedi was named from Βλεννα, mucus, to indicate the slimy nature of their skin. La Cepede distributes them into sections, according to the number of the dorsal fins and the condition of the head. Into his last section, or those with one dorsal fin and no tentacula, he has inserted the Gadus brorme under the title Blennius Torsk, although he had previously given the species under the cod genus.

GENUS LIV. OLIGOPODUS. *Spotted Blenny.*

One dorsal fin extending from the head to the tail; one ray in each ventral fin.

This genus contains the *Coryphæna velifera* of Gmelin, a fish first described by Pallas. It is a native of the Indian seas.

GENUS LV. KURTUS.

Body greatly compressed, and carinated above and below; back arched.

We are indebted to Bloch for the formation of this genus, which contains only one species, termed by him *K. indicus*. La Cepede has changed the trivial name into *Blochianus*. It is a native of the Indian seas, and feeds on crustaceous and testaceous animals.

GENUS LVI. CHRYSOSTROMUS.

Body and tail arched; compressed; one dorsal fin.

Rondeletius described the only species of this genus known to naturalists, under the name Fiatola.

ORDER XIX. THORACIC.

GENUS LVII. LEPIDOPUS.

Body lengthened, blade-shaped; ventral and anal fins consisting of one ray.

Gouan of Montpellier, formed this genus, and described for the first time the only known species,—L. argenteus. Shaw, in his General Zoology, without being aware of the previous labours of Gouan, formed his genus *Vandellius*, for the reception of a species differing in some respects from the fish of Gouan, but of the same genus. Montagu, inattentive equally to the labours of Gouan and Shaw, formed his genus *Ziphotheca*, for the reception of a species of Lepedopus, similar to the one which Shaw describes. He had considered his fish as belonging to the apodal order, not supposing that the pair of ventral scales, though destitute of motion, were regarded as the rudiments of ventral fins. We are disposed to consider this genus as consisting, at present, of four species. The L. argenteus of Gouan, termed Gouanianus by La Cepede—L. tetradens, the Ziphotheca tetradens of Montagu, and the Vandellius argenteus caudafurcata of Shaw.—L. Peronii and L. pellucidus of Risso.

GENUS LVIII. HIATULA.

No anal fin.

The H. Gardeniana of La Cepede, and the only known species, is the Labrus hiatula of Linnæus. It was observed by Dr Garden in South Carolina.

GENUS LIX. CEPOLA. *Band-Fish.*

An anal fin; more than one ray in each ventral fin; body long and blade-shaped; belly scarcely the length of the head.

This genus was first characterised by Bloch. It contains three species, whose specific differences are far from being distinctly marked. The C. tenea and rubescens (whose trivial name La Cepede, with his usual fondness for innovation, has changed into serpentenformis,) are found in the Mediterranean, while the third species, *trachyptera*, has been hitherto observed only in the Adriatic gulf.

GENUS LX. TÆNIOIDES.

An anal fin; pectoral fins disc-shaped; body long, blade-shaped; belly scarcely the length of the head: eyes indistinct; no caudal fin.

The genus contains one species, the T. Hermannii, of whose habits or station nothing is at present known. The trivial name which La Cepede has bestowed upon it is in honour of Professor Hermann of Strasburgh. The eyes are so very small that they can scarcely be distinguished. They appear like black points.

GENUS LXI. GOBIUS. *Goby.*

Ventral fins united; two dorsal fins.

La Cepede distributes the twenty-two species of which the genus consists into two sections, from circumstances connected with the attachment of the pectoral fins. All the species are diminutive in point of size, and have failed to attract the notice of the epicure. A few species, however, are used as food. The G. *lanceolatus* is said to have a very pleasant taste. It lives in the rivers and streams in Martinique.

GENUS LXII. GOBIOIDES.

Ventral fins united; one dorsal fin; head small; the gill-lid attached nearly throughout its margin.

La Cepede has constructed this genus from species which formerly belonged to the genus gobius. The first species which he describes is the gobius anguillaris of Gmelin, a native of the Equatorial seas.

GENUS LXIII. GOBIOMORUS.

Ventral fins distinct; two dorsal fins; head small, eyes approaching; gill-lid attached nearly throughout its margin.

The genus contains four species. The first has been long known to naturalists, and is the Gobius gronovii of Gmelin.

GENUS LXIV. GOBIOMOROIDES.

Ventral fins distinct; one dorsal fin; head small; the gill-lid attached nearly throughout its margin.

The Gobius Pisonis of Gmelin is the only known species of the genus. It was first described by Piso in his Natural History of Brasil.

Genus LXV. Gobiesox.

Ventral fins distinct; one dorsal fin, short, and placed on the tail near the caudal fin; head larger than the body.

The G. cephalus, of which the genus consists, is a native of the American rivers, and was first described by Plumier.

Genus LXVI. Scomber. *Mackrel.*

Two dorsal fins; spurious fins in front of the tail above and below; sides of the tail carinated on the ends of the lateral line.

This important genus contains fourteen species, two of which are natives of our seas. Many of the species exhibit the greatest variety and beauty of colour, and almost all furnish wholesome food. The flesh of the common mackrel is somewhat greasy; and from it the Romans expressed a *garum*, or pickle, which was esteemed not only as an agreeable seasoning, but as a valuable medicine.

The Scomber germo of La Cepede, which is found in great abundance in the Pacific ocean, proves extremely palatable and wholesome to sailors. Commerson observed that the shoals of this species did not approach indiscriminately all the vessels of the fleet, but chiefly those which had been long at sea, and whose bottoms were foul. The same observer supposes that fishes often approach ships in the equatorial seas, enticed by their shadow in the water, which screens them from the direct influence of the sun beams.

Genus LXVII. Scomberoides.

One dorsal fin, with spines in front; spurious fins above and below, in front of the caudal fin.

La Cepede, who formed this genus, has described three species. The *S. Noelii* has ten spurious fins above, and fourteen beneath. The *S. Commersonianus* has twelve spurious fins above and beneath, while the S. saltator has only seven above and eight beneath. The second species is from the shores of Madagascar; but the habitation of the others is unknown.

Genus LXVIII. Caranx. *Scad.*

Two dorsal fins; no spurious fins; sides of the tail carinated.

This was instituted by Commerson, and so named from *καρα. caput*, in reference to the size, the power, and the lustre of that part of the body, and the dominion exercised by the species of this genus over their weaker neighbours. The genus contains twenty species, which La Cepede has distributed into two sections. In the first are placed those which have no spines between the dorsal fins; and the second, such as are furnished with spines in this place. Many of the species are from the Red sea, and present few particulars worthy of being mentioned.

Genus LXIX. Trachinotus.

Two dorsal fins, with spines concealed in the front of these under the skin.

This genus was formed by La Cepede from *τραχεινος*, *asper*, in reference to its dorsal spines. It contains only one species, the T. falcatus, first described by Forskael in his Fauna Arabica. Commerson likewise observed it on the shores of Madagascar.

Genus LXX. Caranxomorus.

One dorsal fin; no spurious fins; upper lip fixed.

This genus is nearly allied to the preceding, and contains 4 species, formerly included in the genus Scomber.

Genus LXXI. Cœsio.

One dorsal fin; upper lip extensile.

The species contained in this genus are two in number; and might with propriety have been united with those in the preceding genus. The first is termed C. cærulescens, and is a native of the Molucca isles; and the second, C. equulus, was described by Forskael.

Genus LXXII. Cæsiomorus.

One dorsal fin; no lateral ridge; separate spines in front of the dorsal fin.

This genus is nearly allied to the preceding, and contains 2 species described from the MSS. of Commerson.

Genus LXXIII. Coris.

Covering of the head entire; one dorsal fin; the 1st or 2d rays of the ventral fins twice as long as the others.

Naturalists are indebted to Commerson for a knowledge of the two species which compose this genus. These he termed C. aygula and C. angulatus.

Genus LXXIV. Gomphosis.

Snout produced in form of a nail; head destitute of scales like those of the back.

Commerson likewise instituted this genus, consisting of two species—the G. cæruleus and G. varius.

Genus LXXV. Naso.

A horn or protuberance on the snout; two plates or shields on each side of the extremity of the tail; skin shagreened.

Commerson formed this genus, which contains two species, one of which is the Chætodon unicornis of Gmelin, found in the Red Sea by Forskael, and at the Isle of France by Commerson.

Genus LXXVI. Kyphosus.

Back elevated; a hunch on the shoulder; gill-lid with scales like the body.

This Commersonian genus contains one species, the K. bigibbus.

Genus LXXVII. Osphronemus.

Ventral fins, each of five or six rays, the first spinous, and the second terminated by a long filament.

This genus contains two species. The first of these, O. goramy, is an inhabitant of the fresh waters of Hindostan and China. It has been naturalized in the Isle of France, and ought to be translated to Europe. As food, it is said to be of exquisite flavour. The second is the O. gallus, the Scaurus gallus of Forskael. It frequents the coasts of Arabia, and is considered by the inhabitants as a noxious species.

Genus LXXVIII. Trichopodus.

Ventral fins with one ray longer than the body; one dorsal fin.

The genus contains two species. One of these is the Labrus trichopterus of Gmelin, a native of the Indian seas. The other is T. mentum, described from a drawing by Commerson.

Genus LXXIX. Monodactylus.

Ventral fins of one short ray. One dorsal fin.

The M. falciformis was first observed by Commerson, and is the only species of the genus.

Genus LXXX. Plectrorinchus.

Lips plaited and marginated; one or more of the plaits of the gill-lid denticulated.

Lacepede instituted this genus. The name is from πληκτρον, *pecten*, and ῥυγχος, *rostrum*. There is but one species observed by him in the Dutch collection.

Genus LXXXI. Pogonias.

One dorsal fin; chin bearded.

This genus, from πωγων, *barba*, was instituted by Lacepede for the reception of one species, the P. fasciatus, in the collection of the Stadtholder at the Hague.

Genus LXXXII. Bostrychus.

Body long; serpentine; two dorsal fins; two tentacula on the upper jaw.

The two species of which the genus consists are but imperfectly known. They rest on the authority of Chinese drawings.

Genus LXXXIII. Bostrychoides.

One dorsal fin. In other respects like the preceding.

A Chinese drawing of the only species of this genus was found in the Dutch collection.

Genus LXXXIV. Echeneis. *Sucking Fish.*

Head depressed, and furnished with an organ of adhesion, consisting of an oval plate with transverse folds.

The name of the genus is derived from εχω, *habeo*. and ναυς, *navis*; because the best known species was supposed to have the property of sticking to ships, and retarding their motions. It is the remora of the ancients.

Genus LXXXV. Macrourus.

Two dorsal fins; tail twice as long as the body.

This genus was instituted by Bloch for the reception of the Coryphæna rupestris of Linnæus, which is found on the coasts of Greenland and Iceland. To the inhabitants of these countries it furnishes a plentiful supply of nourishing food. In some of the districts where it is found it is called berg-lax, or rock salmon. It is the *ingminniset* of the Greenlanders.

Genus LXXXVI. Coryphæna.

Head truncated, or very obtuse; one dorsal fin, nearly as long as the body and tail.

This genus contains sixteen species, which La Cepede has distributed into sections, from the shape of the tail. The first species which La Cepede describes is the C. *hippurus*, which is found both in the Atlantic and Pacific ocean. Its flesh is very agreeable; and being a voracious fish, easily taken, and fond of following vessels, often furnishes the sailor with a grateful repast. When taken out of the water, the beautiful combinations of colours fade as the fish expires, and the dying coryphene is contemplated by sailors with as much delight as the ancient Romans are said to have exhibited on viewing similar changes in the expiring mullet, when brought to the table before the feast began.

Genus LXXXVII. Hemipteronotus.

Head truncated; one dorsal fin, about half the length of body and tail.

La Cepede formed this genus from two species formerly included in the genus Coryphæna. The H. *quinquemaculatus* of La Cepede, the *Coryphæna pentadactyla* of other writers, inhabits the rivers of China, the Molucca isles, and other places in the Indian Archipelago. It is gregarious, appearing in vast shoals, and is eagerly sought after as an article of food. It is dried or salted, and forms an article of trade in those countries similar to the cod fishery of our northern districts.

Genus LXXXVIII. Coryphenoides.

Head truncated, or very obtuse; one dorsal fin; gill opening a simple transverse slit.

This genus contains only one species, the C. branchiostega. It inhabits the seas of Asia, and differs from the genus Coryphæna principally in the form of the gill-opening.

Genus LXXXIX. Aspidophorus. *Pogge.*

Body and tail covered with a scaly coat of mail; two fins on the back.

This genus was first instituted by Scopoli, and afterwards adopted by La Cepede for the reception of two species included in the genus Cottus. The first is the *Cottus cataphractus* of Linnæus, common in the European seas; and the second is the C. *japonicus* of Gmelin, which was first described by Pallas as a native of the seas about the Kurile islands. It is destitute of the cirri or beard under the throat, and from that circumstance ought perhaps to be referred to another genus.

Genus XC. Aspidophoroides.

Body and tail armed with a coat of mail; one dorsal fin; rays of the ventral fins fewer than four.

This genus bears a very close resemblance to the preceding, from which it is principally distinguished by the union of the two dorsal fins. The only species it contains is the Cottus monopterygius of Gmelin, a fish which inhabits the coast of Tranquebar.

Genus XCI. Cottus. *Bull-head.*

Head larger than the body; form approaching conical; two dorsal fins; spines and tubercles on the head or gill-lid; ventral fins with more than three rays.

La Cepede describes nine species, some of which are used as food.

The grunting bull-head, Cottus gruniens, a native of the American and Indian seas, is considered as esculent food. The liver, however, is said to possess noxious qualities. When first taken from the water, this fish utters a sound, in some degree resembling the grunting of a pig, and produced by the sudden expulsion of air from the internal cavities through the gill covers and mouth.

The Cottus insidiator, a native of the Arabian seas, is said to bury itself in the sand, and wait the approach of its prey. When the small fish have approached sufficiently near, it then darts out upon them with considerable velocity. The C. scorpius, which in this country is despised, is eagerly sought after as food by the inhabitants of Greenland. From the liver they likewise extract an oil. This animal is very vivacious. It can close the gill-opening so closely, by means of the lid, as to prevent the atmosphere from drying the gills, and consequently obstructing respiration.

GENUS XCII. SCORPÆNA.

Head covered with spines or protuberances; destitute of small scales; one dorsal fin.

The species of this genus, sixteen in number, are distributed into two sections from circumstances connected with the beard. They have all a very uncouth appearance, and they are armed with formidable spines. The S. horrida, says Shaw, resembles rather some imaginary monster of deformity than any regular production of nature. The head is very large, perfectly abrupt in front, and marked by numerous tubercles, depressions and spines. On the top is a semi-lunar cavity, the mouth opens from the upper part, and is large, and of a shape resembling a horse shoe. It is a native of the Indian seas. The S. porcus is the most common European species. It is found plentifully in the Mediterranean, where it lurks among the sea weeds, and, as opportunity offers, darts upon its prey. When seized, by any stronger animal, it twists itself violently, and, erecting its strong spines, makes a vigorous resistance. Wine, in which this fish was suffered to die, was esteemed by the ancients as a salutary medicine. The S. scrofa, which is found in the Atlantic and Mediterranean, is said to prey not only on the smaller fishes, but on the aquatic birds as they swim on the surface. The S. antennata, remarkable for two long tentacula, surrounded by several fibrous brown bars seated immediately above the eyes, is a native of Amboyna, and its flesh is said to be exquisite. In the S. volitans, the pectoral fins are so large, that the fish can fly for a short distance. It is the Gasterosteus volitans of Linnæus.

GENUS XCIII. SCOMBEROMORUS.

One dorsal fin; spurious fins above and below, in front of the caudal fin; no separate spines in front of the dorsal fin.

The S. plumierii is the only species of the genus, and is a native of Martinique. It was described by Lacepede from the drawings of Plumier.

GENUS XCIV. GASTEROSTEUS. *Stickle-back.*

One dorsal fin; separate spines in front of the dorsal fin; tail carinated laterally; one or more spinous rays to each ventral fin.

The species of this genus are natives of Europe. The G. aculeatus is common in rivers. It is sometimes found in such plenty as to be employed as manure; an oil excellent for burning may be expressed from the body. The other species are natives of the seas. They are armed with sharp spines on the back, so that few fish venture to seize them.

GENUS XCV. CENTROPODUS.

Two dorsal fins; ventral fins with one spine, and five or six small articulated rays.

This genus, from *Κεντρον*, *aculeus*, and *πους*, *pes*, was created by Lacepede for the reception of one species, C. rhombeus, observed by Forskael in the Red Sea.

GENUS XCVI. CENTROGASTER.

Ventral fins with four spines and six articulated rays.

This genus contains two species, which inhabit the sea of Japan. They were first described by Houttuyn in the *Act. Haerl.* vol. xx, 2. p. 334. No 22.

GENUS XCVII. CENTRONOTUS.

One dorsal fin; ventral fins with at least four rays; a longitudinal crest on each side of the tail, and two spines in front of the anal fin.

This genus, formed from *Κεντρὸν*, *aculeus*, and *νωτος*, *dorsum*, contains eleven species. They are all of a small size. The most remarkable among these is the pilot fish of Willoughby, the C. conductor of Lacepede, which has often excited the astonishment of observers. It follows vessels, to feed on the substances thrown overboard; and is generally seen in company with the shark, which in the opinion of some it conducts to its prey.

GENUS XCVIII. LEPISACANTHUS.

Scales of the back large, ciliated, and terminated by a spine; the gill lid denticulated behind.

This genus, from *Λεπις*, *squama*, and *ακανθα*, *spina*, was instituted by Lacepede. It contains only one species, from Japan, first described by Houttuyn.

GENUS XCIX. CEPHALACANTHUS.

Two long denticulated spines on each side of the head behind.

This genus, formed from *Κεφαλη*, *caput*, and *ακανθα*, *spina*, was instituted by Lacepede. It contains only one species, the Gasterosteus spinarella of other naturalists. It differs from the Sticklebacks in wanting the spines on the back. It is a small fish, and a native of India.

GENUS C. DACTYLOPTERUS.

One small fin, consisting of rays connected by a membrane near each pectoral fin.

La Cepede formed this genus from *δακτυλος*, *digitus*, and *πτερον*, *pinna*, for the reception of two species of fishes formerly included in the genus Trigla. The D. priapoda is one of those fishes capable of flying for a short distance in the atmosphere. Hence it has been termed the sea-swallow, by sailors. It is found principally near the tropics, but is also met with in the Mediterranean. The other species, D. Japonicus, was first described by Houttuyn. It is the Trigla alata of Gmelin.

GENUS CI. PRIONOTUS.

Soft rays near each pectoral fin, separate; serrated spines between the dorsal fins.

There is but one species belonging to this genus, a native of the American seas. It is the Trigla volitans minor of Brown. Jamaica, 453, tab. 47. fig. 3.

GENUS CII. TRIGLA. *Gurnard.*

Soft separate rays near each pectoral fin; no spines in the interval between the dorsal fins.

The name of the genus is from *τριγονος*, *terpariens*, in reference to the fecundity of the fish. Many of the species have the power of raising themselves into the air, when the sea does not afford them a safe asylum. Their flesh is white and insipid; and is seldom sought after when other fish can be obtained.

Genus CIII. Peristedion.

Soft separate rays near each pectoral fin; one dorsal fin, one or more bony plates on the under side of the body.

This genus was formed by La Cepede, and contains two species. They are readily distinguished from the species of the genus Trigla by the osseous plates, which form a coat of mail on their under side. The P. malarmat of La Cepede, the Trigla cataphracta of Gmelin, is found in the European and Indian seas. It is sought after as food, although its flesh is said to be dry and insipid. It swims with great rapidity, and is very active in all its movements. The P. chabrontera is found in the Mediterranean, and was first described by Osbeck.

Genus CIV. Istiophorus.

Two dorsal fins, the first very long, elevated and rounded; two rays to each ventral fin.

The T. gladifer is the only known species. It is an inhabitant of the tropical seas, and its appearance is considered by sailors as the presage of a storm. It resembles in many respects the sword-fish. It grows to a great size, swims with great velocity, and possesses undaunted courage. It often strikes its snout against vessels with such force as to break it; and, in consequence of its boldness, proves a dangerous enemy to fishes equal to itself in size. When young, its flesh is considered as agreeable to the taste; but when old, it is oily and indigestible.

Genus CV. Gymnetrus.

No anal fin; one dorsal fin; the rays of the ventral fins elongated.

This genus contains only one species, which was instituted by Bloch, the G. Hawkenii, a native of the Indian seas, and occasionally in those of Europe.

Genus CVI. Mullus. *Surmullet.*

Scales large, and easily detached; summit of the head bluntly elevated; under jaw with a beard.

There are fourteen known species in the genus. The most remarkable of these is the Red Surmullet, Mullus barbatus of Linnæus. This fish, when alive, presents some of the most brilliant colours exhibited in nature, and the changes which they experience as the fish expires are singularly various. The luxurious Romans brought this fish alive to table in a glass vessel, and suffering the fish to expire, contemplated with delight the successive changes of colour. After pleasing the eye by this fine display, the fish was removed and dressed for the feast.

Genus CVII. Apogon.

Scales large and deciduous; head bluntly raised; no beard on the under jaw.

The generic name is from *απωγων*, *imberbis*. The only known species is the A. ruber of La Cepede, the Mullus imberbis of Willoughby. It is found chiefly on the rocky coast of Malta, and differs from the surmullets in wanting the beard or cirrus on the lower lip. It is of a fine red colour; the opening of the mouth is large, and the palate and jaws very rough.

Genus CVIII. Lonchurus.

Pectoral and caudal fins equal at least to a fourth of the whole length of the body: dorsal fin long and indented.

Bloch instituted this genus for the reception of a fish brought from Surinam, which he termed L. barbatus. La Cepede changed the trivial name into dianema, instigated apparently by no other feeling than the love of change. The nose or upper lip is produced into an obtuse short snout, so as to cause the mouth to appear as if placed somewhat beneath. The head is covered with scales like those on the back, and the jaws are furnished with small sharp teeth.

Genus CIX. Macropodus.

Ventral fins the length of the body, caudal fin forked, its length equal to a third part of the body; head and gill lid covered with scales similar to the back; opening of the mouth very small.

This genus, from *μακρος*, *longus*, *πους*, *pes*, contains only one species, M. viridiauratus, an inhabitant of the fresh water lakes of China, but whose history is little known.

Genus CX. Labrus. *Wrasse.*

Lips thick; upper lip protrusile; no teeth in the form of grinders or incisors; rays of the dorsal fin terminated by a filament.

The name of the genus is expressive of the thick lips with which the species are furnished, and is a term used by Ovid. La Cepede describes 130 species. Some of these, however, rest on very doubtful authority, and a few may be considered as varieties. The characters by which they are separated depend, in a great measure, on the number of the rays of the fins. They are all remarkable for the brilliancy of their colours, the size of their scales, and the strength of their teeth, and, we may add, for their extensive distribution. In all the seas of the globe some species belonging to this genus have been found. Few of the species are esteemed as food, and although some are reputed poisonous, the evidence on which the belief rests is unsatisfactory. Many of the species are solitary, while a few appear to be gregarious. The Labrus julis is said to live in vast troops; and, if we may credit Ælian, will attack and bite men bathing in the water. The flesh of the Labrus cinædus is soft, tender, and easy of digestion, and suitable for the young and weak.

Genus CXI. Cheilinus.

Lips thick; rays of the dorsal fin terminating in a filament: large scales, with appendages at the base of the caudal fin.

This genus of La Cepede contains two species, viz. C. scarus and C. trilobatus. The first appears to be the true Scarus of the ancients. It inhabits the shores of the Mediterranean, and has been often examined. It is of a whitish colour mixed with red. The scales are large and transparent. This species lives in shoals, and such is the attachment which is said to prevail among them, that according to Appian, when one has taken the bait, another will come to its assistance, and bite the chord to enable it to escape. This fish was eagerly sought after by the luxurious Romans, who preferred the liver, and even the intestines without being emptied. Its food consists of marine plants.

The second species is described by La Cepede from the manuscripts of Commerson, and is a native of the Indian seas.

Genus CXII. Cheilodipterus.

Upper lip extensile, two dorsal fins; no cutting or grinding teeth: gill-lid destitute of spines or processes.

This genus contains ten species, divided into two sections, from the form of the tail. Little more is known of their history than their systematic characters. They were formerly included in the genera Sciæna and Labrus.

Genus CXIII. Ophicephalus.

Scales of the head polygonal, larger than those of the back; all the rays of the fins jointed.

The name of this genus, from *οφις*, *serpens*, and *κεφαλη*, *caput*, is sufficiently expressive of the distinguishing character of the species. These are two in number, which were described by Bloch, and come from the coast of Coromandel. The scales of these fishes, where exposed, are tuberculated, and feel rough to the touch. They inhabit fresh water lakes and rivers, and feed on aquatic plants. Their flesh is esteemed agreeable and salubrious.

Genus CXIV. Hologymnosus.

Scales invisible; ventral fins resembling a fleshy beard; tail as if formed of two truncated cones, united by their summits.

La Cepede formed this genus from *ὁλος*, *totus*, and *γυμνος*, *nudus*, for the reception of the H. fasciatus, a native of the equatorial seas, where it was first observed by Commerson.

Genus CXV. Scarus.

One dorsal fin; jaws osseous, prominent, occupying the place of teeth.

This genus was instituted by Forskael, and contains at present nineteen species. They are remarkable for the brilliancy of their colours, and the armature of their fins. The mouth in the species of this genus is constructed rather in imitation of some of the cartilaginous fishes, as the Diodon, than of any of the osseous fishes. The jaws are bony entire, in some species, and divided in others, and destitute of true teeth, but often tuberculated or crenulated. They feed on crustaceous and testaceous animals, and likewise on sea weeds. The flesh of the Scarus rivulatus is pleasant to the taste, but the wounds made by the spines of its fins being difficult to heal, it has been considered as venomous. It frequents the coasts of Arabia.

Genus CXVI. Ostorinchus.

Two dorsal fins; osseous jaws prominent, and occupying the place of teeth.

This genus was instituted by La Cepede, and the only species of which it consists (discovered by Commerson) has been named by him in honour of M. Fleurieu. It is a native of the Equatorial seas.

Genus CXVII. Sparus. *Gilt-head.*

Cutting or grinding teeth in several rows; the height of the body nearly equal to its length.

Forskael formed this genus, deriving the name from *σπαιρειν*, *palpitare*, on account of the rapid motions of the fish when taken from the water. It is a very numerous genus. About a hundred species have been described by ichthyologists. They are distributed into three sections, from characters furnished by the form of the tail. The lunulated gilt-head, Sparus aurata, was well known to the ancients, and by them dedicated to the goddess Venus. In spring, this species frequents the shores, and even enters the mouths of rivers. Its flesh is said to improve in fresh water, and hence Duhamel and others have recommended its being translated into lakes and rivers. As food, it was much prized by the ancients, and valuable medical qualities were ascribed to it. Where common, as in the Mediterranean, it is often salted, and sent inland as an article of trade. Several species have a remarkable phosphorescent property. Willoughby first observed this in the S. pagrus, but it is more remarkable in the S. chrysurus. This last fish inhabits the seas of Brazil, and when a few of them are swimming in company, they emit so much light, that in the darkest night a person might see to read by means of it. This property enables the fish to pursue its prey with more certainty; but, on the other hand, it gives information to its foes. Its flesh is esteemed excellent, and much sought after.

Genus CXVIII. Dipterodon.

Two dorsal fins; mouth with several rows of teeth.

This genus contains six species. The D. asper inhabits the rivers of France and Germany; and being very vivacious, might easily be translated into this country, in the more temperate seasons of the year. Its flesh is esteemed excellent, and in our rivers and lakes would prove a valuable addition to our stock of food. As this fish searches for its food in the mud, in which there are occasionally small pieces of gold, and as these have sometimes been found in its stomach, the fishermen have concluded that its food was gold. The flesh of the D. zingel is equally white, firm, and palatable, and is found in the same situations. It is so bold and vigorous, and so well protected by means of scales, that few fishes will venture to attack it. Hence it multiplies very rapidly.

Genus CXIX. Lutjanus.

One dorsal fin; a process to one or more of the pieces of the gill-lid; no spines on these pieces.

This genus contains, according to La Cepede, seventy-four species. The L. anthias is the *ἱερος ἰχθὺς* of the Greeks, who fancied that no dangerous fish could reside in the waters in which it lived, and that divers might descend with safety, if they knew that this fish was an inhabitant of the place. It feeds on small fishes, and is very common in the Mediterranean. The L. johnii, so named by Bloch in honour of his missionary friend John, is found on the coast of Tranquebar. Its flesh is white and palatable. The L. plumierii of La Cepede, the Anthias striatus of Bloch, found in the Atlantic ocean, is also esteemed safe and agreeable food. The Lutjanus scandens, first described in the Linnean Transactions, vol. iii. is remarkable for its power of creeping up the stems of trees, by means of the spinous processes of its fins and gill-lid.

Genus CXX. Centropomus. *Basse.*

Two dorsal fins; one or more processes to each piece of the gill-lid; no spines on these parts.

La Cepede instituted this genus, which contains twenty-one species. The name is derived from *κεντρον*, *aculeus*, and *πωμα*, *operculum*. The Centropomus sandat of La

Cepede, the Perca lucioperca of Linnæus, inhabits the fresh waters of all the countries of the north of Europe. It grows to a great size, and its flesh is white, tender, and pleasant to the taste. In the form of its head, and the size of its teeth, it bears a near resemblance to the pike; while, in the structure of its gill-lid, the number and situation of its dorsal fins, and the hardness of its scales, it approaches in appearance the perch. Hence, almost all naturalists have termed it lucioperca. It is a matter of regret that this fish dies so quickly upon being taken out of the water: hence it cannot be transported alive to any distance. But as it is one of those fishes which, if translated into our lakes and rivers, would prove a valuable addition, the fecundated eggs might be employed with ease. In this department of rural economy, how much remains to be done.

Genus CXXI. Bodianus.

No processes on the gill-lid; plates of the gill-lid spinous; one dorsal fin.

The genus contains twenty-four species. The most remarkable species is the B. palpebratus, first accurately described by Pallas. It has a moveable membranaceous plate above each eye, supposed to assist the animal in regulating the admission of light to that organ. It is a native of Amboyna. The B. pentacanthus, whose trivial name La Cepede, with his wonted love of barbarisms, has changed into jaguar, is a native of the coast of the Brazils. It prefers the mouths of large rivers, near which it grows very fat, and its flesh acquires an increased degree of delicacy and flavour. It is there termed jaguar. The B. aya frequents the lakes of Brazil, and is there salted or dried in the sun as an article of trade. It multiplies very rapidly, and might probably, with little difficulty, be translated to the fresh water lakes of Europe. Its flesh is esteemed good. The B. guttatus of Bloch, changed by La Cepede into B. Jacob-evertsen, the name of a Dutch sailor, is found at St Helena, the East Indies, and Japan. It becomes very fat, and is eagerly sought after by Europeans. The B. apua is another of the Brazilian species used as food. Its flesh is oily, and of exquisite flavour.

Genus CXXII. Tœnianotus.

One or more spines on the gill-lid; dorsal fin very long.

This genus, from *ταινια*, *tenia*, and *νωτος*, *dorsum*, contains only two species, remarkable for their lengthened shape. The first species, T. latovittatus, was observed by Commerson in the isle of France. He found in its stomach the fragments of corals and of shells. Its teeth are very small, and its tongue and palate destitute of asperities; yet the hardness of its jaws, the number of its teeth, and the continuance of its efforts, enables it to triturate those hard bodies, for the performance of which, in other fishes, more powerful grinders are provided. The second species, T. triacanthus, has the tail rounded, while in the former it is forked. Its habitat is unknown, as it was found preserved in spirits in the Dutch collection, during its captivity in Paris.

Genus CXXIII. Sciæna.

Gill-lid furnished with spines, but destitute of processes; two dorsal fins.

This genus contains eleven species, distributed into sections from the form of the tail. They differ from the genus Bodianus chiefly in the number of the dorsal fins. The *Sciæna coro* is a native of the Brazils, and is taken at all seasons, although its flesh is said to be dry and insipid. The Sciæna umbra, the coracinus of the ancients, is the most important species of the genus, and has been long known. It inhabits the Mediterranean and Adriatic seas, and is found peculiarly abundant in the Nile. It lives in troops, and feeds on crustaceous and testaceous animals. It is esteemed excellent food when in season. Those which are found in fresh water are reckoned preferable to those taken in the sea, and the young are considered as more palatable than the old. The ancients attributed to this fish the most extraordinary medical virtues.

Genus CXXIV. Micropterus.

Rays of the second dorsal fin short.

This genus contains one species, which La Cepede has named in honour of Dolomieu. We are ignorant of the discoverer and the locality of this species; it was found in the museum at Paris.

Genus CXXV. Holocentrus.

One dorsal fin; one or more spines, and a process on each gill-lid.

Bloch formed this genus from species chiefly belonging to the Perca of Linnæus. At present, it contains sixty-five species, divided into sections from characters furnished by the caudal fin. The H. schratzer is found abundantly in the Danube and its tributary streams. Its flesh is white, firm, and salutary, and of a pleasant taste. It feeds on small insects and worms, and spawns in the spring. So valuable a fish ought to be translated to other countries. Although it soon dies when taken from the water, yet with care it may be conveyed to a distance, or the spawn may be used as a substitute.

Genus CXXVI. Perca. *Perch.*

Two dorsal fins; one or more spines, and a process to the gill-lid; with or without a beard.

This genus, as it now stands, contains fourteen species. The common perch of our lakes may be regarded as the most important species of the genus in an economical point of view. The *P. umbra*, the umbra of the ancients, another valuable species, chiefly resides in the Mediterranean. Its head is compressed and covered with small scales, and it has a thick short cirrus on the lower jaw. Its flesh is firm, but easy to digest, and its head was esteemed a favourite morsel by the ancient Romans. It feeds on sea weeds and small worms. From the skins of some of the species an isinglass is prepared, little inferior to that which is obtained from the air-bag of the sturgeon.

Genus CXXVII. Harpe.

Many large strong teeth in each jaw; in the upper jaw small compressed teeth in the intervals between the larger ones; dorsal, ventral, and anal fins large and falcated.

This genus was instituted by La Cepede, and contains only one species, H. cæruleo-aureus, of which little is known. It is described from the drawings of Plumier.

Genus CXXVIII. Pimelepterus.

The whole, or a great part of the dorsal, anal, and caudal fins adipose.

This genus, from *πιμελη*, *pinquedo*, and *πτερον*, *pinna*, contains one species, viz. P. Bosquii, named in honour of M. Bosc, the discoverer. It is found in the Atlantic Ocean, and follows vessels, picking up the fragments of food thrown overboard. It keeps in the eddy at the rudder. It is very difficult to catch, as, with considerable dexterity, it bites off the bait without swallowing the hook. According to Bosc, it is sought after as food by the French, but neglected by the English. In its manners it bears a near resemblance to the pilot fish.

Genus CXXIX. Cheilio.

Snout depressed; head and gill-lid destitute of small scales; gill-lid carved; under jaw pendant; dorsal fin low and long, ventral fins small.

This genus, from χειλος, *labrum*, contains two species, first observed by Commerson at the Mauritius. The first is termed C. auratus, on account of its golden yellow colour. The lateral line is spotted with black points. The flesh is white, and of a pleasant taste, but disregarded, as it is very common. The second species is termed C. fuscus. The colour is brown, having the ventral fins white, and the dorsal and anal fins spotted with white.

Genus CXXX. Pomatomus.

Gill-lid notched at its upper posterior margin, and covered with scales like those on the back; anal fin adipose.

The P. skib of La Cepede is the only known species. It inhabits the bays and mouths of rivers in Carolina, and is there called skibjack. It performs its motions in a remarkably rapid manner, darting suddenly to a considerable distance. Its flesh is reckoned good. It was observed by Bosc during his residence in the United States.

Genus CXXXI. Leiostomus.

Jaws without teeth, and entirely covered with the lips; the mouth under the snout.

Bosc is the discoverer of L. xanthurus, the only known species, termed in Carolina *yellow-tail*. La Cepede formed the genus from λειος, *lævis*, and στομα, *os*. It differs from the perches in the absence of a process to the gill-lid, and in wanting teeth.

Genus CXXXII. Centrolophus.

A longitudinal crest, and row of distant spines, in part concealed in the skin, above the nape; one dorsal fin.

This genus was instituted by La Cepede to include a fish sent him from Fechamp by M. Noel of Rouen. It was called by the fishermen Le Negre, and hence he has termed the species C. niger. It is of a black colour. The eyes are large, and in front of the dorsal fin there are three spines placed vertically, or pointing forwards.

Genus CXXXIII. Eques.

Two dorsal fins; the rays of the first ending in long filaments; teeth numerous, rigid, and fixed.

The E. Americanus is the only known species of the genus, and has hitherto been found only in the seas of the new continent. It is the Chætodon lanceolatus of Gmelin. In point of brilliancy, and variety, and disposition of colours, this fish has few rivals. The head is small and compressed; the snout rounded. The genus was formed by Bloch.

Genus CXXXIV. Leiognathus.

Jaws without teeth; a strong curved spine on both sides of each of the soft rays of the dorsal fin; a long flattened scaly appendage near each ventral fin; gill-lid carved and destitute of small scales.

This genus (from λειος, *lævis*, and γναθος, *maxilla*) contains only one species, viz. *L. argenteus*, a native of Tranquebar. It was first described by Bloch under the title Scomber edentulus, but it differs from the mackrel in being destitute of teeth. The head, body, and tail, are also compressed, and the opening of the mouth is very small. Its flesh is fat and agreeable to the taste; and being found at all seasons, is of great use to the inhabitants of those shores which it frequents.

Genus CXXXV. Chætodon.

One dorsal fin; gill-lid destitute of processes; teeth small, flexible, and moveable; opening of the mouth small.

This genus has obtained its present name from χαιτη, *seta*, and ὀδους, *dens*. La Cepede has enumerated forty-two species. They chiefly inhabit tropical seas. Their flesh is excellent food, and they are much sought after by sailors.

They are remarkable for their form and the brilliancy and variety of their colours. The limits by which the different species are separated are ill defined, so that much confusion prevails in their nomenclature. They all inhabit the seas of tropical countries, and were unknown or disregarded by the ancients. The skeletons of some species have been found along with other ruins of the animal kingdom, in the Strata at Mount Bolca. La Cepede particularly mentions the remains of the Chætodon vespertilio and teira. The Ch. marginatis appears to prefer the mouths of rivers, is very common at the Antilles, and its flesh is good. The flesh of the Ch. macrolepidotus, a native of the East Indies, is said, in point of delicacy, to resemble the sole. But the most extraordinary species is the Ch. rostratus, a native of the fresh waters of India. Dr Shaw, after informing us that its prey consists of the smaller kinds of insects, says, "When it observes one of these, either hovering over the water, or seated on some aquatic plant, it shoots against it from its tubular snout a drop of water, with so sure an aim as generally to lay it dead, or at least stupified, on the surface. In shooting at a sitting insect, it is commonly observed to approach within the distance of from six to four feet before it explodes the water. When kept in a state of confinement in a large vessel of water, it is said to afford high entertainment by its dexterity in this exercise; since, if a fly, or other insect, be fastened to the edge of the vessel, the fish immediately perceives it, and continues to shoot at it with such admirable skill as very rarely to miss the mark."

Genus CXXXVI. Acanthinion.

One dorsal fin; teeth small, flexible, and moveable; two or more naked spines in front of the dorsal fins.

The three species, of which this genus consists, were formerly included in the genus Chætodon; but the spines, placed behind the head, form a sufficient mark of distinction, and is expressed in the name of the genus from ακανθα, *spina*, and ινιον, *occiput*. The first species, A. rhomboides, is a native of the American seas, as is also the A. glaucus. The flesh of the last species is white and nourishing, and sought after as food. It sometimes grows to the length of 18 inches. The third species inhabits the rocky shores of Arabia, where it was observed by Forskael. It has something of the habit of a flounder, and seldom exceeds a foot in length.

Genus CXXXVII. Chætodipterus.

Body and tail compressed; two dorsal fins; teeth small, flexible and moveable; gill-lid destitute of processes and spines.

La Cepede instituted this genus for the reception of C. Plumierii. This species is nearly as deep as it is long, and its sides are lozenge shaped. The general colour is green, mixed with yellow, crossed by six narrow bands of deep green. It was observed in the West Indies by Plumier; and prefers a stony bottom.

GENUS CXXXVIII. POMACENTRUS.

One dorsal fin; gill-lid furnished with a process, but destitute of long spines; teeth small, flexible and moveable.

This genus contains seven species. They inhabit the seas of warmer countries, and in general exhibit a fine display of colours. One species has indeed obtained the name of Peacock, (P. pavo,) from the variety and lustre of its colours. It is a native of the Indian seas, and was first described by Bloch.

GENUS CXXXIX. POMADYSIS.

Two dorsal fins; teeth small, flexible and moveable; gill-lid furnished with a process.

Forskael discovered, in the Arabian sea, the only species of the genus termed P. argenteus, with whose habits we are still unacquainted.

GENUS CXL. POMACANTHUS.

One dorsal fin; teeth small, flexible, and moveable; gill-lid furnished with long spines, but no process.

The seven species included under this head, were formerly arranged in the genus Chætodon. The Pecanescens, a native of Arabia, and first described by Forskael, is sought after as food, and its flesh is agreeable. The P. paru, a native of the American seas, is likewise much sought after as food, and is taken by the hook.

GENUS CXLI. HOLACANTHUS.

One dorsal fin; teeth small, flexible, and moveable; gill lid with a process and spines.

This genus contains thirteen species. They inhabit the tropical seas, and are elegantly ornamented with curved coloured bands. The species are divided into sections from circumstances connected with the tail. The Holacanthus imperator is not only remarkable on account of the brightness and distribution of its colours, but of its excellence as food. It is an inhabitant of the Indian ocean, and its flesh is remarkably fat and palatable, reckoned equal in point of flavour and richness to the salmon. It is considered as superior to any other fish known in that vast ocean. It grows to about a foot in length, and is of an oval shape.

GENUS CXLII. ENOPLOSUS.

Two dorsal fins; teeth small, flexible, and moveable; a process and one or more spines on the gill-lid.

This genus, from ενοπλος, *armatus*, was instituted by La Cepede, and includes only one species, named Whitii, in honour of the discoverer. See White's *Tour*, *New South Wales*, p. 254. tab. 39. It was at first termed Chætodon albescens. Its colour is white, tinged with blue, and silvery.

GENUS CXLIII. GLYPHISODON.

One dorsal fin; body and tail compressed; teeth indented or carved.

This genus, formed from γυφις, *incisura*, and οδους, *a tooth*, contains two species. The G. moucharra of La Cepede, Chætodon saxatilis of Bloch, is found on the coast of Arabia, as well as on the shores of the Brazils. It remains always in deep water, among corals, on the polypi of which it subsists. Although its flesh is white, yet it is dry and insipid. The flesh of the other species, G. kakaitul of La Cepede, the Chætodon maculatus of Bloch, a native of the fresh waters of Surinam and Coromandel, is so full of bones, that none but the negroes make use of it.

GENUS CXLIV. ACANTHURUS.

One dorsal fin; body and tail compressed; one or more spines on each side of the tail.

The name of the genus is derived from ακανθα, *spina*, and ουρα, *cauda*. There are six species, the most remarkable of which is the A. chirurgus or Lancet fish, so called from the wounds which it inflicts with its caudal spines, being deep, and accompanied with a flow of blood. It is found in the sea at the Antilles, where it is much sought after for dietetical uses. The A nigricans is found in the warmer seas of both continents. It feeds on small crabs and shells, and its flesh is firm and palatable.

GENUS CXLV. ASPISURUS.

One dorsal fin; body and tail compressed; a hard shield-like plate on each side of the tail.

This genus, from αςπις, *clypeus*, and ουρα, *cauda*, contains only one species, viz. A. sohar. It was first described by Forskael, who found it in the Arabian gulf. It lives on the remains of organised bodies, and resides near the shore.

GENUS CXLVI. ACANTHOPODUS.

One dorsal fin; one or two spines in the place of each ventral fin.

This genus contains the chætodon argenteus and Bodaertii of Gmelin, of whose history little is known.

GENUS CXLVII. SELENE.

Two dorsal fins, with spines in the space between them.

This genus, from σεληνη, *luna*, contains two species, natives of the West Indies and America. The first, termed S. argentea, was described by La Cepede from the drawings of Plumier; and from its shape is termed by the natives moonfish. The second, S. quadrangulatus, is the Faber marinus fere quadratus of Sloane, and placed in the genus zeus by many naturalists. In shape it is almost square.

GENUS CXLVIII. ARGYREIOSUS.

One dorsal fin, with spines in front.

The zeus vomer of Linnæus is the only species of this genus. It is common to the coast of Norway and the Brazils. This is a very remarkable circumstance, indicating a constitution capable of supporting opposite extremes of temperature. In whatever situation it is found, it presents the same form, and exhibits the same beauty of colouring. It arrives at the same size in the seas of both continents, and in both its flesh is esteemed as excellent. The name of the genus is derived from αργυρεος, *argenteus*.

Genus CXLIX. Zeus. *Doree.*

One dorsal fin, without spines in front, the rays terminating in long filaments.

This genus, as now restricted, contains only three species. The first of these is the Z. ciliaris, so named from a few of the last rays of the dorsal and anal fins, extending like hairs far beyond the connecting membrane, and even farther than the tail itself. La Cepede, in the absence of observation, hazards the conjecture, that the animal may use these long filaments to entice its prey to approach, as a few fishes are known to do, who possess long filaments. He even supposes, that by means of these, twisted round aquatic plants, the fish maintains itself stationary for particular purposes. These conjectures are supposed to be rendered probable from the facts which are established with regard to the cunning of another species, the Z. insidiator, which, like the chætodon rostratus, ejects water through its tubular mouth on flies that alight on aquatic plants, and thus stupifies and secures them; but the analogy is here very remote, as the points of resemblance are so few. The flesh of this last species is rich and agreeable; a hook baited with a fly is employed in taking it. Both species are natives of the Indian seas. The third species is the Z. faber, or common doree. It is a native of the Northern Atlantic and Mediterranean seas, and was well known to the ancients.

Genus CL. Gallus,

Two dorsal fins, without spines between them.

La Cepede formed this genus for the reception of the Zeus gallus of other writers. This species is very widely distributed, being common to Greenland, the Mediterranean, South America, and the East and West Indies. Its flesh is esteemed good. It feeds on small worms and fishes.

Genus CLI. Chrysotosus. *Opah.*

One dorsal fin; jaws destitute of teeth; body and tail compressed; height equal to the length.

The generic name is from *χρυσωτης*, *aurator*. The Zeus luna of Linnæus is the only species. It is found in the Northern and Atlantic seas, and from the inspection of drawings in the Museum at Paris, La Cepede is disposed to consider that it likewise inhabits the Chinese seas. Dr. Mortimer says, that the Prince of Anamaboe, on the coast of Africa, recognised, in an English specimen, a fish which he said was common on his own shores, and very good to eat.

Genus CLII. Capros.

Body and tail compressed; jaws destitute of teeth; two dorsal fins.

This genus, from *καπρος*, *aper*, was instituted by La Cepede, and so named from the resemblance the only known species bears to a wild boar. It is the Zeus aper of Linnæus, and has long been known as an inhabitant of the Mediterranean. It is scarcely three inches in length, and is of a reddish colour; the snout is somewhat produced and sharpish, and protrudes in the act of opening like the common Doree. Its flesh is said to be very coarse and of a rank flavour.

Genus CLIII. Pleuronectes. *Flounder.*

With pectoral fins; both eyes on the same side of the head.

This extensive and important genus, containing upwards of forty species, derives its name from *πλευρον*, *latus*, and *νηκτης*, *natator*. The genus is divided into two sections, from the position of the eyes, both of which are always placed on one side of the head. In the first division are placed those having the eyes on the right side, and in the second those having the eyes on the left. It sometimes happens, however, that a species with eyes in general on the right side, has been found having its eyes on the left, all the other characters of a species remaining fixed. This circumstance points out the propriety of being cautious in relying on the character furnished by the position of the eyes.

The genus contains at present upwards of thirty species, but a more attentive examination of their characters, than has hitherto taken place, would perhaps point out the propriety of suppressing a few as varieties, and some as hybrids. Their flesh is white, pleasant, and easily digested; and as the species are of considerable size, they are much sought after as food. Several species delight to reside at the mouths of rivers, and even to live in the fresh water. By a little attention these might be translated into lakes and ponds, and thus not only the quantity, but the variety of food furnished might be increased. All the species prefer a sandy bottom, and they are much more numerous in cold than in hot countries.

Genus CLIV. Achirus.

Both eyes on the same side of the head; no pectoral fins.

This genus, from *α* privative and *χειρ*, *manus*, was formed for the reception of those species which have no pectoral fins, formerly included in the genus pleuronectes. There are six species known. The A. marmoratus inhabits the sea at the Isle of France, where it was observed by Commerson. Its flesh is esteemed excellent. We may observe, that Commerson observed a row of pores at the base of the dorsal and anal fins, equal in number to the rays in those fins, which, upon being pressed, poured out a milky mucus.

Order XX. ABDOMINAL.

Genus CLV. Cirrhitus.

Gill-flap of seven rays, the last remote; beards united by a membrane, and placed near the pectoral fins.

This genus contains only one species, described from the MSS. of Commerson. It bears a close resemblance to the species of the genus Holocentrus and Perca. The seven filaments of the beard are long, and united by a membrane, resembling a second pectoral fin. There is no mention made of the place where it was found.

Genus CLVI. Cheilodactylus.

Body and tail compressed; upper lip double and extensile; head abrupt.

There is only one species belonging to this genus, from the East Indies; and described fom a specimen in the Dutch collection.

Genus CLVII. Cobitis. *Loche.*

Head, body, and tail cylindrical; eyes near the summit of the head; no teeth; bearded; one dorsal fin; scales minute.

This genus contains three species, two of which have been long known to naturalists. The first, *G. barbatula*, or common Loche, is common in the waters of the southern and middle districts of Europe. It prefers rivers which have a gentle current, to those which are either rapid or dormant. Its flesh, during autumn and spring, is esteemed a great delicacy, superior indeed to all other fresh water fish, especially when it is killed in wine or in milk. It has been translated into some of the northern countries of Europe. It soon expires when removed from the water, and even when placed in water in a state of rest. The *G. tænia* differs in external character from the last, chiefly in having a double spine on each side of the head, a little before the eyes. When taken from the water, it emits a grunting sound like the gurnard, and is more vivacious than the last. Its flesh is dry and insipid. The G. *Tricirrhata* was observed by M. Noel in the rivulets near Rouen. Its beard consists of three filaments.

Genus CLVIII. Misgurnus.

Body and tail cylindrical; one short dorsal fin; jaws with teeth.

The *Cobitis fossilis* of Linnæus is the only known species of the genus. It inhabits marshes and lakes with a muddy bottom. It is remarkably vivacious, and is capable of surviving among mud, provided it be moist. This is a wise provision of nature, by which this animal is fitted for those situations in which it resides. When the pools or ditches in which it lives dry up, this animal buries itself in the mud, and lives securely until the rain replenishes its pond. As it is frequently dug up in this situation, it has been supposed to search for its food in the ground like an earthworm. It will remain alive under ice, provided there is a small portion of unfrozen water around it. It appears to be extremely sensible to the changes in the state of the atmosphere. During calm weather, it remains at rest on the mud in the bottom of the ditch; but, at the approach of a storm, or change of weather, it rises to the surface of the water, and moves about with seeming uneasiness. Hence it is often kept in vessels within doors by the curious, for the purpose of predicting the changes in the weather. In winter, it buries itself in the mud, and issues forth in spring, when it spawns. It is found in the marshes and lakes of the midland parts of Europe. Its flesh is soft, and but little sought after.

Genus CLIX. Anableps.

Pupil of the eye double.

The A. surinamensis, the only known species, was the cobitis anableps of Linnæus. It is a native of the rivers of Surinam, near the sea coasts. We have already adverted to the extraordinary structure of the eyes in this fish, which appear as if furnished with two pupils. The anal fin in the male is composed of nine rays, the last three or four only being distinct. The preceding ones are in part united with a hollow conical appendix, covered with scales, and open at the apex. This opening communicates with the milt and the bladder of urine, and is the passage through which they escape. The species is ovoviviparous.

Genus CLX. Fundulus.

Body and tail nearly cylindrical: jaws with teeth; no beard; one dorsal fin.

There are two species in this genus; the first of these is the *cobitis heteroclita* of Linnæus, whose trivial name is now changed by La Cepede into *F. mud-fish!* It was observed in Carolina by Dr. Garden, and was there named mud-fish. The other species inhabits Japan, and was first described by Houttuyn in Act. Haarl. xx. 2. p. 337. n. 26. In the former species there are six rays in each of the ventral fins; in the latter, eight rays.

Genus CLXI. Colubrina.

Head lengthened; above covered with scales, like those of a serpent; no dorsal fin.

This genus has been constructed for the reception of a species, whose existence rests on the authority of a Chinese drawing in the Dutch collection. La Cepede has termed it C. Chinensis.

Genus CLXII. Amia.

Head covered with plates, divided by sutures; teeth in the jaws and palate; beard on the upper jaw.

The A. calva, the only known species, is a native of Carolina. It is a fresh water fish, and was originally described by Linnæus from specimens sent him by Dr. Garden. It does not appear to have fallen under the inspection of any other ichthyologist.

Genus CLXIII. Butyrinus.

Head without scales, and one-fourth of the whole length of the animal; one dorsal fin.

The B. bananus is the only species, of which little satisfactory has been ascertained. It is described by La Cepede from the MS. of Commerson. The tail is forked; on each side of the back there are four longitudinal waved lines, and the lateral line is nearly straight.

Genus CLXIV. Tripteronotus.

Three dorsal fins, and one anal fin.

The hautin of Rondeletius; the T. hautin of La Cepede is the only known species. It is the only fish of this order which possesses three dorsal fins; and, what is more extraordinary, when the number of the dorsal fins is considered, it has only one anal fin.

Genus CLXV. Ompok.

Jaws with a beard and teeth; no dorsal fin; anal fin long.

The only known species of this genus is the O. siluroides. A specimen of this fish was found in the Dutch collection, having the provincial name *Ompok* attached to it.

Genus CLXVI. Silurus.

Head large, depressed; mouth terminal, bearded; one short dorsal fin.

This genus, formerly very extensive, contains at present only eleven species. They are distributed into two sections, from the form of the tail. The *S. glanis*, or common silure, is one of the largest of the inhabitants of the fresh waters. It grows sometimes to the length of 15 feet, and to the weight of 300 pounds. The head is depressed; the snout rounded in front; the lower jaw is longest. There are two filaments on the upper jaw, and four on the under. The general colour is green, mixed with black. The eyes are remarkably small. It inhabits the larger rivers of Europe, Asia, and Africa, and is seldom found in the open sea. Its motions are all slow. It lurks under some root, with its body sunk in part in the mud; and, by moving the filaments of its beard, it entices the small fishes to approach, when it seizes them. The flesh is white, fat, and pleasant to the taste, but very difficult to digest. The air-bag furnishes isinglass, which is considered excellent. The skin dried.

and rubbed with oil, is sometimes used as a substitute for glass. This species might be translated with ease into this country; and there appears to be several favourable situations for its growth. The *S. fossilis*, which is a native of the East Indies, is sometimes dug out of the mud like the Misgurnus, which it appears to resemble in habit.

GENUS CLXVII. MACROPTERONOTUS.

Dorsal fin very long.

The species of this genus, four in number, were separated by La Cepede from the Siluri, from which they differ in the greater length of the dorsal fin. If such a character be admitted as sufficient to constitute a genus, we fear that the science of ichthyology will speedily revert to that state of confusion and uncertainty which prevailed in the days of Aristotle and Pliny. The first species is the *Silurus anguillaris* of Linnæus, which La Cepede now names M. charmuth. Geofroy, according to La Cepede, has discovered a cavity connected with the gills, which the animal has the power of closing. In this cavity there is a flat cartilaginous substance, divided into many branches, having the surface covered with numerous ramifications of blood-vessels. This organ he considers as a supplementary gill, and is disposed to believe that the circulating system is performed by means of three separate ventricles. But from the details which we have seen, it is impossible to form any distinct conception of such an arrangement. This species is common in the Nile. The *M. batrachus* is a native of Asia and Africa. The skin is so transparent on the sides, that the divisions of the muscles can be perceived like so many transverse lines. The remaining species of the genus, viz. M. fuscus and hexacicinnus, are described on the authority of Chinese drawings in the Library of the Museum at Paris.

GENUS CLXVIII. MALAPTERURUS.

Dorsal fin adipose, and placed near the tail; furnished with electrical organs.

The Silurus electricus of Linnæus is the only known species of the genus. It has been long known as possessing those benumbing qualities which are so remarkable in the Torpedo. It is found in many of the African rivers. See the article ELECTRICITY.

GENUS CLXIX. PIMELODES.

Two dorsal fins; the second adipose.

This genus contains twenty-four species, formerly included in the genus Silurus. They are divided into two sections from the form of the tail. The P. bagre is a native of the great rivers on the American continent. There are four filaments in the beard, two orifices to each of the nostrils, and a lengthened cavity on the head. The flesh is held in little estimation. The P. ascita exhibits one of the most remarkable examples of reproduction in the whole system. The eggs, while still in the uterus, gradually increase in size, and distend the skin of the belly until it burst longitudinally. To this slit, the farthest advanced egg approaches, and its integuments give way, opposite to the head of the animal. The embryo is left resting on the yolk, and attached to it by a cord of vessels. When all the yolk is absorbed, the remains of the egg pass through the slit, and the animal, separated from its mother, begins to enjoy an independent existence. Other eggs come forward to the same position; and when all have been excluded, the edges of the opening meet, and speedily grow together, when a fresh rupture takes place in the following season. This is a curious instance of the ovoviviparous mode of reproduction. This species is found both in the East and West Indies.

GENUS CLXX. DORAS.

Two dorsal fins; the second adipose; longitudinal rows of large hard plates on the sides of the body.

Two species; viz. D. carinatus and costatus, belong to this genus. They were formerly considered as Siluri. The first of these is a native of Surinam; the second is common to America and India. Its flesh is said to have a very unpleasant taste; and the formidable spines with which it is armed, are considered by the fishermen as venomous. For the purpose of curing the wounds which they receive by accident from this fish, they anoint them with the oil which they obtain from its liver, a balm which they frequently carry about with them.

GENUS CLXXI. POGONATHUS.

Dorsal fins, two in number, supported by rays; body with lateral plates.

This genus differs from the former, in the second dorsal fin being radiated. It contains two species, first observed by Commerson. The first named *P. courbina*, a native of Plate river, has twenty-four filaments in the beard of the under jaw. It grows to the length of more than two feet, and weighs upwards of six pounds, but its flesh is soft and insipid. The *P. auratus* has only one filament in the beard, on the under jaw.

GENUS CLXXII. CATAPHRACTUS.

Two dorsal fins; the second with one ray; body with lateral plates.

We owe this genus to Bloch. It contains three species. The first of these, named C. callichthys, is found both in the East and West Indies. It lives in limpid running fresh water, and is said to creep out of the water to a considerable distance from the rivers, and to dig holes in the ground, in which it conceals itself. It seldom exceeds a foot in length. Its flesh is said to be palatable. It has four filaments in the beard, and the tail is rounded. The C. *Americanus* has six filaments in the beard, and has hitherto been observed only in Carolina. The C. *punctatus* has four filaments in the beard, and the tail is in the form of a crescent. It is found in the rivers of Surinam.

GENUS CLXXIII. PLOTOSUS.

Two dorsal fins; the second of these, and the anal fin, united with the caudal.

The P. *anguillaris* is the only known species, and is a native of the Indian seas. It was inserted by Bloch in his genus *Platystachus*.

GENUS CLXXIV. AGENEIOSUS.

Two dorsal fins; the second adipose; chin beardless.

The two species, A. armatus and inermis, are natives of the Indian and South American seas, and were formerly included among the Siluri. The first of these has a remarkable long serrated bony process on each side of the head, near the nostrils.

GENUS CLXXV. MACROMPHOSUS.

Mouth beardless; first ray of the first dorsal fin lengthened; strong and notched; second dorsal fin supported by rays.

The Silurus cornutus of Gmelin, is the only known species of the genus. It was first described by Forskael. The snout is about half the length of the body, compressed, and a little recurved at the top. The first ray of the first dorsal fin is serrated beneath for about half its length, and extends nearly to the tail. This fin contains nine rays, the second dorsal fin contains only six.

Genus CLXXVI. Centranodon.

Head depressed, and covered with large hard plates; mouth at the extremity of the snout, without teeth or beard; one or more spines on each gill-lid.

This genus contains only one species, formerly termed Silurus imberbis. It was first described by Houttuyn, and is a native of Japan. The body and tail are lengthened, and covered with distinct scales. The eyes are large and approaching.

Genus CLXXVII. Loricaria.

Body covered with a coat of mail; mouth inferior; lips extensile; one dorsal fin.

The genus contains two species, viz. L. setifera, and maculata, natives of the American seas. The mouth of the first is surrounded by a number of small filaments, which are not observable on the latter. These fish bear a very close resemblance to the sturgeon in the armature of the body, the position of the mouth, and the great size to which they attain.

Genus CLXXVIII. Hypostomus.

Body covered with a coat of mail; mouth inferior; lips extensile; two dorsal fins.

The presence of the second dorsal fin, is the character by which this genus is distinguished from the preceding. The only known species is the H. guacari of La Cepede, a native of the American rivers. It is the Loricaria plecostomus of Linnæus. The flesh is said to be good.

Genus CLXXIX. Corydoras.

Body and tail covered on the sides with large plates; mouth terminal; no beard; two dorsal fins, with more than one ray in each.

A specimen of the C. Geoffroy, the only known species, was found in the Dutch collection. Its native country is unknown. In the first dorsal fin, there are two spinous and nine articulated rays. The tail is forked.

Genus CLXXX. Tachysurus.

Mouth terminal, bearded; the first ray of the dorsal and pectoral fins strong; dorsal fins two, radiated.

The existence of the T. sinensis, the only known species, rests on the authority of a Chinese drawing in the Dutch collection.

Genus CLXXXI. Salmo. *Salmon.*

Mouth terminal; head compressed; second dorsal fin adipose; first dorsal fin as near the head as the ventral fins; upwards of four rays in the gill-flap; teeth strong and numerous.

The characters of the twenty-nine species which compose this important and extensive genus, have not been satisfactorily determined. Naturalists, in general, attending to the characters furnished by colour and by the number of rays in the fins, have, we fear, multiplied the species unnecessarily. At present, indeed, it is difficult, from the characters in ordinary use, to determine the young animals as of the same species with the old. Recourse must be had to the characters furnished by the organs of respiration, and the intestines; and under the guidance of the marks which they furnish, the species may be satisfactorily determined. All the species of this genus are elegant in their form, finely variegated in colour, and rapid in their movements. Their flesh is excellent. This in some changes to a fine red upon boiling, in others it continues white.

Genus CLXXXII. Osmerus. *Smelt.*

First dorsal fin farther removed from the head than the ventral fins.

The character by which this genus is distinguished from the preceding is so unimportant, that we are at a loss to account for the older naturalists being disposed to separate them. The genus contains six species. The O. eperlanus, or common smelt, is well known. The other species are natives of warmer countries.

Genus CLXXXIII. Coregonus.

Teeth in the jaws none, or very small.

Twenty species are described by La Cepede. They were included by Linnæus in the genus Salmo. The C. *lavaretus*, or gwiniad, is sought after on account of its flesh, which is white and tender. They die very soon after they are taken, and hence it is very difficult to translate them. The C. thymallus, or grayling, is likewise another species sought after as food. Its flesh is firm, white, and pleasant to the taste, but considered as difficult to digest. The eggs, or spawn of the C. migratorius, are eaten in Siberia, its native country. The C. Wartmanni, a native of the Swedish lakes, is either eaten in a fresh state, when it is considered as excellent, or salted and carried to a distance. At the age of three years, it is sometimes seized with a distemper which gives it a red colour.

Genus CLXXXIV. Characinus.

Gill-flap consisting of four rays, or more.

Generic characters, so vague and trivial as those by which the three preceding genera are distinguished, indicate the imperfect state of the science. Sixteen species are described by La Cepede. The first of these is the C. piabucu, so named from its provincial name in Brazil, although termed by Gmelin and others argentinus. It is a native of the middle parts of America, inhabiting rivers. It is easily taken with a hook. Its flesh is white and palatable. The C. bimaculatus, found in the rivers of Amboyna and Surinam, is likewise remarkable for the whiteness and delicacy of its flesh. All the species, indeed, bear so close a resemblance to the salmon, that they might have continued under the same genus, and in a separate section, with advantage to the student.

Genus CLXXXV. Serrasalmus.

Under part of the belly carinated, and notched like a saw.

The S. rhombeus is the only known species. It is a native of the rivers of Surinam, and was first described by Pallas. It is said to attain to a considerable size. In shape, it bears some resemblance to the Chætodons. It is said to be very voracious, and that it will attack ducks which happen to be swimming on the water. Its flesh is white, firm, and fat, and held in great estimation. The fish is of a reddish tinge, with black points; the sides are silvery, and the fins grey.

GENUS CLXXXVI. ELOPS.

Gill-flap of thirty rays or more; eyes approaching; one dorsal fin; a scaly appendage near each ventral fin.

The Saurus maximus of Sloane, now Elops saurus, is the only known species. It is found in Jamaica, where it is called the Sein Fish, or Sea Galley Wasp. In its general appearance, it approaches the common pike. The tail is much forked, and armed both above and below by a strong spine, forming a first or spiny ray on each side of the tail. In the specimen examined by Bloch, no spinous ray in the caudal fin could be perceived. Dr Shaw, however, observed it in a fine specimen preserved in the British Museum.

GENUS CLXXXVII. MEGALOPS.

Eyes large; gill-flap of at least twenty-four rays.

The M. *filamentosus*, brought from Madagascar by Commerson, is the only species yet discovered. The rays in the gill-flap are singularly numerous. The last ray of the dorsal fin extends backwards in the form of a long filament. The species bears a near resemblance to the preceding.

GENUS CLXXXVIII. NOTACANTHUS.

Body and tail lengthened; the nape raised, and anal and caudal fins united; spines in place of a dorsal fin.

The Acanthonotus of Bloch, is the only known species. It grows to nearly three feet in length. It is a native of the East Indies, and is said to be remarkably active in all its motions, and exceedingly voracious.

GENUS CLXXXIX. ESOX PIKE.

Opening of the mouth large; jaws with strong teeth; snout depressed; dorsal and anal fins short, nearly equidistant from the head.

This genus contains nine species, which are divided according to the form of the tail into two sections. The common pike, E. lucius, now common in the lakes and rivers of Europe, is a strong active voracious fish, and is not unfrequently compared to a shark. It preys indiscriminately on young fish, serpents, frogs, and the young of aquatic birds. Its flesh is held in some estimation, and is used either fresh, salted, or smoked. The eggs or spawn are formed into a sort of caviar, which is not considered as wholesome. When castrated, pikes are said to become speedily fat. The *E. belone*, or gar-fish, is an inhabitant of the sea, and approaches the shore to spawn. It is considered as the forerunner of the mackrel. The bones become green on being boiled. The flesh is dry and insipid. The E. gladius, which is common to the shores of Asia and America, furnishes a pleasant and wholesome food, and is easily obtained. It multiplies very rapidly.

GENUS CXC. SYNODUS.

Dorsal and ventral fins nearly equidistant from the head; body and tail lengthened and compressed.

This genus contains five species distribtued into two sections, from the form of the tail. The only species of importance in an economical point of view, is the S. Malabaricus. It was inserted in the genus Esox by Bloch. It lives in the rivers on the coast of Malabar. Its flesh is white and palatable.

GENUS CXCI. SPHYRÆNA.

Two dorsal fins; opening of the mouth large.

The number of the dorsal fins furnishes a very obvious character, by which this genus may be distinguished from Esox, with which it was formerly united. Five species are described by La Cepede. The first of these, termed by him *S. spet*, the *Esox sphyræna* of Linnæus, has been known to naturalists since the days of Aristotle. It is found in the Mediterranean sea, and likewise in the Atlantic ocean. The flesh is white, easy to digest, and resembles in flavour the cod. It grows to upwards of two feet in length. The remaining species are new, and described from the drawings of Plumier.

GENUS CXCII. LEPISOSTEUS. *Garfish.*

Body covered with osseous scales; one dorsal fin, more distant from the head than the ventral fins.

The armature of the species of this genus resembles a coat of mail, so hard are the scales, and so closely attached to the body. The L. gavial of La Cepede is the *Esox osseus* of Linnæus. It is a native of the lakes and rivers of Europe, Asia, and America, but in the former country it is rare. The flesh is firm, white, and well flavoured, and much sought after.

GENUS CXCIII. POLYPTERUS.

Gill-flap of one ray; two blow holes; dorsal fins numerous.

The P. bichir, the only known species, exhibits many singular peculiarities of structure. It is found in the Nile, and was described for the first time by Geoffroy, in the *Bulletin des Sciences*, No. 61. The body is nearly cylindrical, long, and serpentiniform; in the anal fin are fifteen rays; the tail is rounded. It is known to the Egyptians by the name of *bichir*, and is considered as a very rare animal. It is supposed in general to inhabit the depths of the Nile, remaining among the soft mud, which it is thought to quit only at some particular seasons, and is sometimes taken in the fishermen's nets at the time of the decrease of the river. It is said to be one of the best of the Nilotic fishes, having a white or savoury flesh; and as it is hardly possible to open the skin with a knife, the fish is first boiled, and the skin afterwards drawn off whole.

GENUS CXCIV. SCOMBERESOX. *Saury.*

Jaws long; dorsal fin immediately above the anal fin; between the caudal fin and the dorsal and anal fins a number of spurious fins, as in the mackrel.

This genus, instituted by La Cepede, contains only one species, with whose history he seems to be very imperfectly acquainted. It is the Saury pike of the British Zoology.

GENUS CXCV. FISTULARIA.

Jaws long, tubular; mouth terminal; one dorsal fin.

The F. petimba of La Cepede is the only known species, It is the F. tabacaria of Linnæus. It was first described by Marcgrave in his history of the Brazils, under the name of Petimbuaba. The tail is perhaps of the most singular construction of any species in the system. It is deeply forked, and from the middle of the fircature springs a very long and thickish bristle, or process of a substance resembling that of whalebone, and gradually tapering to a fine point. A variety has been observed by Dr Bloch, in which this part was double, and the snout serrated on each side. This species inhabits the equatorial seas, lives chiefly on the smaller fishes, and its flesh is poor, and unpleasant to the taste.

Genus CXCVI. Aulostomus.

Jaws long, tubular; mouth terminal; longitudinal row of spines instead of the first dorsal fin.

The Fistularia chinensis of Gmelin is the only known species. It is a native of the equatorial sea. It feeds on small worms, and the spawn of fishes. Its flesh is said to be dry and insipid. M. Gazola supposes, that he has observed the remains of this fish in the strata of Mount Bolca.

Genus CXCVII. Solenostomus.

Jaws long and tabular; mouth terminal; two dorsal fins.

The Fistularia paradoxa of Pallas, is the only known species. It is a native of Amboyna, and in its general form appears to bear a close resemblance to the Syngnathi, or Pipe-fish.

Genus CXCVIII. Argentina. *Argentine.*

Fewer than thirty rays to the gill membrane; more than nine rays in each ventral fin; one dorsal fin; colour silvery.

La Cepede describes four species. The first of these, A. sphyræna, or Pearly argentine, is found in the Mediterranean Sea, and in the Atlantic Ocean. The skin of the air bag of this little fish is covered with a silvery powder, or rather shining silvery scales. These are carefully collected and introduced into small globules of glass, to the inside of which they are fastened with gum. These beads are termed artificial pearls, and are used as articles of dress. The A. glossodonta of Gmelin, changed by La Cepede into A. *bonuk*, was first described by Forskael as a native of the Red Sea, where he likewise found the A. *machnata*. The A. *Carolina*, so named from the country in which it has been found, is about the size of a small herring, and lives in the fresh waters.

Genus CXCIX. Atherina. *Atherine.*

Gill-flap and ventral fins, with fewer than eight rays; no teeth in the palate; two dorsal fins; a longitudinal silvery band on each side.

There are four species of Atherine described by naturalists. The A. hepsetus, or European Atherine, is by far the most common, being found in the North Sea, the Atlantic, and the Mediterranean. In general appearance, it much resembles the smelt. Its flesh is considered as uncommonly delicious. About the Greek Islands, according to Sonini, where it is seen in vast shoals, it is easily taken by trailing in the water a horse's tail, or a piece of black cloth fastened to the end of a pole; the fishes following all its motions, and suffering themselves to be drawn into some deep cavity formed by the rocks, are readily secured by means of a net.

Genus CC. Hydrargira.

Gill-flap and ventral fins with fewer than eight rays; no teeth in the palate; one dorsal fin; lateral silvery band.

Bosc discovered in Carolina the only known species of the genus, named H. *swampina*, because it is found in the swamps or lagunes. The head is depressed, the lips are extensile, the under jaw longest. This species inhabits the fresh water marshes, and as these are sometimes nearly dried up, it is compelled to shift its haunts to deeper water, which it accomplishes by a series of leaps. The flesh is unsavoury, and little sought after, but it furnishes a grateful repast to the aquatic birds which frequent its haunts.

Genus CCI. Stolephorus.

Fewer than nine rays in the ventral fins and gill-flap; one dorsal fin; no teeth; lateral silvery band.

La Cepede describes two species, viz. S. Japonicus and S. Commersonii. The former of these was first described by Houttuyn. It has five rays in the dorsal fin, while the latter species has fifteen.

Genus CCII. Mugil. *Mullet.*

Lower jaw carinate within; scales striated; two fins on the back.

There are seven species belonging to this genus. The most common is the M. cephalus, or common mullet, a fish well known to the ancients. It is to be found in almost all seas. This ascends rivers, like the salmon, to spawn; and at that time they congregate in vast shoals. At this time the fishermen endeavour to surround them with the net. They are said to grow very fat in rivers and lakes with a sandy bottom. They are esteemed excellent food when fresh, and are likewise often used salted. The spawn salted and dried forms a kind of caviar named bortargo, which is used in Italy and the midland districts of France. The M. albula, a native of the American seas, is likewise esteemed an excellant dish for the table. In the M. crenilabis, a native of the Red Sea, both lips are curiously crenulated on the edges. The M. tang, whose flesh is fat and savoury, inhabits the rivers of Guinea. The history of the remaining species requires farther elucidation.

Genus CCIII. Mugiloides.

Lower-jaw carinate within; scales striated; one dorsal fin.

The only known species, M. Chilensis, was found by Molini at Chili. It inhabits the fresh water rivers, and grows to about a foot in length.

Genus CCIV. Chanos.

Lower jaw carinate within; no teeth; scales striated; one dorsal fin; a membranaceous wing on each side the tail.

The C. Arabicus was first described by Forskael, and is the only species known. It is a native of the sea of Arabia, and was formerly inserted in the genus Mugil. The scales are large and rounded, and of a brilliant silvery colour; the head is more narrow than the body, destitute of scales, and of a green colour mixed with blue; the upper lip is grooved, and longer than the lower; the latter line is curved at its commencement, and then proceeds in a straight line to the tail. Its ordinary length is about four feet, but one variety, named *Anged*, grows to nearly twelve feet.

GENUS CCV. MUGILOMORUS.

Lower jaw carinated within; no teeth, but protuberances in their stead; more than thirty rays in the gill-flap; one dorsal fin, with an appendage to the rays.

The only known species of this genus is the Mugil appendiculatus of Bosc, the description of which was communicated by that naturalist to La Cepede. The trivial name imposed by the discoverer, was changed by the last author into Anna-carolina, in honour of his own wife.

GENUS CCVI. EXOCÆTUS. *Flying-Fish.*

Head entirely covered with small scales; pectoral fins very large, reaching to the caudal fin; gill-flap of ten rays; one dorsal fin situated above the anal fin.

The species of this genus, which are four in number, have the power of leaping out of the water, and flying for a short distance, by the aid of their long pectoral fins. The first species is the *E. volitans*, or common flying fish, and has been long known to naturalists. It is very extensively distributed, being found in the European, American, and Indian seas. In the dorsal and anal fins there are fourteen rays; fifteen or sixteen in each of the pectoral fins; ventrals small, and placed nearer the head than the middle of the whole length of the fish. The stomach can scarcely be distinguished from the intestinal canal, and the air bag is uncommonly large. According to the observations of Plumier, as quoted by Bloch, the spawn of this species (found near the Antilles) corrodes the skin of the palate or tongue. The second species, *E. mesogaster*, has twelve rays on the dorsal and anal fins; thirteen in the pectoral fins; ventral fins placed near the middle of the animal. This species was observed by Plumier in the sea near the Antilles. The E. exiliens; the dorsal fin has eleven or twelve rays; the anal fins twelve; eighteen in each of the pectoral fins; the ventral fins long, reaching to the extremity of the dorsal fin, and situated a little beyond the middle of the body towards the tail. This species frequents the same seas as the E. volitans. It is likewise found in the Mediterranean, sometimes single, sometimes in small shoals. In shape it greatly resembles a herring; its flesh is fat and delicate. The last species, *E. commersonii*, has twelve rays in the dorsal fin, ten in the anal, and thirteen in each of the ventral fins. These last are sufficiently long to reach to the middle of the dorsal fin, and are situated beyond the middle of the body towards the anal fin. The dorsal fin is marked on the part nearest the tail with a large blue spot. It is a native of the Indian seas, where it was first found by Commerson.

GENUS CCVII. POLYNEMUS.

Free rays near each ventral fin; head covered with small scales; two dorsal fins.

La Cepede describes six species, all of which were known to former naturalists. He divides them into sections, from the form of the tail. They are chiefly the inhabitants of warmer countries. The *P. plebeius* of Broussonet is termed *P. emoi* by La Cepede; the trivial name here adopted being the appellation by which this fish is known to the natives of Otaheite. It is a native of the American, Indian, and Southern seas. The flesh is considered excellent, and hence in India this species is known by the name of *royal fish*. The inhabitants of the coast of Malabar prefer the head of the fish as a delicious morsel. In these countries it is salted and dried. M. Gazola supposes that he has found the remains of this fish in the strata of Mount Bolca. The P. paradisus, or Mango fish, is reckoned one of the best esculent fishes found at Calcutta. It is known to the natives by the name of *tupsee mutchey*. It feeds on young fishes and the crustacea.

GENUS CCVIII. POLYDACTYLUS.

Free rays near each pectoral fin; head without scales; two dorsal fins.

The P. plumierii is the only known species. It bears a close resemblance to the species of the preceding genus. It is of a silvery colour; the nose is protuberant and long; the upper jaw longer than the under; the six free rays which are near the pectoral fins, resemble long threads; the second dorsal fin and the anal fin are of equal extent, placed opposite, and falcated.

GENUS CCIX. BURO.

A double process between the ventral fins; one long dorsal fin; scales small and difficult to perceive; five rays in the gill flap.

The B. brunneus is the only known species, and was described by La Cepede from the MSS. of Commerson. Over the surface there are numerous scattered small spots, of a white colour; the iris is golden and silvery; head small; nose a little pointed; upper jaw moveable, and, together with the lower jaw, furnished with one row of small pointed teeth; the back and belly are carinated, and the body and tail are compressed.

GENUS CCX. CLUPEA. *Herring.*

Jaws furnished with teeth; more than three rays in the gill-flap; one dorsal fin; belly carinated, and notched or very sharp.

La Cepede describes seventeen species of herrings, which he distributes into two sections, from the shape of the tail. The most common species, C. harengus, is one of the most important to the human race in an economical and a commercial point of view. This fish is an inhabitant of the northern seas. In Europe it is seldom found farther south than the fiftieth degree of latitude, nor farther north than the sixtieth. On the coasts of America, however, it reaches farther south. The migrations of this fish have long attracted the attention of naturalists; lengthened descriptions have been given of their marvellous journies from the arctic regions, of the course which they pursue, and the obstructions which they meet with. But these descriptions have been given from a very imperfect acquaintance with the habits of the animal. It is now clearly established, that the herrings, like all the other fishes that reside in deep water, approach the neighbouring shore at the season when they are ready to spawn, and return to their favourite haunts when the process of reproduction is finished. The food of the herring consists of the smaller *crustacea* of young fishes, even those of their own species. At the season when they are ready to spawn, their stomachs are found empty. This fish is salted as an article of trade, the process (it is said) being first tried by William Beukelen of Biervlet near Sluys. The smoking of herrings, according to La Cepede, was first practised by the inhabitants of Dieppe. In some of the northern countries, when the herrings are in abundance, they boil them in large cauldrons, and obtain oil for their lamps; the refuse they employ as manure to the ground. The sprat, *C. sprattus*, differs from the herring in having nine rays in each ventral fin, while the herring has only six; and according to Mr Neill, " if a sraight line be dropped from the fore part of the dorsal fin perpendicularly downwards, it will, in the true herring, fall a little in front of the ventral fins, but in the garvie (sprat) it will fall a little behind the same fins." This species is found in the northern countries, and also in the Mediterranean. It is used for all the purposes to which the herring is applied, and is prepared after the same manner. The *C. alosa* or *shad*, termed also from its size, mother of herrings, migrates from the sea into the fresh water rivers, like the salmon. The fry are called *white bait.* The flesh has rather a disagreeable taste. The C. encrassicolus, or anchovy, is another species of this genus held in high estimation. It inhabits the sea, and, like the herring, it approaches the shores for the purpose of spawning. The Romans expressed a pickle from this fish, which they termed a *garum.* The moderns pickle them, and as the bones dissolve entirely in boiling, the sauce is of equal value. The remaining species are chiefly the inhabitants of the seas of warmer countries. They are esculent, and possess in a greater or less degree the peculiar flavour of the herring.

Genus CCXI. Mystus.

More than three rays in the gill-flap; belly carinated; anal fin very long, and united with the caudal fin. One dorsal fin.

The Clupea mystus of Osbeck is the only known species. It is a native of the Indian seas. In its general form it resembles the blade of a sword, the body and tail being greatly compressed. Upper jaw longer than the under, and furnished on each side with a flat narrow denticulated bone, which reaches to the ventral fins.

Genus CCXII. Clupanodon. *Pilchard.*

More than three rays in the gill-flap; belly carinated; anal and caudal fins separate; one dorsal fin; jaws without teeth.

The absence of teeth in the jaws of the Pilchard, is the mark by which, as a genus, it is distinguished from Clupea. Six species are known. The *C. pilchardus*, or common pilchard, is the most important species of the genus. It is found in great abundance on the shores of Cornwall. The flesh is considered excellent, and is eaten either fresh or salted. It contains a great deal of oil, which is extracted from it in considerable quantities by the Cornish fishermen. The C. thrissa is a native of the Indian and American seas, and ascends the fresh water rivers to spawn. The flesh is considered as fat and agreeable, but in certain circumstances it has been found to be hurtful. The C. sinensis frequents the shores and rivers of Asia and America, where it is taken in such quantities that the inhabitants manure their fields of rice with them.

Genus CCXIII. Gasteropelecus.

Head, body, and tail, compressed; belly carinated and semicircular; two dorsal fins; ventral fins very small.

This genus was instituted by Gronovius, and afterwards adopted by Bloch, for the reception of the Clupea simia of Linnæus. It has been inserted by Gmelin and some others in the genus Salmo. The two dorsal fins separate it from the herring, while the circumstance of the second dorsal fin being radiated indicates its want of connection with the salmon. It is a native of the equatorial seas, and is said to swim very ill, on account of the peculiar shape of its body, which renders it difficult to maintain its vertical position.

Genus CCXIV. Mene.

Head, body, and tail, compressed; belly carinated and semicircular; back elevated; one low, lengthened dorsal fin; ventral fins narrow and produced.

The only species which has been taken notice of, rests on the authority of a Chinese drawing in the Dutch collection, and is termed by La Cepede, M. Anna-carolina, in honour of his wife Anne Caroline Hubert Jube La Cepede.

The generic name is indicative of its moon-shaped form.

Genus CCXV. Dorsuarius.

The anterior part of the back furnished with a compressed hunch, terminated above by a thin edge; one dorsal fin.

This genus contains at present only one species, termed *D. nigricans.* It is described by La Cepede from the manuscripts of Commerson. It was found near fort Dauphin, in Madagascar.

Genus CCXVI. Xyster.

Head, body, and tail, compressed; belly carinated and semicircular; back elevated; gill-flap of seven rays; a depression below each ventral fin.

Xyster *fuscus*, the only species which has been described, was observed by Commerson. It is of a uniform brown colour. The two jaws are rounded, and nearly of equal length; the caudal, dorsal, and anal fins, have small scales at the base; the tongue is short, large, and semicartilaginous. The nostrils have two openings each.

Genus CCXVII. Cyprinodon.

Head, body, and tail, of an ovate form; three rays in the gill-flap; jaws with teeth.

The C. variegatus is from Carolina, and was first observed by Bosc. The opening of the mouth is very small; the under jaw is longest; the teeth are short; the gill lids rounded; the lateral line indistinct; iris of a golden colour. It scarcely reaches the length of four inches.

Genus CCXVIII. Cyprinus Carp.

Gill-flap with four rays or more; jaws without teeth; one dorsal fin.

This very extensive genus, containing seventy species, has been subdivided into sections, from the presence or absence of the beard, and the form of the tail. These sections, we may add, are distinguished by characters more obvious and important than many of those employed by La Cepede in the construction of genera, so that we are surprised to find them still remaining in company, after witnessing so many other genera dismembered. The species are esteemed excellent food, and much sought after. The carp, which stands at the head of fresh water fishes, is well known in this country as a valuable and useful pond fish, but it is more particularly esteemed on the continent. The breeding and feeding of this fish, is there to many a source of very considerable profit. The flesh of the Barbel, C. *barbus*, is white and good, but the spawn is considered by many as hurtful. Bloch, however, is disposed to call the truth of this opinion in question, and states, that he has eaten the eggs, with all his family, without suffering any inconvenience. The scales of the C. alburnus, or bleak, are employed similar to those of the atherine, in the formation of artificial pearls. For this purpose the scales are carefully removed, and frequently rubbed against one another in water. The silvery looking substance is then introduced, along with a solution of isinglass, into glass balls prepared for the purpose. Almost all the species may be kept in ponds, where they increase rapidly in size. They soon become acquainted with the person who feeds them, and will readily eat meat from his hand. They likewise, by habit, obey the call of a bell. When in this naturalized or domesticated state, their fins sometimes change in form and even structure, as may frequently be observed in the gold and silver fishes of China.

DIVISION VI.

Osseous fishes with a gill-lid, but destitute of a gill-flap.

ORDER XXI. APODAL.

GENUS CCXIX. STERNOPTYX.

Body and tail compressed: under part of the body carinated and transparent; one dorsal fin.

The *S. diaphana*, an inhabitant of the West Indies, is the only known species. Lacepede has changed the trivial name into Hermann, in honour of professor Hermann of Paris, who first described the species. The skin is apparently destitute of scales, and there is no lateral line. There are nine rays in the dorsal fin, of which one is spinous. It is a native of the island of Jamaica.

DIVISION VII.

Osseous fishes with a gill-flap, but destitute of a gill-lid.

ORDER XXV. APODAL.

GENUS CCXX. STYLEPHORUS.

Eyes pedunculated; snout produced, looking upwards; between which and the head there is a flexible leathery duplicature; mouth terminal; gills three on each side; pectoral fins small; dorsal fin extending from the head to the tail; caudal fin short, radiated with spines; body long, compressed.

This genus was instituted by Dr. Shaw for the reception of the S. chordatus from the West Indies. See *Lin. Trans.* vol. i. p. 90. tab. 6. Lacepede has changed the trivial name imposed upon it by Shaw, and has substituted *argenteus* in its place.

ORDER XXVIII. ABDOMINAL.

GENUS CCXX. MORMYRUS.

Snout produced; mouth terminal; jaws with teeth; one dorsal fin.

La Cepede has described nine species of Mormyri, principally from the notes and observations of Geoffroy. They are chiefly inhabitants of the Nile.

DIVISION VIII.

Osseous fishes, destitute of a gill-lid and gill-flap.

ORDER XX. APODAL.

GENUS CCXXI. MURÆNOPHIS.

No pectoral fins; one gill opening on each side; body and tail nearly cylindrical; dorsal, caudal, and anal fins united.

This genus, the *gymothorax* of Bloch, contains twelve species. They were included by Linnæus in the genus Muræna. The first species described by La Cepede is the M. helena. This is the *Muræna* of the ancients. It is found in the seas of the temperate and warmer regions of the earth. It lives with equal comfort in fresh water. The Romans constructed ponds for feeding fishes of this kind, and esteemed them as an excellent dish for the table. The memory of one Vedius Pollio is transmitted to posterity by Pliny as execrable, since he was in the practice of feeding his Murænæ with his condemned slaves. In ponds they become very familiar, and will eat food from the hand. They are cunning, and when they have swallowed the hook, make the utmost exertions to bite the line.

GENUS CCXXII. GYMNOMURÆNA.

No pectoral fins; one gill-opening on each side; body and tail nearly cylindrical; no distinct dorsal or anal fin.

There are two species described by La Cepede; the G. *doliata* and *marmorata*, from the notes of Commerson. In the former, the anus is situated nearer the head than the middle of the fish; in the latter, it is nearer the tail than the head.

GENUS CCXXIII. MURÆNO-BLENNA.

No distinct fins; body and tail nearly cylindrical; surface viscous.

The M. Olivacea, the only species, was found by Commerson in the Straits of Magellan. Its body is more completely enveloped in mucus than any other fish. An individual of this species, kept in alcohol for two months, was found nearly reduced to a mucilaginous oily pulp.

GENUS CCXXIV. SPHAGEBRANCHUS.

Destitute of fins; gill-openings two, under the neck; body and tail nearly cylindrical.

The S. *rostratus* of Bloch, and the only species of the genus, is a native of the East Indies. It has four gills on each side; the mouth is furnished with teeth; the skin has no visible scales; the snout terminates in a point; the upper jaw is longest.

GENUS CCXXV. UNIBRANCHAPERTURA.

No pectoral fins; body and tail serpentine; one gill-opening under the neck; dorsal, anal, and caudal fins united.

This genus, the last in the system of La Cepede, contains five species. It was termed Symbranche by Bloch. The U. marmorata is a native of the fresh waters of Surinam. Its flesh is fat, but unpleasant to the taste.

Such is an outline of the system of ichthyology as given by La Cepede. In our descriptions of the genera, we have stated the more essential characters only, as we wished to prevent the article from swelling to an inconvenient length. The reader will readily perceive that the number of genera has been greatly increased since the days of Linnæus. The Swedish naturalist included all the species known to him in sixty-one genera; we have enumerated two-hundred and twenty five. We are persuaded, however, that the characters employed in the formation of not a few of the modern genera, ought to have been confined to the definition of species merely. Many of the names employed to designate the genera and species by former authors, have been suppressed by La Cepede, and new terms employed in their place, in many cases without any apology for the change being offered. We would earnestly recommend to those who cultivate this branch of Zoology, to respect and follow the excellent and judicious rules laid down by Artedi; otherwise ichthyology will continue a mere heap of rubbish, destitute of fixed principles, and a determinate nomenclature.

The reader in perusing our account of the genera, must have been struck with the occurrence of the same genera in the same relation to other genera, in the systems of Linnæus and La Cepede, although the principles employed in the construction of the primary divisions of these two systems differ widely from each other.

BRITISH FISHES.

As many of our readers are probably anxious to become acquainted with the number of fishes which are natives of the seas, lakes, and rivers of the British isles, we subjoin a synoptical view of the present state of our native ichthyology. The addition of the characters by which the species are distinguished, would have augmented the list to an inconvenient length, so that we have confined our short observations, annexed to each species, to a notice of the more common provincial names and places of residence. The reader who wishes more extensive information on the subject may consult those works already enumerated in the historical part of this article, which treat of British fishes.

CARTILAGINOUS FISHES.

GENUS I. PETROMYZON. *Lamprey.*

1. *P. marinus.* Sea Lamprey.

The Lamprey is common in the greater rivers of the three kingdoms, into which it enters for the purpose of spawning. In Scotland it is called *lamper eel.*

2. *P. fluviatilis.* Lesser Lamprey.

Equally common with the preceding species in the same situations. It is, however, found in the lesser streams and rivulets, into which the sea lamprey does not enter. It is the *nine eyed eel* of the Scotch.

3. *P. branchialis.* Pride or lampern.

This species is not so common as the two which we have noticed. It is found, however, in several of the English rivers.

GENUS II. GASTROBRANCHUS. *Hag.*

4. *G. glutinosus.* Glutinous hag.

The hag is perhaps no where common on our coasts, although it has been met with at various places.

GENUS III. RAIA. *Ray or skate.*

5. *R. batis.* Skate or Flaire.

Common on all parts of the coast. Mr Neill informs us, that in the Frith of Forth it is called *blue skate, grey skate, or Dinnen skate.*

6. *R. oxyrinchus.* Sharp nosed ray.

This is equally common as the skate, and sometimes confounded with it. In the Forth it is called *white skate, friar skate May skate*, or *mavis skate.*

7. *R. clavata.* Thornback.

Very common on all parts of the coast. Montagu considered the R. fullonica of some authors as the male thornback. The teeth in the males of this species are sharp, and in the females blunt.

8. *R. Aspera.* Rough ray of Pennant.

This species was found by Pennant in Loch Broom. Montagu is inclined to consider it as a variety of the thornback, while Donovan regards it as the same with his R. rubus. The description left us by Pennant would lead us to consider it as different from any of these species.

9. *R. tuberculata.* Shagreen ray.

This species was first observed by Pennant at Scarborough. It has since occurred to Montagu on the Devon coast, where it is called *dun-cow.*

10. *R. rubus.* Land Ray, or French ray.

Montagu, to whom we are indebted for much valuable information with regard to the species of rays, considers the R. rubus and miraletus of Donovan as synonymous, and females, while he regards the Fuller's ray of Pennant as the male. The opinion of such an eminent zoologist will always be received with respect, but we do not see the propriety of the new trivial name maculata, by which he has proposed to designate the species.

11. *R. marginata.* Bordered ray.

This species is described by La Cepede from the manuscripts of M. Noel as having been seen by him at Liverpool and Brighton. See *Hist. Nat. des Poissons*, vol. v. 663. tab. 20. f. 2.

12. *R. pastinaca.* Stinging ray.

This appears to be common in the English seas, but it is very rare in Scotland. It is however mentioned by Sibbald.

13. *R. Cuvieri.* Cuvierian ray.

Mr Neill is the only British naturalist who has seen a specimen found on our coasts. It was taken in a traul net in the Frith of Forth in the summer 1808.

14. *R. radiata.* Starry ray.

This species is figured by Donovan in his British Fishes, tab. cxiv. where he says " it was caught on the north coast of Britain, and obligingly communicated to us by Mr Statchbury, of the Old Jewry, London.

15. *R. microcellata.* Small-eyed ray.

This species is found on the west coast of England, and is confounded by the fishermen with the shagreen ray, and called dun-cow. It is described by Montagu in the *Memoirs of the Wernerian Natural History Society*, vol. ii. p. 430.

GENUS IV. TORPEDO. *Cramp Fish.*

16. *T. vulgaris.* Common cramp fish.

This celebrated fish has been taken at various places on the southern coasts of England and Ireland.

GENUS V. Squalus. *Shark.*

A. With temporal orifices.

1. With an anal fin.

17. *S. catulus.* Rough hound.

The rough hound is found sparingly on all parts of the coast. It is now generally admitted by ichthyologists, that the *S. canicula*, or spotted dog fish, is merely the female.

18. *S. galeus.* Tope.

Occasionally found in the English seas, rarely off the coast of Scotland.

19. *S. mustelus.* Smooth hound.

Found on all parts of the coast. It is the *murloch* of the Frith of Forth.

20. *S. vulpes.* Fox shark.

Sometimes taken in the English seas.

2. Destitute of an anal fin.

21. *S. acanthius.* Piked dog-fish.

This species swarms on the east coast of Scotland, whence it is called dog-fish. It follows the shoals of herrings, and appears to be gregarious.

22. *S. Lelanonius.* Lochfine shark.

This species is figured and described by Dr. Leach in the second volume of the *Mem. Wernerian Soc.* p. 64. tab. 2. fig. 2. from a specimen obtained by the late Dr. Walker from Lochfine. He considers it as the same with the basking shark of Pennant found at Loch Ransa. Stewart however inserts it in the section furnished with a temporal orifice.

B. Destitute of temporal orifices.

23. *S. carcharias.* White shark.

This formidable monster is occasionally found in our seas. The jaws of one taken in the Pentland Frith are now before us.

24. *S. maximus.* Basking shark.

This is common in the Scottish seas. On the west coast it is called *sail-fish*, *sun fish*, or *cairban*; in Orkney it is called *Homer*, and in Zetland *brigdie*.

25. *S. glaucus.* Blue shark.

The blue shark frequents the coasts of Cornwall chiefly during the pilchard season.

26. *S. cornubicus.* Porbeagle shark.

Occasionally found in the sea at different parts of the coast. It is the same as the Beaumaris shark.

GENUS VII. SQUATINA. *Angel Fish.*

27. *S. vulgaris.* Common angel fish.

Found on many parts of the coast. In some places in England it is called fiddle-fish or puppy-fish. It has been repeatedly taken in the Frith of Forth.

HALSYDRUS. *Sea Snake.*

28. *H. pontoppidiani.* Sea snake.

This is the great sea snake of the Orkney islands, already taken notice of.

GENUS IX. LOPHIUS. *Angler.*

29. *L. piscatorius.* Common angler, or fishing frog.

Common on all parts of the coast. In Scotland it is called *wide-gab*, or *mulrein*.

30. *L. cornubicus.* Mounts-bay angler.

This species is described by Borlase in his History of Cornwall, 266. tab. 27. fig. 6. Donovan seems disposed to conclude, but apparently without sufficient reason, that the description of this fish must have been taken from a dried specimen of the common angler.

31. *L. Fergusonii.*

This species is described in *Phil. Trans.* vol. liii. p. 170. and figured tab. 13. It was taken in King Road near Bristol. It is quoted by Pennant as synonymous with the L. cornubicus, although its characters are sufficiently obvious to point out a specific difference.

GENUS XI. CHIMÆRA. *Sea Monster.*

32. *C. monstrosa.* Arctic sea monster.

Occasionally found in the Scottish seas, rarely on the English shores.

GENUS XIII. ACIPENSER. *Sturgeon.*

33. *A. sturio.* Common sturgeon.

Frequently found in the salmon nets in the large rivers.

GENUS XV. TETRODON. *Sun Fish.*

34. *T. mola.* Common sun fish.

This fish has been frequently taken in the Frith of Forth. It was common on the Cornish coast in the days of Borlase.

35. *T. truncatus.* Oblong sun fish.

This species is occasionally found in the English seas, where they have been taken of five hundred pounds in weight.

36. *T. stellatus.* Starry sun fish.

This is the globe Diodon of Pennant. It is of rare occurrence on the English shores, although common in the seas of more southern latitudes.

GENUS XIX. SYNGNATHUS. *Pipe Fish.*

37. *S. typhle.* Short pipe fish.

Found on all the British shores, lurking among the sea weeds in shallow water.

38. *S. acus.* Needle pipe fish.

This is so nearly allied to the preceding in character and habit, that doubts are entertained by many naturalists as to the propriety of continuing it as a distinct species.

39. *S. pelagicus.* Pelagic pipe fish.

This is caught in the winter season among the sprats on the English coast, and was first described as British by Donovan.

40. *S. equoreus.* Equoreal pipe fish.

We owe the knowledge of the occurrence of this species on the English shores to the late Mr. Montagu.

41. *S. barbarus.* Long pipe fish.

This has been found on different parts of the coasts of England and Scotland.

42. *S. ophidion.* Snake pipe fish.

This is a species of frequent occurrence. It is, unlike its congeners, said to be oviparous.

GENUS XX. CYCLOPTERUS. *Sucker.*

43. *C. lumpus.* Lump sucker.

This is frequent on all the coasts, and is sometimes brought to market.

44. *C. liparis.* Unctuous sucker.

This species is taken on our coasts, but it is a fish rather of rare occurrence.

45. *C. bimaculatus.* Bimaculated sucker.

First described and figured by Pennant, from the communications of the Duchess Dowager of Portland. It has been found at several places on the English coast.

46. *C. Montagui.* Montagu sucker.

This species was first observed by the late Mr. Montagu, and named in honour of him by Mr. Donovan. It was found by him on the coast of Devon.

GENUS XXI. LEPADOGASTER.

47. *L. gouani.* Lesser sucking fish.

This is the Jura sucker of Pennant. It has been found in the sea at the island of Jura, and on the coasts of Cornwall and Devon.

GENUS XXIV. CENTRISCUS. *Trumpet Fish.*

48. *C. scolopax.* Snipe trumpet fish.

This fish has been taken on the coasts of Devon and Cornwall, according to Donovan, who first introduced it into the list of the British species.

OSSEOUS FISHES.

GENUS XXVII. LEPTOCEPHALUS.

49. *L. morrisii.*

This species was first observed by Mr. William Morris in the sea near Holyhead, and has since been found by several English naturalists.

Genus XXIX. Trichiurus. *Blade Fish.*

50. *T. lepturus.*

A specimen of this fish was cast ashore in the Moray Frith, near Gordon Castle, which was about 12½ feet in length without the head. An account of it by Mr. Hoy is published in the Linnæan Transactions, vol. xi. part 2d.

Genus XXXI. Ophisurus. *Sea Serpent.*

51. *O. ophis.* Spotted sea serpent.

This species was first described as British by Merret in his *Pinax*, page 185, under the title Serpens Marinus. It was omitted by Pennant in his British Zoology, but continued by Berkenhout and others.

Genus XXXVI. Muræna. *Eel.*

52. *M. anguilla.* Common eel.

Found in lakes, ditches, and rivers, throughout the kingdom. In many places, they appear to live in the sea during the winter, from whence in spring they migrate to the fresh waters. They return again in harvest, and at that season are considered as in the best state for the table.

53. *M. conger.* Conger eel.

Common in the sea.

54. *M. myrus.* This species inhabits the Mediterranean, and is inserted in the list of British fishes on the authority of Berkenhout.

Genus XXXVII. Ammodytes. *Launce.*

55. *A. Tobianus.* Sand launce, or sand eel.

Found in the sea on the sandy shores. Is less common in the northern than in the southern parts of the island.

Genus XXXVIII. Ophidium.

56. *O. barbatum.*

This species is well known as a native of the Mediterranean and Red Seas. It is inserted in the British list on the authority of Berkenhout.

57. *O. imberbe.*

First described as British by Pennant, who obtained it from the sea near Weymouth. Montagu found it on the south coast of Devon, and has published a minute description of it in the *Memoirs of the Wernerian Nat. Hist. Soc.* vol. i. p. 95. t. iv. f. 2.

Genus XL. Ziphias. *Sword Fish.*

58. *Z. gladius.* Common sword fish.

Willoughby states, that he has seen a fish of this species in England fifteen feet in length. It is, however, a fish of rare occurrence.

59. *Z. rondelatii.*

This species is described by Dr. Leach in the *Memoirs of the Wernerian Society*, vol. ii. p. 58. He considers it the Ziphias or Gladius of Rondeletius, although it has a second anal fin, of which that author takes no notice. We are inclined to consider these as belonging to one species, and to attribute the differences in the accounts which have been given of them to the imperfection of the specimens described.

Genus XLII. Anarchichas. *Wolf-Fish.*

60. *A. lupus.* Common wolf-fish.

Frequent on the coast, especially in the northen parts of the island, where it is called *Cat-fish.*

Genus XLVII. Callionymus. *Dragonet.*

61. *C. lyra.* Gemmeous dragonet.

Common in the Frith of Forth, where it is called *Gowdy.* The female, or sordid dragonet of naturalists, is called *Sting-fish* on the coast of Devon.

Genus IV. Trachinus. *Weever.*

62. *T. major.* Greater weever.

Pennant is the first naturalist who describes this species. It inhabits the sea near Scarborough, and is occasionally brought in the spring to the London market.

62. *T. draco.* Common weever.

Not uncommon on the English coasts. Rare in the Scottish seas.

Genus XLI. Gadus. *Cod.*

Section I. *With three dorsal fins ; chin bearded.*

64. *G. morhua.* Common cod.

This is found in the sea in all parts of the island, but the greatest fisheries are on the Scottish coasts. Their capture gives employment to a great number of seamen.

65. *G. æglifinus.* Haddock.

Equally common as the cod, but more capricious in its migrations. Haddocks have appeared in the Frith of Forth in the month of June this year, in great numbers, after a partial absence of several years.

66. *G. callarias.* Dorse.

Inserted on the authority of Willoughby. It is not mentioned by Pennant or Donovan.

67. *G. luscus.* Bib.

This species is nowhere found in any numbers, and is seldom sought after.

68. *G. barbatus.* The pout.

It is not a common species. By the Scarborough fishermen it is called Fleg, and its flesh is considered delicate.

69. *G. minutus.* Poor.

This species, common in the Mediterranean, was observed on the Cornish coast by the Rev. Mr. Jago.

70. *G. punctatus.* Speckled cod.

This species, which is said to be frequently taken in the weirs at Swansea, is described by Dr. Turton in his *British Fauna*, p. 90.

Section II. *With three dorsal fins ; chin beardless.*

71. *G. carbonarius.* Coal fish.

Very common, especially in the tideways in the northern islands. When young they are good to eat, but when full grown they are very coarse and unpalatable.

72. *G. merlangus.* Whiting.

Taken in the spring months in considerable numbers, on all the coasts of the island.

73. *G. pollachias.* Pollack.

Common on the English coast, and on the west coast of Scotland, but seldom found on the east. At Scarborough they are called *Leets*, with us *Lythes.*

74. *G. virens.* Green cod.

This species is not uncommon in the northern seas. It was first described as British by Pennant, from the observations of Sir John Callum.

Section III. *With two dorsal fins ; chin bearded.*

75. *G. molva.* Ling.

Common on all parts of the coast. In the northern islands, the salting of these fish for exportation is a considerable article of trade.

76. *G. lota.* Burbot.

This species lives in the fresh water, and prefers clear waters, where the current is slow. It is unknown in Scotland, and in England it is found only in a few rivers. Its flesh is excellent, and eagerly sought after.

77. *G. mustela.* Five bearded cod.

Not uncommon on the English shores. First accurately discriminated by Pennant.

78 *G argenteolus.*

This is a new species, described by Montagu in the 2d volume of the *Memoirs of the Wernerian Nat. Hist. Society*, p. 449. It is common on the western coast of England, and is more nearly allied to the three bearded cod than to any other of the genus.

79. *G. triarratus.* Three bearded cod.

This is a common species, frequenting the rocky parts of the coast. By some it has been injudiciously considered as a variety of the five bearded cod.

Section IV. *With two dorsal fins ; chin beardless.*

80. *G. merluccius.* Hake.

This fish is unknown in Scotland, and is seldom seen on the east coast of England ; but on the south-west shores of that kingdom, and on the south-east shores of Ireland, it is found in great shoals, and caught for the market. It is not held in high estimation, as its flesh is soft and insipid.

Section V. *With one dorsal fin ; chin bearded.*

81. *G. brosme.* Tusk.

This species is chiefly found in the seas around the Zetland islands. It is rare in Orkney, and very seldom found to the south of the Pentland Frith. Considerable confusion has arisen in the determination of the synonymes of this fish, in consequence of calling our fish *torsk* instead of *tusk*, as the former name on the continent designates a very different species.

We are aware that several other species of cod have been described by naturalists as natives of our seas, but their claims to rank as distinct species have not been satisfactorily ascertained.

Genus LIII. Blennius. *Blenny.*

Section I. *Two dorsal fins ; head with tentacula.*

82. *B. phycis.* Forked Blenny.

First observed by Mr Jago on the Cornish coast. It is the Forked Hake of the British Zoology.

Section II. *One dorsal fin ; head with tentacula.*

83. *B. ocellaris.* Ocellated Blenny.

This well known Mediterranean species, was found in the year 1814 by the late Mr Montagu, at Torcross, Devonshire, and is figured and described by him in the second volume of the *Memoirs of the Wernerian Nat. Hist. Society.* La Cepede has erroneously placed this in his first section, as if it had two dorsal fins, and has, without sufficient reason, changed the trivial name into lepus.

84. *B. gattoruginea.* Gattorugine Blenny.

Described by Pennant as having been found on the coast of Anglesea. Montagu has likewise met with it on the south coast of Devon.

85. *B. galerita.* Crested Blenny.

It is found on the rocky shores of the English coast, but is by no means a common species.

86. *B. Montagui.*

This species is described at length and figured by Montagu in the first volume of the *Memoirs of the Wernerian Nat. Hist. Society.* He entertains doubts as to its claims to rank as a species distinct from the preceding, although its characters are sufficiently well marked.

Section III. *One dorsal fin ; no tentacula on the head*

87. *B. pholis.* Smooth Blenny.

This species is found plentifully on the south coast of England under stones.

88. *B. viviparus.* Viviparous Blenny.

This is the most common species, being found near the shore under stones, and among the sea-weed, at all parts of the coast.

89. *B. gunnellus.* Spotted Blenny.

This is equally common with the last in the same situations. Mr Low, in his *Natural History of Orkney*, notices a fish allied to this species, which he calls Purple Blenny. He says, " I should almost take it for a variety, (of B. gunnellus) were it not the colour is different ; being in this reddish purple, the fins lightest, and of the same shape and size of the former. It likewise wants the spots on the back the other has ; instead of eleven in the former, this has only a single one, and that placed near the beginning of the back fin. In other circumstances, both of its shape and way of life, it agrees altogether with the former." Fabricius and other naturalists have described several varieties of the gunnel blenny, differing chiefly in the number and colour of the spots.

Genus LVII. Lepidopus. *Scale-foot.*

90. *L. tetradens.* Four-toothed Scale-foot.

The late Mr Montagu described and figured this species for the first time as a British fish, in the *Memoirs of the Wernerian Nat. Hist. Society*, vol. i. p. 81. tab. 2. It was taken in Salcomb harbour on the coast of South Devon in 1808. A smaller specimen occurred near the same place two years afterwards.

Genus LIX. Cepola. *Band-fish.*

91. *C. rubescens.* Red Band fish.

The only British specimen of this fish which has occurred was caught in Salcomb bay on the 25th of February 1803 ; and figured and described by Montagu in the seventh volume of the *Linnæan Transactions*, p. 219. tab. 17.

Genus LXI. Gobius. *Goby.*

92. *G. niger.* Black Goby.

Not uncommon on the English coast, where it is termed *Rock-fish.* Sometimes found on the west coast of Scotland.

93. *G. minutus.* Spotted Goby.

This species, which is frequent on the English shores, is likewise found on those of Scotland. It is chiefly obtained from the shrimp nets.

Genus LXVI. Scomber. *Mackrel.*

94. *S. scomber.* Common Mackrel.

Common on all parts of the coast, principally during the autumn months. The Coly Mackrel of some authors appears to be only a variety.

95. *S. thynnus.* Tunny Mackrel.

Not uncommon on the west coast of Scotland. They appear to be rare on the English coast.

96. *S. pelamis.* Bonito.

We insert this in the British list on the authority of Stewart, who, in his *Elements of Natural History*, 2d edit. vol.

i. p. 365, says, "It has been taken, though rarely, in the Frith of Forth."

GENUS LXVIII. CARANX. *Scad.*

97. *C. trachurus.* Common Scad.

This is a rare fish on our coasts. It has occurred to Pennant and Donovan, but few other British naturalists have met with it.

GENUS LXXXIV. ECHINEIS. *Sucking Fish.*

98. *E. remora.* European sucking fish.

This fish holds its place in the British list on the authority of Turton, who says, in his *British Fauna*, p. 94, "taken by the author, in Swansea, from the back of a cod fish, in the summer of 1806.

GENUS LXXXIX. ASPIDOPHORUS. *Pogge.*

99. *A. cataphractus.* Mailed pogge.

Common on all parts of the coast. It ascends the large rivers as far as the water is brackish.

GENUS XCI. COTTUS. *Bull Head.*

100. *C. gobio.* River bull head.

Frequent in England in the clear brooks.

101. *C. scorpio.* Father lasher.

This is a very common species. It is found in all parts of the coast, and sometimes ascends the larger rivers, into brackish water.

GENUS XCIV. GASTEROSTEUS. *Stickle back.*

102. *G. aculeatus.* Three spined stickle back.

Common in rivers and ditches. During floods it is sometimes swept into the sea, where it attains a greater size than in fresh water.

103. *G. pungitius.* Ten spined stickle back.

Chiefly found on the coast. Is rare in Scotland.

104. *G. spinachia.* Fifteen spined stickle back.

Inhabits the sea. It appears to be a weak fish, as it is frequently cast ashore by the tide.

GENUS CII. TRIGLA. *Gurnard.*

105. *T. gurnardus.* Grey gurnard.

This is very common on all parts of the coast. Being easily taken, it is much used as food by the crews of our coasting vessels.

106. *T. cuculus.* Red gurnard.

Common on the English coast. Unknown in Scotland.

107. *T. Lyra.* Piper.

Found on the western coasts of England, where it is held in some estimation.

108. *T. hirundo.* Sapphirine gurnard.

This remarkably beautiful fish is found on the coast of Wales and Devonshire.

109. *T. lastoviza.* Streaked gurnard.

The species described by Donovan as the streaked gurnard, *Trigla lineata*, tab. iv. appears referable to this species of La Cepede, from the coincidence of the numbers of the rays of the fins. The last author, however, is silent with respect to the branching of the thread-like ridges on the belly. The specimen which Donovan figures was taken on the eastern coast of England.

110. *T. lineata.* Lineated gurnard.

This is the species originally described by Mr Jago, and introduced into the *British Zoology* by Mr Pennant. It has been taken on the coast of Devon in great abundance, by the late Mr Montagu. In this species the ridges are not branched, and do not reach the length of the belly.

111. *T. lævis.* Smooth gurnard.

This is a new species, found on the coast of Devon, described by Montagu in the second volume of the *Memoirs of the Wernerian Natural History Society*, p. 455. "It is taken," he says, "by the shore nets as well as by hook, the finest when fishing for whiting, by a bait of Launce. It is sometimes called Yellock, at Torcross, by the fishermen, but generally confounded with the Sapphirine, the Red and the Streaked (lineated) gurnards, under the denomination of Tub."

GENUS CV. GYMNETRUS.

112. *G. Hawkenii.*

Dr. Shaw, in his *General Zoology*, vol. iv. p. 198, after describing this species, says, "it appears from a print published in the year 1798, that a specimen of this fish was thrown on the coast of Cornwall in the month of February in the same year. Its length was eight feet six inches, its breadth in the widest part ten inches and a half, and its thickness only two inches and three quarters. The tail in this specimen was wanting. The colours the same as in the specimen figured by Dr Bloch."

GENUS CVI. MULLUS. *Surmullet.*

113. *M. barbatus.* Red surmullet.

The only evidence of this species being found in our seas, is the following passage in the *British Zoology*: "We have heard of this species being taken on the coast of Scotland, but had no opportunity of examining it; and whether it is found on the west of England with the other species or variety, we are not at this time informed."

114. *M. surmuletus.* Striped surmullet.

This species is not uncomomn on the English coast, and has been considered by some as merely a variety of the former species, an opinion with which we are disposed to agree.

GENUS CX. LABRUS. *Wrasse.*

115. *L. gibbus.* Gibbous wrasse.

Inhabits the coast of Anglesea, and first described by Pennant as a British species.

116. *L. trimaculatus.* Trimaculated wrasse.

First observed by Pennant on the coast of Anglesea, and afterwards on the coast of Devon. In the Frith of Forth it is called the *Sea Perch.*

117. *L. cornubicus.* Goldfinny.

This appears to be a common species, and was first observed by Mr Jago in Cornwall. In the Frith of Forth, according to Mr Neill, it is called the *Brassy.*

118. *L. julis.* Indented striped wrasse.

This species was observed by Miss Pocock on the coast of Cornwall in the year 1802, and is figured by Donovan in his *British Fishes*, tab. 96.

119. *L. tinca.* Ancient wrasse.

Not uncommon on the English shores. It has likewise been found in the Frith of Clyde.

120 *L. bimaculatus.* Bimaculated wrasse.

Brunich observed this species at Penzance, on whose authority it was inserted in the *British Zoology.*

121. *L. variegatus.* Striped wrasse.

Pennant obtained this species off the Skerry isles, on the coast of Anglesea, from which place Donovan likewise obtained specimens.

122. *L. coquus.* Cook wrasse.

This is rather a doubtful species, as no naturalist has found it since the time of Mr Jago.

123. *L. lineatus.* Streaked wrasse.

This species is figured by Donovan in his *British Fishes*, tab 74, as a new species. It was taken on the Cornish coast, where it is called *green fish.*

124. *L. comber.* Comber wrasse.

This species is but little known. Pennant says, "I received this fish from Cornwall, and suppose it to be the comber of Mr Jago."

Genus CXVII. Sparus. *Gilt head.*

125 *S. aurata.* Lunulated gilt head.

This species is not uncommon on the coast of Wales; in other parts of this country it may be considered as rare.

126. *S. pagrus.* Red gilt head.

Not uncommon on the coast of Devon, where it is taken near the shore by the hook, and in nets.

127. *S. lineatus.* Black gilt head.

This species, which Montagu considered a non-descript, and which he has figured and described in the *Memoirs of the Wernerian Natural History Society*, vol. ii. p. 451, tab. xxiii. is frequent on the coast of Devon, in company with the preceding species.

128. *S. dentex.* Four toothed gilt head.

This species has been added to the list of British fishes by Mr Donovan. It is figured at tab. lxxiii. of his British Fishes, from a specimen caught in the sea off the coast of Hastings in Sussex.

129. *S. Raii.* Rayan gilt head.

This species was first observed by Mr Johnston, who communicated it to Ray. By this author it was described under the title, "Brama marina cauda furcipata." Pennant describes it as the *toothed gill head.* Bloch afterwards gave a figure of it under the name of S. Raii. La Cepede rejects the name which Bloch had bestowed on it, substitutes a French provincial name in its place, and named it S. castaneola. Shaw, to increase the difficulty, describes two spari, S. Raii and S. castaneola, as if they were distinct species. Amidst so many changes, it is suprising that no one has done justice to Johnston, to whom we owe its discovery. This is a rare species in England, but it has frequently occurred on the east coast of Scotland.

Genus CXX. Centropomus. *Basse.*

130. *C. punctatus.*

This is the Perca labrax of Linnæus. It is frequent on the English coast, and is sometimes taken in the Frith of Forth. Its flesh is prized as excellent food.

Genus CXXV. Holocentrus.

131. *H. cernua.* Ruffe.

This is found in several of the English streams, but appears to be unknown in Scotland. It is the Perca cernuca of Linnæus.

132. *H. Norvegicus.* Sea Perch.

This species has generally been confounded with the Perca lineis utrinque septem transversis of Artedi, the Perca marina of Rondeletius, Willoughby, Belonius, and Salvianus. This last, however, has ten spinous rays and fifteen branched ones in the dorsal fin, while our species has fifteen spinous and fourteen branched rays in the same fin. The H. Norvegicus is rather a rare species on our coasts. In the northern Islands of Scotland it is called *Bergylt.*

Genus CXXVI. Perca. *Perch.*

133. *P. fluviatilis.* Common Perch.

This is common in many parts of our island in lakes. In the north of Scotland it is a rare fish.

Genus CXLIX. Zeus. *Doree.*

134. *Z. faber.* Common Doree.

Found on the English coast, and brought to market. It is rare on the coast of Scotland.

Genus CLI. Chrysotosus. *Opah.*

135. *C. luna.* Common Opah.

Various instances are on record of this fish having been cast ashore on the Scottish shores. It has likewise been observed on the English coast.

Genus CLIII. Pleuronectes. *Flounder.*

Section I. *Eyes on the right side.*

136. *P. hippoglossus.* Holibut.

Common on all parts of the coast. In the Scottish markets it goes by the name of *Turbot.*

137. *P. limanda.* Dab.

This species is equally common as the last on all our shores. In the Edinburgh market it is termed *Saltie*, or *Salt Water Fleuk.*

138. *P. Solea.* Sole.

The principal fisheries are on the western coasts of England. In Scotland they are in a great measure neglected. They occasionally enter our large rivers, and seem capable of living in brackish water.

139. *P. platessa.* Plaise.

Very common on all parts of the coast.

140. *P. flesus.* Common Flounder.

Common, subject to variations in colour. The *P. roseus* of Shaw's General Zoology, vol. iv. p. 302. tab. 43.* is a rose-coloured variety. The P. passer of Linnæus is a reversed variety, having the eyes on the left side.

141. *P. microcephalis.* Smear Dab.

This species is found on the southern and western coasts of England, and was first figured and described by Donovan in his British Fishes, tab. 42.

142. *P. variegatus.* Variegated Sole.

This is another species, for the discovery of which we are indebted to Donovan. He has figured and described it in his British Fishes, tab. 107. It was found along with other flat fish in the Billinsgate market.

143. *P. limandula.* Smooth Dab.

This is the Smear Dab of Pennant, and is sometimes found on the English stalls.

144. *P. arnoglossus.* Lantern fish.

This is the smooth sole of Pennant. It was described by Ray, but has not been observed by any naturalist since his time.

Section II. *Eyes on the left side.*

145. *P. maximus.* Turbot.

Common on all parts of the coast, and highly prized.

146. *P. rhombus.* Brill or Pearl.

Common on the English coast. Mr Neill says that it is found in Aberlady bay, and is called *Bonnet Fleuk.*

147. *P. megastoma.* Whiff.

This is the Whiff of Ray, and has been confounded with the Brill and the Spotted Flounder by the continental ichthyologists. It is not uncommon on the English shores.

148. *P. punctatus.* Spotted Flounder.

This species has been observed among the Zetland isles, and likewise on the English coast. It is described in the Wernerian Mem. vol. ii. p. 241.

149. *P. cyclops.* Cyclops Flounder.

This new species of flounder was discovered by captain Merrick of Aberfraw in Anglesea, and has been described and figured by Donovan in his British Fishes, tab. 90.

Genus CLVII. Cobitis. *Loche.*

150. *C. barbatula.* Common loche.

This is a very common fish in our small rivers and streams. In England it is frequently called the *groundling*, in Scotland the *lying loche*.

151. *C. tænia.* Armed loche or groundling.

This species, which is not mentioned by Pennant, is found in the Trent, according to Berkenhout, and is said by Turton to inhabit the clear streams of Wiltshire.

GENUS CLXXX. SALMO. *Salmon.*

152. *S. salar.* Common salmon.

Common in all the large rivers, and a species of vast commercial importance. The fisheries are regulated by laws which should be revised, as they are founded, in some instances, on mistaken notions with respect to the habits of the fish, and are exceedingly partial in their operation.

153. *S. eriox.* Grey.

This species was first described by Ray. They are found in several of the rivers of England and Scotland. The tail is even at the end, the spots on the body are large, round, and purplish. The flesh when boiled is pale pink coloured.

154. *S. trutta.* Salmon trout.

This species, like the preceding, migrates from the sea into the rivers to spawn, and is very common. It is often termed the *sea-trout*, or the *bull-trout*.

155. *S. fario.* River trout.

This is the most common species, and is found in all our rivers and streams. It varies in colour according to the qualities of the water in which it resides.

156. *S. salvelinus.* Red-belly.

This is an alpine species, and appears to be common to the lakes of Wales and Scotland. It was first distinctly pointed out as a British fish by Donovan in his *British Fishes*, tab. 112.

157. *S. alpinus.* Char.

Frequent in the larger lakes in the middle and southern parts of the kingdom.

158. *S. cambricus.* Sewin.

This fish is figured and described by Donovan in his *British Fishes*, tab. 91. It is very common in Wales. It appears to have been confounded with the S. eriox, and even with the Sheiffer mulleri of Bloch, but the form of the tail and of the spots furnish sufficient characters of distinction.

159. *S. albus.* White.

This species is described by Pennant in his *British Zoölogy*, as inhabiting the Esk in Cumberland. He considers it as the Phinock of the Scots. Is the S. cumberland of La Capede specifically distinct?

GENUS CLXXXI. OSMERUS. *Smelt.*

160. *O. eparlanus.* Smelt or Spirling.

This species frequents many of the larger rivers, and is gregarious. It feeds upon the smaller crustacea.

GENUS CLXXXII. COREGONUS.

161. *C. lavaretus.* Gwiniad.

This is common in some of the Welch lakes, and is likewise found in those of Scotland.

162. *C. thymallus.* Grayling.

Common in many of the English rivers. Mr Low, in his Natural History of Orkney, p. 224, informs us, that it is very common in that country.

163. *C. albula.* Juvangis.

Stewart, in his *Elements of Natural History*, vol. i. p. 373, refers the *Juvangis* of Lochmaben to this species. Mr Pennant considered it as the Gwiniad. In the *Statistical Account of the Parish of Lochmaben*, vol. vii. p. 236, it is said that "they have a mark of a heart on the head."

164. *C. clupeoides.*

This species, described by La Cepede from the communications of M. Noel, is the *fresh water herring* of Loch Lomond. According to the observations of Dr Stewart of Luss, however, it is the gwiniad, and is also called powan and pollag.

GENUS CLXXXVIII. ESOX. *Pike.*

166. *E. lucius.* Common Pike.

This fish, which is now found in many of the lakes and rivers of this kingdom, is said to have been introduced into England in the reign of Henry VIII. in 1537. But as *pykes* and *breams* are stated to have been served up in plenty, at the feast given by the Archbishop of York in 1466, it is probable that even at that time pikes were not uncommon in the country. In the south of Scotland it is called *ged.*

165. *E. belone.* Gar pike.

The gar-pike is taken on all our coasts, and in general makes its appearance with the mackrel. We have seen specimens thrown ashore in the winter season in the northern islands.

GENUS CXCI. LEPISOSTEUS. *Gar-fish.*

167. *L. Osseous.* Common gar-fish.

This species was first described as British by Berkenhout, as having been found on the Sussex coast. Mr Stewart, in his *Elements of Natural History*, 2d edit. vol. i. p. 374, adds that it has been taken in the Frith of Forth.

GENUS CXCIII. SCOMBERESOX. *Saury.*

168. *S. saurus.* Common saury.

Ray was the first who described this species as British under the name *skobster* or *skipper*, and as inhabiting the coasts of Cornwall. Pennant afterwards contributed to make it more generally known. It has since been found by several naturalists on various parts of the coast. In the Frith of Forth it is called *gowdnook*, or *gaufnook*, and sometimes *Egyptian herring*.

GENUS CXCVII. ARGENTINA. *Argentine.*

169. *A. sphyræna.* Pearly Argentine.

First described as British by Pennant. It is a rare species, and has seldom come under the observation of British ichthyologists. Mr Low, in his *Nat. Hist. of Orkney*, p. 225. examined one found on the shores of that country.

GENUS CXCVIII. ATHERINA. *Atherine.*

170. *A. hepsetus.* European Atherine.

According to Pennant, this fish is very common in the sea, about Southampton, and Donovan obtained them from the coast of Devon. In Scotland, according to Mr Neill, they are found washed ashore in the Frith of Forth, and we have observed young specimens in the Tay.

GENUS CCI. MUGIL. *Mullet.*

171. *M. cephalus.* Common mullet.

This fish is found on many of our shores, near the mouths of rivers, both in Scotland and England.

GENUS CCV. EXOCŒTUS. *Flying Fish.*

172. *E. volitans.* Common Flying Fish.

There is but one instance on record of this fish having been found on our shores. In June 1765 one was caught at a small distance below Caermarthen, in the river Towy, being brought up by the tide, which flows as far as the town. An account of it was communicated to Pennant, by John Strange, Esquire, at Caermarthen, who saw the fish.

Genus CCIX. Clupea. *Herring.*

173. *C. harengus.* Common Herring.

Very common on the coasts of Scotland and the north of England. Those which are caught on the west coast of Scotland are preferred to those taken on the east, as being larger and fatter, from their living in deeper water.

174. *C. spirattus.* Sprat.

This is frequently confounded with the herring fry. It is much more frequent in England than in Scotland. With us it is called *garvy.*

175. *C. alosa.* Shad.

This fish is not uncommon in the great rivers, into which it enters to spawn. It feeds on young herring and other small fishes. Above and below the forked division of the tail, on both sides, we have observed subsidiary finlets or plaits, which do not appear to be taken notice of by authors.

176. *C. encrassicolus.* Anchovy.

This species has hitherto been met with but sparingly on our shores. Ray observed it in the estuary of the Dee. Pennant obtained it in Flintshire, and Donovan from the coast of Hampshire.

Genus CCXI. Clupanodon. *Pilchard.*

177. *C. pilchardus.* Common Pilchard.

This fish is occasionally seen in the Scottish seas, but it appears to be very common on the Cornish shores. It is very distinct from the herring, with which, however, it has been often confounded.

Genus CCXVII. Cyprinus. *Carp.*

Section I. *Bearded.*

178. *C. carpio.* Common Carp.

This fish is a native of the warmer countries of Europe, but on account of the excellence of its flesh it has been naturalized in many of the northern kingdoms. It is generally said to have been introduced into England about the year 1514 by Leonard Maschal. But Mr. Donovan proves, from a passage in the *Boke of St Alban's*, by *Wynken de Worde*, published in the year 1496, that it was known in England at that period, although considered as rare. A few unsuccessful attempts have been made to translate them into Scotland, where it is said they will not breed in the ponds.

179. *C. barbus.* Barbel.

This is common in the still, deep parts of the English rivers. It is not known as an inhabitant of Scotland, into which, however, it might easily be translated.

C. gobio. Gudgeon.

This is a very common fish in England, being found in almost all the streams and pools of fresh water. It is unknown in Scotland.

180. *C. tenca.* Tench.

It inhabits tranquil waters, and is common in the lakes and rivers of England. The only evidence of its being found in Scotland is in the Statistical Account of the parish of Inch in Galloway, by the Rev. Peter Ferguson. Speaking of the lakes in the parish, he says "they abound in pike, perch, carp, *tench*, roach, white and red trout." *Stat. Ac. Scot.* vol. iii. p. 137.

Sect. II. *Beardless.*

181. *C. carassius.* Crusian.

According to Pennant, this species is common in many of the fish ponds about London, and other parts of the south of England. He believes that it is not a native fish. It is not however ascertained by whom, or at what period, it was introduced.

182. *C. phoxinus.* Minnow.

This gregarious species is found in almost every gravelly stream.

183. *C. leuciscus.* Dace.

The dace is very common in the early part of summer in many of the English rivers. It is unknown in Scotland. The *graining* of Pennant, found in the Mersey, appears to be a variety of this species; it is the C. Lancastriensis of Shaw. *General Zoology*, vol. v. p. 234.

184. *C. rutilus.* Roach.

This is found in many of our deep rivers and lakes. It is rare in the eastern parts of Scotland; but on the west it is common, and known by the name of *Braise* or *Gilt-head.*

185. *C. idus.*

This species is inserted as British on the authority of Mr. Stewart, in his *Elements of Natural History*, 2d edit. vol. i. p. 382, who says, "Found in the Nith by Dr. Walker."

186. *C. orfus.* Rudd, or Finscale.

This Linnæan species is unquestionably the Rutilus latior of Willoughby, and minutely described by him as a native of the English Lakes.

187. *C. erythrophthalmus.* Red Eye.

This species is figured by Donovan, tab. xl. We may observe that disputes have arisen about our English Rudd; some supposing it the *orfus* of Linnæus, while others regard it as the *erythrophalmus.* To us it appears extremely probable, that both species are found in our lakes; and had the descriptions of Pennant and Donovan been as copious and minute as that of Willoughby, all doubts upon the subject would easily have been removed.

188. *C. Jeses.* Chub.

The chub is common in the deep holes of rivers in England: in Scotland, according to Pennant, it is found in the Annan.

189. *C. alburnus.* Bleak.

Very common in some of the English rivers; unknown in Scotland.

490. *C. brama.* Bream.

The bream is common in the lakes and deep parts of rivers in England and Ireland: in Scotland it is found in Lochmaben.

191. *C. auratus.* Gold fish.

This species was introduced into England about the year 1691. It breeds freely in the open waters: in Scotland it does not increase.

In the preceding list of our native fishes, we have purposely omitted a few spurious species which have a place in some of the works on British zoology. Perhaps one or two in the present list may, upon farther inquiry, be found mere varieties. This, we suspect, will prove to be the case with some of the species of the genera Squalus, Raja, Salmo, and perhaps Cyprinus. (J. F.)

ICOLMKILL, or I-COLUMB-KILL. See IONA.

ICOSANDRIA. See BOTANY.

IDA. See TROY and TROAD.

IDAAN, a race of mankind, dispersed through several islands of the Eastern seas, and principally characterized by the singularity of their customs. Mr. Dalrymple justly observes that "the Idaan of different places go under different denominations, and have different languages," and accordingly we find them under the name of Idaan Maroot, Alforese, Horaforas, Dejakkese, Biadjoos, and Oraa-Abing. All these seem to constitute but a single race of people, but the appellation Idaan is more specially applicable to those in the northern parts of Borneo; Alforese to those of the Molucca islands, now nearly extirpated from some of them; and Horaforas to those of the eastern islands in general. See BORNEO, Vol. III. p. 729.

IDEA. See LOGIC and MORAL PHILOSOPHY.

IDEAL BEAUTY. See TASTE.

IDENTITY. See LOGIC.

IDOLATRY. See POLYTHEISM.

IDRIA, is a district of Carniola, dependent on the circle of Adlerberg, in the dominions of the emperor of Austria. Having been wrested from that monarch by the French in 1809, it was constituted a canton and mayoralty, extending over eleven miles square, and forming part of the Illyrian provinces. It was further sub-divided into the town of Idria, the village of Lower Idria, and eight hamlets. The whole of this territory is mountainous, and interspersed with narrow vallies, which are copiously watered by torrents from the hills. The river Idrixa rises in the Julian Alps, about three leagues from the town of Idria, and after receiving the Canomla, Zalla, and several subterraneous streams, it falls into the Isonzo, 19 leagues lower down. This river abounds with fish, among which are fine trout of remarkable size. Several sluices and canals are formed in the valley where it runs, one of which, of superior construction, was executed by the French in 1813, on the torrent Woitschaik, for the purpose of floating wood. Thunder storms prevail in summer, and there are sometimes two or three in a day: the heat is then oppressive, owing to the reflexion of the sun from the surrounding hills: autumn is rainy, and winter is of long duration. The thermometer in the most severe cold falls a few degrees below zero. Two chains of mountains 1728 feet high, bounding the valley of the Idria, are covered with snow nearly six months of the year: and 300 or 400 men are employed while storms prevail, clearing the great road to Laybach. The medium height of the barometer is 27 inches 5 lines; its variations are neither frequent nor considerable. A strong prejudice subsists in the country regarding the insalubrity of the climate, which of late has been controverted. But although two-thirds of the district are forests, vegetable life is languid in the immediate vicinity of the town of Idria; fruits and grain seldom ripen, and cattle always decline. Toothach is universal among the inhabitants, few persons have good teeth, and they are lost by all at an early age. As the inhabitants are principally divided into miners and forresters, the one class enjoys vigorous health, while the other is subjected to disease: and the consequences are beheld even in their respective offspring. Life is here of short duration; many die young, and forty is an age beyond which great expectations of survivance are not entertained. The unusual insalubrity of Idria is traced to the mines and metallurgic operations, by those who consider the atmosphere of the same constitution as in other places.

The minerals of Idria are in considerable number and variety, and also of uncommon value, compared with their narrow bounds. Among these are white marble, found in the valley of the Canomla; thick beds of different coloured jasper in the country of Woiska; fine and coarse free stone; sulphuretted iron, and indications of coal. But the chief riches of Idria are its quicksilver mines, the largest, most magnificent, and most productive in the world. The metallic stratum is situated about 240 yards deep; it extends 800 yards in one direction by 1000 in another: and lies in a valley, whose surface is 507 feet above the level of the sea. Six shafts penetrate the mine, four of which are vertical, and two have an inclination. The former are named St. Barba, St. Theresa, St. Francis, and the Emperor Joseph; three of them are appropriated for the extraction of the mineral substances, or discharging water, which is accomplished by 15 pumps, worked by a hydraulic wheel 36 feet in diameter; while the fourth is reserved for introducing the materials necessary for the operations below. Access is gained from within a spacious building, situated in the town of Idria, leading almost horizontally under a lofty vault to a staircase, always kept in excellent repair, constructed mostly of stone steps, but partly of wood. It reaches to the depth of 150 yards, after which the remainder of the descent is accomplished by wooden ladders, which are sometimes damp, and on that account less convenient and agreeable. Dr. Brown observes, that in leaving the mine he ascended by a ladder of 639 staves. There are several landing places paved with flag stones in the course of the descent, and benches to rest upon: and the whole mine is kept remarkably clean and in good order. The subterraneous excavations are occupied by nine horizontal galleries, including intermediate ones, with their numerous ramifications, about seven feet high, and as much in width. They are arched over by artificial building, unless where they penetrate the solid rock, which requires no support, and are in general well aired from currents being established between them. According to Jars, by whom the mine was visited about the year 1759, the entrance to the principal gallery is covered by an iron grating, at the moment the workmen descend, which is kept down until their return. At the distance of 260 yards from the mouth of the same gallery, there is a chapel, where mass is performed on all festival days, and the images of saints, protected by a grating, stand in niches. Kuttner says the principal shaft is 86 fathoms in depth, and Keysler, that the lowest part of the mine lies 840 below the surface of the earth. The temperature of some parts is such as to cause profuse perspiration in the workmen: numerous thermometrical observations prove, that among great beds of rich ores the heat is from 80° to 95°. Every thing within seems to announce disorder and chaotic confusion: the whole mineral kingdom apparently has been confounded by some catastrophe, to constitute the treasures which this spacious cavern contains. Enormous heaps of shells are intermixed with mercury, bitumen, and sulphur, and the ores are disseminated in the most unequal manner. On account of its uncommon arrangement, the mine of Idria bears no resemblance to any other, and presents none of those facilities in the working which are found in mines with veins.

Considerable misapprehension seems to have prevailed concerning the quality of the ores of Idria. Some authors have affirmed, that it contains 50 per cent. of metal at an average, and that portions afford even 80 per cent. But the mean produce of 9908 tons was only 8·616 per cent. by exact observation. Virgin mercury, as we have seen in the preceding list of combinations, exists in various situations, elaborated exclusively by the hand of nature. It appears in pure globules, and has been known to issue in a slender stream from some narrow fissure in the rocks. A miner is said to have collected 36 pounds of mercury in this manner in six hours. The quantity of virgin mercury procured annually is very unequal. When Dr. Pope visited the mines in 1663, it amounted to 11,862 pounds, which nearly doubled the product of 1661, and somewhat exceeds the statement of Keysler and Jars, at 100 quintals, or 10,000 lib. Probably it is more rare at present. A small portion is always presented in a leathern purse to foreigners of distinction who inspect the mines.

The ores being separated, according to their quality, by the miners, are drawn up in strong square boxes, each capable of containing 700 or 800 lib. by means of a hydraulic wheel put in motion by the water of a canal led from the Idrixa. All are then conveyed to the lavatories, or washing rooms, where they undergo a new assorting, and the richer kinds are set apart by themselves. The object of washing is to disengage all the earth which contains no mercury; and for this purpose seven wire sieves are first employed, and the result then transferred to another set of very expert workmen. Sieves suspended in a cistern, and while immersed, kept in constant motion, are now used, that the heaviest particles may fall to the bottom; and great care is taken to preserve those of a red colour, as they contain cinnabar. After these two levigations the ores are pounded, and again carried to the lavatories, to undergo a third on inclined planes. From the lavatories they are conveyed to furnaces, to be subjected to distillation; but, before being exposed to the action of the fire, the whole are rigorously assayed, in order to anticipate what product may reasonably be expected. As there are two kinds of ore, one in large pieces, and the other in powder, there is a furnace for each. The furnace destined to receive the first has two fire-places and four chambers or ovens, which communicate by lateral conduits with two rows of reservoirs, or very high chambers of mason work, separated by intermediate walls, but mutually communicating by means of alternate apertures a foot square. Of these reservoirs or condensers there are twenty-eight. The second furnace, appropriated for burning the ores in powder, has six furnaces and twenty-four chambers, instead of twenty-eight. The area in both is inclined to facilitate the flowing of the mercury, and a conduit common to the whole condensers brings the mercury into another great reservoir, where it is collected for use. The charge of the first furnace is 30,000 lib. of ore, that of the second 60,000. When the furnaces are charged, all their apertures, and those of the condensing chambers, are carefully luted with clay and slacked lime. The fire is then progressively augmented during nine hours, until the earthen clods, wherein pieces of ore or the powder have been put, become red hot, and the ores burn vehemently. The whole is then allowed to cool for six days, and the mercury, completely disengaged, is collected in the general reservoir. As the heat of the furnace, particularly of that which burns the larger pieces, is retained a long time, it would be difficult to collect the metal sooner. A single charge of the furnaces will frequently produce 8000 pounds of quicksilver. The mercury is taken out of the common reservoir, and packed in white sheepskin bags, which have been tanned with alum, in quantities of 25, 50, or 100 pounds. The bags are then conveyed to a magazine, where each is covered by a second skin, and packed up in casks, which are exported to the various places where they are required.

But, independent of the pure mercury thus obtained and exported from Idria, there are mercurial preparations to a very great extent of all the different kinds which are known in commerce. With the exception of Chinese vermilion, the products seem scarcely susceptible of improvement. For these purposes there is a spacious building, divided into three great laboratories. The first is appropriated for amalgamation of sulphur and mercury, which is then converted to cinnabar; the second is consecrated to the preparation of vermilion, wherein eight mills are employed in grinding the cinnabar; and in the third there are twenty-two furnaces, each provided with six large iron capsules. Much accessory apparatus is used besides.

In addition, and subsidiary to the mining establishment, and that for mercurial preparations at Idria, there are several branches of arts and manufactures. These consist chiefly of a glass work, for providing the bottles and window glass; a pottery for all the earthen ware required; a tannery for preparing the leather packages; and a rope work which furnishes cordage. Numerous mechanics, and artizans of all descriptions, are also ready to provide the necessary apparatus for the various operations.

As the mines of Idria are the most productive which are known, it may not be uninteresting to learn the quantity of metal obtained from them. It has been different at different periods, which is not surprising, considering the uncertainty which attends subterraneous researches. In the year 1663, they produced 255,981 pounds. About the year 1730, the quantity seems to have been 360,000; twenty years later it was calculated at 300,000; and in the year 1799, Kuttner was informed that the product has been known to amount to 1,000,000 or 1,200,000 pounds, which is probably erroneous. But by an accurate computation, made by the director of the mines under the French regime, between the years 1809 and 1813, we learn that the average quantity obtained yearly in that time amounted to about 365,928 pounds. Of the total product, there were delivered into the magazines the following proportions, in quintals of 100 pounds each.

Mercury	14,194 quintals	25 lib.
Cinnabar	702	25
Vermilion	2,700	29
Corrosive sublimate	24	50
Calomel	64	—
Red precipitate	28	67
	17,713	96

The whole of this was obtained in 56 months. Thus the profits of the mines, which are the property of the Emperor of Austria, and carried on at his expence, are very considerable; being at a medium about 800,000 francs, or £35,000 Sterling yearly. To render the average nearly the same, the rich and poor ores are worked at once.

A great quantity of the quicksilver was formerly exported to Spain, and from thence to South America, where it was employed in the separation of the metal in the silver mines. The Dutch were accustomed to purchase 100,000 lib. yearly. Most part of it is now carried to Vienna, and a large proportion to England.

In the year 1663, there were 280 miners, but at present 700 are employed, besides 300 wood cutters, who are under an inspector general; and there are nearly 600 pensioners, including women and children. The whole of this great establishment is under the most admirable system of administration. All the workmen are divided into companies, they assemble at three in the morning, when their names are called over, and they descend into the mine, each with a lamp in his hand. Owing to the high temperature of the galleries, the rarefaction of the air, and evolution of certain gases in the combustion of the lamps, as well as the deleterious effluvia escaping from the metals, their health suffers severely. Those who are occupied where native mercury is found inhale small particles of it, and very soon lose their teeth: those employed in sweeping the chambers of condensation also inspire a considerable quantity of metal, while detaching it from the sides of the condensers. Thus they undergo a copious salivation. "We saw there," says Dr Pope, "a man who had not been in the mines above half a year before, so full of mercury, that putting a piece of brass in his mouth, or rubbing it in his fingers, it immediately became white like silver. I mean, it had the same effect as if he had rubbed mercury upon it. And so paralytic, that he could not, with both his hands, convey a glass half full of wine to his mouth without spilling it, though he loved it too well to throw it away." Some observers affirm, that the quicksilver insinuates itself into the bodies of those who work the virgin mercury, so that when they go into the warm bath, or are put into a profuse sweat by steam, drops of pure mercury have been known to issue through the pores from all parts of their bodies. This much is certain, however, that the workmen who have been occupied several years in the furnaces, become subject to shiverings, convulsions, decrepitude, and a premature old age. Their wages, partly in grain, and partly in money, are exceedingly moderate; but by the paternal care of government, all are provided with a competency when they are unable to continue their labours.

The quicksilver mine of Idria was accidentally discovered in the year 1497, by a peasant, while receiving the water of a spring into a tub for the purpose of trying if it was tight. He was astonished on emptying its contents to find some metallic globules at the bottom, which he immediately ascribed to witchcraft. But having conquered his apprehensions, he collected them together for the inspection of a goldsmith in the small town of Bischoflaach, about four leagues distant. Neither promises nor presents, however, could induce him to point out the spot; and he engaged another peasant, Cazian Anderlin, to assist him in working the mine. But soon ceasing to find native mercury, their labours were abandoned. Other peasants followed in their foot-steps, and were equally disappointed. A company of miners nevertheless had better success. In 1525, the works were interrupted, and the miners totally ruined by an earthquake; nor was the pursuit resumed with activity until 1572. The Archduke Charles of Austria having taken possession of the mines, established a regular system for their management. Vast quantities of mercury were extracted from them; and their riches together with their great extent attracted the notice of the curious from all parts of the world. In 1803, a fire broke out in the mine, which did great damage, and occasioned the loss of several lives; but it was observed, that the subterraneous temperature was lower, and that the air of certain galleries was less easily vitiated than before. The French extorted the cession of Idria in 1809, and worked the mine for behoof of the order of the *three golden fleeces.* Numerous and important improvements were made by them, until the Emperor of Austria regained possession of it in 1813.

Immediately above the site of the mines the town of Idria is built, spreading over the valley, and up the sides of the hills. All the houses are detached; they are small; but each is inhabited by two or three families, and has a piece of ground from which the owners endeavour to raise a few vegetables. Though irregularly built, its aspect is not unpleasant to the eye, and it exhibits none of that black and dismal appearance, which is common to towns in the vicinity of mines. Its principal public buildings are, a handsome parish church; a very fine hospital, to which two physicians and a surgeon are attached; and a dispensary; for supplying medicines to the sick. There is a public school for the education of youth, with six masters, and a female to superintend that of girls. An old castle contains the treasure for the necessary expenditure, and a magazine for storing up the products of the mine; also one for provisions to the inhabitants; several public offices, as a hall for the council of administration, and accommodation for its chief director. Some of the edifices devoted to public purposes were erected here during the occupation of Idria by the French. In the year 1812, the population of the town amounted to 4095, and that of the whole district to 7060. Lat. 46° 16′ W.; Long. 33° 53′ E. Distant 18 miles from Upper Laybach. See *Philosophical Transactions*, vol. i. iv.; Brown's *Travels*, p. 83.; Kuttner's *Travels*; Jar's *Voyages Metallurgiques*, tom. ii.; Keysler's *Travels*, vol. ii. (*c*)

JEDBURGH, a burgh town of Scotland, and the principal town of the county of Roxburgh, is pleasantly situated on a declivity on the north side of the river Jed. From historical evidence, it appears that a village, castle, and church, had been founded at New Jedworth, now called Jedburgh, before the middle of the ninth century.[*] As Roxburgh, originally the principal town of the county, was often possessed by the English, and the village reduced to ruins by the frequent sieges of the castle, the seat of the judicatories was transferred to Jedburgh after the reign of David the First. The natural beauty of its situation, as well as its vicinity to the borders, attracted the frequent residence of some of the princes and persons of high distinction in both nations, as the town occasionally fell into the hands of the English or the Scots. Here the pious David founded, or, according to the opinion of some historians, rebuilt, A. D. 1138, a monastery, which he dedicated to the holy Virgin, and appropriated to canons regular of the order of St Augustin, imported from Beauvais in France. A church had been erected at Jedburgh during the Saxon period, in the ninth century: and as the lower story and gable wall of the monastery, still remaining, exhibit beautiful specimens of the Saxon architecture, it affords a strong presumption of their remote antiquity.[†] Great additions, during successive ages, were made to the revenue of the abbots and monks, by the liberal donations of the heirs of the throne, and of opulent barons and individuals belonging to both kingdoms. Before the expiration of the 12th century, the churches of Ancrum, Longnewton, Oxnam, Eckford, Crailing, Nisbet, Hobkirk, Liddel, or Castleton, had all become the property of the abbey of Jedburgh, and various accommodations of fuel, fish, &c. were also acquired in distant districts of the country. The increasing emoluments of the monastery of Jedburgh were beheld with a jealous eye by the bishops of Glasgow, to whose diocese it belonged, and occasioned frequent disputes and litigation between them and the abbots, which were at length terminated by the interposition of royal authority.[‡] A convent of Carmelites was founded at Jedburgh by the donations of the citizens and neighbouring inhabitants in 1513, which gives colour to a conjecture, that the constant rage of hostile incursions from the neighbouring kingdom did not intrude upon the tranquillity of religious communities, and that even the savage spirit of the border warriors was overawed by a reverence for superstitious pageantry, and the display of consecrated grandeur. The names of all the streets and closes in the town of Jedburgh, and of the adjacent fields, denote the ancient occupancy and predominance of the ecclesiastical orders; Canongate, Abbot's Tower, Abbey close, Dean's Close, Friars, Prior Meadow, Monklaw, Virgin, Ladysyards, &c. A part of the ruins of the Abbot's Tower, at the head of the Abbey Close, and of the castle on the hill at the west entrance to the town, have been lately removed. The only building of antiquity now remaining, with the exception of the abbey, is a house at the bottom of the town, celebrated on account of its having been the residence of Queen Mary, October 1566, when she held a justice court at Jedburgh, and from whence she made a visit to Bothwell at his house in Liddisdale, distant from Jedburgh 17 Scots miles, and returned the same day.

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[*] It was called New Jedworth, as distinguished from Old Jedworth five miles south, and nearer the English border.

[†] See CIVIL ARCHITECTURE, Plate CLXVII

[‡] The bishop of Durham claimed a right to Roxburghshire as a part of his diocese, ascertained and acknowledged by ancient treatie between the kings of England and Scotland.

All the lands, baronies and estates, vested in the Abbey of Jedburgh, were conferred by James VI. 1662, on Sir Andrew Kerr of Fairnieherst, and converted into a temporal lordship, together with the title of Lord Jedburgh.[*]

It is to be regretted, that the superstitious veneration, which in barbarous ages had protected the religious edifices, lost all its influence on the Protestant reformers, whether of warlike or ecclesiastical characters. The abbey, as well as the town of Jedburgh, was burnt and demolished by Lord Surrey, 1523, on his second incursion into Scotland. But, as has been observed, the ground or lower parts of the monastery escaped devastation at that time, nor did it afterwards sustain any damage from the fanatical rancour of domestic reformers. Jedburgh has the honour of parochial precedency, being the oldest parish in Scotland of which any historical record has been transmitted to posterity.

As Jedburgh was exposed to frequent depredations from the incursions of the English, and the greatest proportion of the property and all authority were engrossed by the ecclesiastical dignitaries, it does not appear to have made any progress in the manufactures and commerce, which, previous to the Reformation, began to be cultivated, in a limited degree, by several of the towns and burghs removed from the scene of rapine. In the estimate of the revenue of the burghs for fixing the assessment of tax for the defence of the borders, in the minority of Queen Mary, Jedburgh stands perhaps lower in the list than any one of the same population and extent.

After the union of the crowns, when free intercourse was opened between England and Scotland, the town of Jedburgh derived great profit, and attained a considerable degree of commercial prosperity, from the exportation of salt, skins, and malt, into the neighbouring county of Northumberland, and carrying wool to the coast towns, to be thence exported to the continent. This contraband traffic continued for many years after the union of the legislatures, till it was checked by the exaction of the malt tax 1728, and the more unrelaxed vigilance of excise officers on the English borders. From this period, the population and industry of the town of Jedburgh underwent a rapid decline. Efforts were made, from time to time, by some of the neighbouring gentlemen, and by the wiser citizens, to set on foot different branches of manufacture. A linen company was established. The manufacture of coarse wools was also attempted, but, from the discontinuance of these speculations, they appear to have disappointed the expectations of their patrons. The delusive hope of acquiring indolent independence, as the price of political service, and party contests and divisions, repeatedly occasioned by the return of elections after the union of the legislatures, deadened the spirit of enterprize, and retarded the occupation and improvement of those local advantages, which, in later years, have so much redounded to the credit and melioration of the community.[†]

About fifty years ago, a few enterprising individuals began to carry on a considerable manufacture of flannels, blankets, and coarser woollen fabrics. Their success roused the emulation of their fellow-citizens. A spirit of industry pervaded all ranks; and a great variety of woollen manufactures were pursued with dexterity and profit. During this period of industry, the wages of labourers have been doubled. There has been no want of employment for any class of men. Shops have been multiplied, and better furnished; and the surrounding fields brought to the most perfect state of culture. In the course of ten years preceding the year 1816, several hundreds have been added to the population of the town of Jedburgh, and more money has been expended in building and improvements of every kind than for forty years preceding.[‡] Land in the vicinity of Jedburgh was then seldom purchased at more than 20*l*. per acre, and a few years ago it has been sold for 100*l*. and 150*l*. per acre. The rent of the surrounding inclosures has been raised from 10*s*. and 20*s*. to 5*l*. and, in some instances, to 6*l*. or 7*l*. per acre. This description of the prosperity of Jedburgh must, however, be understood to refer to a period preceding the year 1816, when, from obvious reasons, which need not be mentioned, every species of manufacture and labour began gradually to slacken, and more than two-thirds of the persons employed are now laid aside from work. A great proportion of the fields, surrounding the town, had been purchased by the successive heirs of the Lothian family; but, as these made no part of the entailed estate, they were sold in separate lots, about twenty years ago, to private individuals, who are inhabitants of the town.

After the Reformation, Roxburghshire was consigned to the diocese of the bishop of Glasgow, and Jedburgh was then, and still continues to be, the seat of the presbytery. The parish is of great extent, reaching from the river Teviot to the borders of Northumberland.

The total population of the parish was found, upon the late survey in 1813, to amount to 4927, of which 2827 reside within the royalty of the burgh. The males in the town 1354. Females 1473.

There are, besides the parochial church, three dissenting meeting houses, all attended by large congregations. The parish church, consisting of the western division of the abbey, was repaired in 1792, and adapted, with great taste and propriety, to the style of the ancient edifice; and may be considered as one of the most elegant churches in the kingdom. The grammar and English schools, the former in the patronage of the heritors, the latter in the patronage of the magistrates, are now united, and conducted with great success by the present incumbent Mr Robison.

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[*] The Marquis of Lothian is the male representative of this ancient family, and his ancestors sat as peers in the Scotch Parliament, with the title of Lord Jedburgh.

[†] The situation of Jedburgh is well calculated for the manufacturing of woollen goods, being situated on a river, affording a variety of convenient situations and falls for mills. From the vicinity of Cheviot hills, any quantity of Cheviot wool may be procured, and laid down by the farmer, free of any expense for carriage. If the manufacture of worsted goods or English blankets is preferred, an abundant supply of Leicester wool, with the same advantage, can be procured from the stock farms on the lower grounds. In the year 1815, one hundred and four persons were employed in the manufacture of coarse woollen cloth, Scotch blankets, baize of different colours, flannels, &c. and 205 were employed in the lamb wool hosiery.

[‡] In the year 1773, the whole population of Jedburgh amounted to nearly 2000, and now amounts to 2827. Within the last forty years, six bridges have been built within less than three miles of the town, three of them immediately contiguous. A magnificent court-house was erected eight years ago in the middle of the town, and adds to the beauty of the streets. An asylum is also provided for the reception of persons deranged. Persons convicted of crimes are also confined in it to hard labour.

The set of the burgh is nearly the same as that of Edinburg, consisting of a provost, four bailies, dean of guild, and treasurer; eight deacons of the trades; and fourteen merchant counsellors. The revenue of the burg arises entirely from the rent of the mills, to which the inhabitants of the town are thirled, and from the customs upon meal, barley, &c. imported into the town for sale. The magistrates of Jedburgh preside, together with the chamberlain of the Duke of Roxburgh, at St. James's fair in the vicinity of Kelso, and enjoy the half of the customs; privileges which redound more to their honour than profit, as they are supposed to have been conferred as a reward for meritorious services during the period of the Border wars, but are not productive of any solid emolument. There are four fairs held annually in the town of Jedburgh. The whole revenue of the town does not exceed 500*l.* per annum, of which a large part is expended annually for the interest of debt. The mills were formerly included in the lordship of Jedburgh, conferred on Sir Andrew Kerr; but were afterwards transferred, either gratuitously or for a small sum, to the burgh, and confirmed by a charter of James the First.

The poor of the town are maintained by an assessment, laid upon the inhabitants in proportion to the value of their houses and landed property within the royalty. The number of poor now in the list of supply amounts to 67, and the assessment granted for the last half year, (July 1817) to the sum of 135*l.* The annual rent of the houses and gardens within the royalty is estimated at 4000*l.* A parish bank was established July 1815 in the town of Jedburgh, in partnership with the country parish, and six neighbouring parishes, which has fully answered the hopes of its patrons; the small sums deposited now amounting, July 1817, to 1996*l.* An auxiliary bible society was established two years ago, under the direction of the most respectable neighbouring gentlemen, and the ministers of the town. A branch of the British Linen Company was established at Jedburgh in the year 1791, and carries on business to a great extent.

There is a good butcher market in the town of Jedburgh; the bread has been long excellent; and in the summer months, and in winter when the weather is mild, the town is well supplied with fish, brought from the distance of thirty miles. A stage-coach runs from Jedburgh three days in the week, and returns in the alternate days. A coach also runs from Hawick to Berwick, which passes through Jedburgh and returns the same day. The greatest grievance to which the town and neighbourhood are subjected arises from the dearness of fuel, consisting chiefly of coals brought from Northumberland. The average price may be stated at 1*s.* 7*d.* per cwt.

The diversity of surface, and the adjacent woods and brooks, afford a variety of beautiful picturesque scenes. The soil is deep and fertile even to the top of the hills, and peculiarly favourable to horticulture and orchards, for which Jedburgh has been long celebrated. Some of the pear-trees, which bear the marks of great antiquity, are supposed to have been planted by the hands of ecclesiastical proprietors before the Reformation.*

JEDO. See Jidda.

JEJURRY is the name of a pretty large Mahratta town in India, in the province of Bejapoor. It is principally celebrated for its temple, dedicated to an incarnation of Mahadeva, or Siva. It is built of fine stone, and has a very majestic appearance and situation, on a high hill, in a beautiful country. The ascent to the temple is by a handsome flight of broad stone steps, arches being in many places thrown across over the stairs. The inner temple where the deity is placed is ancient, and not very handsome. The establishment of dancing girls attached to it, amounted in 1792 to 250. The revenues of the temple are derived from offerings, and from houses and lands given by pious persons. The annual expenditure on account of the idol is 6000*l.* The idol has horses and elephants kept for him, and along with his spouse, is bathed daily in rice and Ganges water, the last of which is brought from a distance of 1000 miles. At the annual fair, which is held in January, no fewer than 100,000 persons visit Jejurry. East Long. 74° 17′, and North Lat. 30° 54′. See Moor's *Hindoo Pantheon.*

JELLY. See Chemistry.

JEROM, or Hieronymus, was born about the year 329 at Strido, a town on the confines of Pannonia and Dalmatia. His father, who was a person of rank and property, took great care of his education; and sent him at a proper age to study at Rome, under the best masters of those times. Under the celebrated Donatus, he made great progress in the belles lettres, and all the learned languages; and was particularly careful to accomplish himself in the art of oratory, that he might the better recommend the Christian tenets. Having finished his education at Rome, he travelled into various countries in pursuit of knowledge, examining all the public libraries, and conversing with all the men of learning in his way. Upon his return to Rome, he resolved to devote his future life to study, and to withdraw himself entirely to some remote region, at a distance from large towns and civilized life. Taking with him only his books, and money sufficient to defray the expense of his journey, he proceeded through Asia Minor to Jerusalem; thence to Antioch, where he had a dangerous illness; and finally settled in a frightful desert of Syria, where he entered upon a strict monastic course of life, in the 31st year of his age. He applied himself especially with the utmost assiduity to the study of the sacred scriptures, and of the oriental languages; but, after four years of laborious application, his health became so much impaired, that he found it necessary to return to Antioch. By Paulinus, bishop of that city, he was ordained a priest in the year 378; but with the express stipulation on his part, that he should not be confined to any particular cure. In 381, he went to Constantinople, where he acknowledges himself to have received much valuable instruction relating to the Scriptures from Gregory Nazianzen; and, in the following year, he accompanied Paulinus of Antioch to Rome, where he became secretary to Pope Damasus. After the death of that pontiff in 385, and in consequence of the vexations which he experienced from the followers of Origen, he again removed from the city of Rome, and took up his abode at Bethlehem in Judea. Thither he was followed by many persons of both sexes from various parts, who had resolved to embrace the monastic life, and who were attracted by his fame for learning and piety to put themselves under his superintendence. Here he enjoyed all that repose in which he so much delighted, and employed the remainder of his life in composing a variety of learned works, and in diligently attending to the religious instruction of those who had collected around him as their pastor. He was much engaged particularly in writing against the prevailing heresies of his time, especially against the errors of Origen, and those who supported the tenets of that rival father. He lived to the age of 90 years, retaining his vigour of mind to the last; and died on the 30th of September, A. D. 420. He has been pronounced by Erasmus, "the greatest scholar, the greatest orator, and the greatest divine, that Christianity had then produced;" but Le Clerc professes to shew, that his eloquence is often the most hyperbolical declamation, his acquaintance with the learned languages far from accurate, and his reasonings generally obscure and inconsistent. His style as a writer, is nevertheless acknowledged to be in no small degree both elegant and animated; and his judgment and learning to have been upon the whole superior to those of any of the fathers who preceded him. His talents were better than his temper; and he made greater attainments in the knowledge than in the spirit of Christianity. He was a man of the most choleric disposition, and ready to burst into the most outrageous abuse upon the slightest provocation; insatiably greedy of fame, and bitterly censorious of his most respectable rivals and opponents. The first edition of his works was published by Erasmus at Basle in 1526, with an account of his life prefixed; but the latest and fullest was published at Verona by Vallersius, in 11 vols. folio. They consist chiefly of his Latin version of the scripture, distinguished by the name of the Vulgate, commentaries on different books of scripture, polemical treatises, letters, and biographical accounts of preceding ecclesiastical authors. Of these, the commentaries and letters are accounted the most useful, and the chief advantage of his writings consists in the information which they afford respecting the opinions of the learned Jews in biblical literature, and the fragments which they contain of the ancient Greek translations of the Bible. See Mosheim's *Ch. Hist.* vol. i.; Lardner's *Works*, vol. ii.; Milner's *Ch. Hist.* vol. iii.; Cave's *Hist. Liter.* vol. ii.; Le Clerc's *Questiones Hieronymianæ*; and Jortin's *Remarks on Eccl Hist.* (*q.*)

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JERSEY, is an island in the English Channel, subject to the Dominion of Great Britain, lying off the coast of Normandy in France. Its form is an irregular parallelogram, the extreme length of which is 12 miles, the extreme breadth 7, and the superficial area 62½ square miles, or 40,000 acres. The climate is so mild, that frost is rarely of any duration, and snow seldom lies above two or three days in winter. Shrubs requiring shelter in the southern parts of England, sustain no injury here from exposure, and spring flowers blow in the open air of the colder season. Fogs are not uncommon, and there are frequent gales, together with keen and penetrating winds from the east, which are severe on delicate constitutions. Pulmonary affections are often fatal, and there are numerous cases of scrophula, which some have ascribed to the habitual use of of salted provisions.

The surface of Jersey is an inclined plane, rising abruptly from the sea on the north, where its lofty cliffs are in general 100, or frequently 200 feet high, and declining gradually to the southern coast. Its shore is deeply indented by many fine bays, of which St Aubin, Brelade, de Lecq, and Boulay, are the most important. But they are not well sheltered from storms, and the ports of St Helier and St Aubin are both dry at low water. A chain of rocks runs out from the north and north-east, dangerous to mariners, as are the shallows in other parts; and the tides, which rise from 40 to 50 feet, exhibit some singular phenomena.

The island is watered by numerous streams, and so copiously, that it has been observed, there is scarcely a house which has not a spring or a brook near it. All the mineral waters hitherto discovered are chalybeate; but only two have attracted any notice on account of their medicinal properties—one in the parish of St Mary, the other in that of St Saviour.

A lage portion of Jersey, consists of sienite, especially the northern coast, where there are rocks of various elevation, generally exhibiting broad and perpendicular faces to the sea, and every where intersected by veins also perpendicular, running north and south. Many remarkable caverns have been formed in them by the action of the waves What approaches nearest to granite is quarried at Mont Mado, of which ample use is made for architectural purposes. Varieties equally hard and compact are obtained at St. Brelade's Bay and Plemont. These of scinite appear in some places to pass into porphyry, in others into a kind of green stone in a state of partial or entire decomposition. No metallic traces, except of iron and manganese, are seen in any part of Jersey. It has been said that copper ore is found. Ochre of different colours is obtained in various places, and there are some specimens of tripoli.

The surface of the island is extremely irregular, consisting of numerous small vallies running across the island; and the soil, which is principally a light and fertile earth, has been compared to that of Guernsey. Considerable variety of vegetables is produced here. Madder grows wild, also the luteola, single camomile, and a number of aromatic herbs. Laver and samphire grow on the coast, and chiefly to the north. Fine fruits of the highest flavour come to maturity in the orchards. A kind of pear called *chaumentelle* is particularly celebrated, some attaining a pound in weight. It sells for a high price at all times, and is sent in presents to England. From the profusion of apples a great quantity of cider is obtained yearly. There are no woods of forest trees throughout the island; but one of the most important vegetables is sea weed, or *vraic*, which grows all around the rocky shore, and is used, either in a recent state for manuring the land, or when dried, as fuel. Only two seasons in the year, which are proclaimed by order of the magistrates, being appointed for cutting it, whole families watch the period when it is torn off the rocks by tempests, to rake it together. The ordinary farinaceous grain of England is cultivated; also bearded wheat, called *froment tremais* in Jersey, which is reaped in three months, and the various edible roots. Lucern and clover are in general cultivation, but hops have not succeeded. Instead of reserving a field for each kind of grain, it is common to sow several in patches in those of very small size. The vegetable produce of the island is considerably less than its consumption; and there is sometimes a temporary scarcity in the town of St. Helier, extending both to bread and meat.

Many species of fish frequent the shores, but the inhabitants do not seem to avail themselves of the great advantage to be derived from them. Rays, turbot, plaise, soles, and mullet, are caught, besides others. "But," in the words of an old author, "the sea about Jersey may be stiled the kingdom of congers," which are seen among the rocks at all seasons; some six feet long, and weighing 54 pounds. Oysters, lobsters, and crabs, are plentiful. Numbers of small snakes, all harmless, and also beautiful lizards, are seen on the island. It is infested by toads of monstrous size, though none are found on Guernsey. The red legged partridge was once common, but is now nearly extirpated. There are three species of field mice, one of which, in as far as we can learn, is the *mus* typhlus, or blind mole, hitherto ascribed to southern Russia. It approaches to the size of a rat, and is of a grey colour, with long hair: the eyes are so small as to be scarcely discernable; and under the fur there are in the site of the ears two bare vesicles. The horses of the island are small, strong and hardy; and the cows are of that breed known in England by the name of Alderney cows. Sheep are diminutive in size, and mostly black. Another species is alluded to by authors of the seventeenth century, as "those famous sheep with six horns, three of each side; one whereof bent towards the nose, another backwards towards the neck, and the third stood erected upwards in the midst of the other two, mentioned by writers as one of the singularities of this island, are become very rare." Some goats are bred; and hares are scarce.

The inhabitants are distinguished by few peculiarities from those of the rest of the British Dominions, except in their language, which is French. This is the vernacular tongue; divine service, pleadings in court, and the public acts, are all in good French, which is understood, and occasionally spoken, by the upper ranks; but, in compliance with custom, they frequently converse in the provincial language, which is described as consisting of more dialects than those of ancient Greece. But English is becoming more prevalent daily, and, if it received greater encouragement, would soon be universal.

In the year, 1806, the total population of Jersey amounted to 4363 families, consisting of 10,284 males and 12,571 females, being 22,855 souls, which is at the rate of 365 persons to each square mile. These are dispersed in twelve parishes, containing two towns, several villages, and several fortresses. The town of St. Helier is the capital, situated on the east side of St. Aubin's Bay, and consisting of about 1000 houses, wherein between a third and a fourth of the whole population, or above 6000 individuals, reside. In the year 1693, it seems to have consisted of only 210 houses. Their antique appearance is now modernized; many of the streets have footpaths, but they are liable to be overflowed by the channels of a stream from the north, and the town is not yet lighted; consequently, a great number of small lanterns are seen in motion at night. There is a square, wherein stands a gilt statue of King George II. in Roman costume, surrounded by a neat iron railing. The parish church, which is the most modern in the island, was built in 1341; but, since that time, it has undergone considerable alterations. It contains a neat organ, and some handsome mural monuments. There are also chapels for Presbyterians and Wesleyan Methodists, both of which are neat and spacious buildings of recent erection. The Roman Catholics perform divine worship in a private apartment, not being sufficiently affluent to erect an edifice exclusively devoted to the exercise of their religion. There are a workhouse and a public hospital here for the use of the whole island. The latter was rebuilt in 1783, in consequence of another being damaged by an explosion of gunpowder. It has commonly about 100 patients, of whom not above two-thirds are natives of Jersey, and about a tenth part of the whole labour under mental derangement. On one side of the square is the court-house, a plain but solid structure, wherein are held the assembly of the states and the courts of judicature; and the governor of the island has a house and garden belonging to the town. A new prison, situated at the west extremity of St. Heliers, on the sea shore, was completed in 1815. The basement of this edifice has a squared front of sienite from Mont Mado, and is separated from the upper story by a facia of dark grey granite from Sorel, a rocky promontory in the northern quarter of the island. Above this the sienite is resumed; and the uniformity being relieved by pilasters between every window, the whole is completed with an elegant cornice of Portland stone. The front stands on an arcade extending 120 feet in length by 8 in width; and the intercolumnations are grated to the crown of the arches. The space within the arcade is for the accommodation of the male prisoners, when they leave their dormitories. Water is raised to a capacious cistern in the roof, by means of a forcing pump, and the prisoners of every description have access to a constant and ample supply. The centre of the upper floor forms a chapel, divided by partitions of sufficient height, to prevent any communication whatever, whither the prisoners of the several classes are conducted by different doors. An unfinished house in the town was converted to a theatre, where some comedians occasionally repair from England to perform during a few months of the year, and there are regular assemblies in winter. A public library was established by the Rev. Mr Falle in the 17th century, which since that time has received considerable accessions. There are three gazettes in French published here on Wednesday, and one in English on Saturday. A weekly market is held for fish and provisions, which is well supplied, especially from the coast of France since the late peace; most of the flour is brought from that country and England. Several packets are established between St. Helier's and Weymouth, and there are regular traders to Southampton, whither the voyage is usually made in between 16 and 24 hours. The town of St. Aubin's stands on the opposite side of the bay, to which it gives name, about four miles from St Helier's. It is a small place, situated under a long range of cliffs, and consists principally of one street, well sheltered from the prevalent winds, and commanding a fine and interesting prospect of the bay. Being distant from the church of St Brelade, to which parish it belongs, a neat chapel has been erected by private subscription. This town is protected by a fort mounting 14 guns, which has been erected on a rock, dry at low water, but insulated with the rise of the tide. A strong pier projects from the fort, within which there are 30 feet water at new and full moon, and although this is merely a tide harbour, St Aubin's, on account of it, enjoys some portion of foreign trade.

Jersey, from its peculiar situation, has been strengthened by more than an ordinary portion of military architecture. Elizabeth Castle, which is the proper residence of the governor, is a strong fortress in St Aubin's Bay, defending the approach to St Helier's, from which it is distant 663 geometrical paces, and is accessible by a sandy beach during five or six hours while the tide ebbs, but is insulated with its flow. A fortification which was recently constructing on the town hill overhanging St Helier's, is designed to contain 2000 or 3000 men. Here a well has been sunk 233 feet through the solid rock, which has from 80 to 100 feet of fine water. Besides these, may be named other strong places, as mount Orgueil, Fort Henry, La Rocco, Seymour Tower, a fort at Noirmont Point, and Ich-Ho; as also a chain of Martello towers, redoubts, and batteries, in every maritime part of the island. Barracks for the accommodation of regulars are erected in various quarters. In the time of war there were, belonging to the island, a troop of cavalry, six battalions of militia, consisting of above 2000 men, and a company of artillery amounting to 600 or 700.

Few manufactures are conducted on a large scale in Jersey. About 24,000 hogsheads of cider, however, which is the common beverage of the island, are made annually; and a plentiful year will yield 36,000. Tanning, soapmaking, candlemaking, and other works, are among the manufactures for supplying the inhabitants. Great quantities of worsted stockings are spun and knit in the island. The principal exports are cider, of which 1800 hogsheads are sent to England; fruit, potatoes, cattle, and worsted stockings. During the five years preceding 1813, the exports were at an average 768 cows, 13 bulls, 900 pipes of cider, 1228 tons of potatoes. From England are imported corn, flour, seeds, live and dead stock, cloth, linen, crockery and glass ware, paving stone, and in general all articles necessary for subsistence, apparel, and furniture. Salt fish to a large extent is imported from Newfoundland. The commercial relations of Jersey were formerly restricted for the most part to England and France, after which another field was opened to that island, where about 80 fishing vessels were employed during peace; and now it trades with almost every country in Europe, and also with America. During the year 1813, there entered inwards 734 vessels, and 813 cleared outwards, of which 440 were in ballast. Those constituting the difference, 79, were vessels from England for oysters, which make no entry inwards, but clear outwards. Fifty-nine vessels, whose united burden amounted to 6003 tons, and navigated by 549 men, belonged to the island in the year 1812. Until lately, the currency of the island was principally French, with a small proportion of Spanish money; and the amount of specie was about 80,000*l.* Sterling. After the French Revolution, the coin of England came into more gradual use, until, by the gradual rise of gold and silver, almost the whole specie of the island was withdrawn. The established banking-houses, of which there were three, became obliged to issue notes of five and ten shillings value. Others soon adopted the same plan; and at length no fewer than 80 bankers were circulating notes, from the value of one pound down to one shilling. From the want of coinage of low denomination, they were readily taken; but the hazard inseparable from such an inundation of paper money was diminished by the introduction of 10,000*l.* of silver coinage by government, accompanied by a prohibition against issuing notes of lower value than one pound. Mr Colquhon, in his work on the *Wealth and Resources of Great Britain*, computes that the total worth of the island, as property, is 2,610,030*l.* In this estimate are included the value of the soil, of the public and private buildings, farm stocking, shipping, furniture, and coinage; but probably the whole is not worth above 2,000,000*l.* at the highest calculation.

Jersey is under a peculiar form of government, which some have supposed to be exactly similar to that of the British islands. It consists of a court of judicature, and an ecclesiastical body, separately exercising their respective jurisdiction, but which, together with twelve constables, and a military governor, are combined into an *Assembly of the States.* The court of judicature is composed of a bailiff, who presides, and twelve jurats; together with an attorney and solicitor-general, a high sheriff, two under sheriffs, six pleaders, and an usher. The bailiff is appointed by the king, and the jurats are chosen by the masters of families: he keeps the public seal, which however he connot use without the consent of three jurats. The clergy consist of eleven rectors and a dean, corresponding to the twelve parishes in the island, and forming a regular spiritual court, of which the dean is the head. In the assembly of the States, the attorney-general and high sheriff are admitted *ex officio*, but have no vote. No assembly can be held without the governor's permission, who has a negative voice. But by an order of James VI. in council, he must summon the States within 15 days, if the bailiffs or jurats require it. Likewise he is directed to abstain from using his negative voice, except in such points as shall concern the king's special interest. Seven of each class of jurats, clergy, and constables, must be present, to constitute an assembly of the states, whose business is chiefly raising money for the public service. There are several peculiarities in the laws of Jersey, of which a code was compiled by the States in 1771, and sanctioned by the king. Legitimation by subsequent marriage is recognised, and the *cessio bonorum* of the Scottish law. The punishment of death is seldom inflicted; but mutilations are practised: A criminal convicted of forgery, which is not a capital crime, was sentenced, in 1814, to lose the tip of his right ear.

Falle, the historian of Jersey, observes, that there are "yet remaining in this island some old monuments of paganism. We call them *poquelays*: they are great flat stones, of vast bigness and weight, some oval, some quadrangular, raised three or four feet from the ground, and supported by others of a less size. At ten or twelve feet distant is a smaller stone set up on end, in manner of a desk, where it is supposed the priest kneeled, and performed some ceremonies while the sacrifice was burning on the altar." The monuments here alluded to are cromlechs, which the author, from the quantity of ashes found around them, and their position on eminences near the sea, supposes were altars dedicated to its divinities. Only four of a decided character now remain, one of which is broken down. Jersey had formerly an abbey, dedicated to St. Hellier, four priories, above twenty chapels, and twelve parish churches. All the last, which were consecrated between 1111 and 1341, are still preserved, and some of the chapels.

Jersey is supposed to be the island mentioned under the name of Cæsarea, in the itinerary of Antoninus, and to have thence derived its present name. It is said to have been afterwards called Angia, in a grant by Childebert king of France in the sixth century. About the year 857, it is affirmed that a certain St. Helier suffered martyrdom here, but how, or for what cause, or wherein his sanctity consisted, we are not informed. Indeed, these early notices are extremely obscure and indefinite. Having belonged to Normandy of old, Jersey became an appendage of the British isles, when William the Conqueror subdued England; and it was annexed to the crown, along with those in the neighbourhood, by Henry I. However, the French made frequent endeavours to recover what they conceived pertained more naturally to their kingdom, from geographical position, and in the course of the civil wars between the houses of York and Lancaster, they reduced about one half of the island. In the year 1518, it was visited by the plague, which became so destructive in the town of St. Helier, as to occasion the removal of the courts of justice and the market. About this time the superficies was partitioned among a number of petty owners, whose oppressions and dissensions were such, that Henry VII. instead of himself applying the sword of justice, which might have produced extermination, obtained a papal bull, excommunicating those guilty of intestine commotions. In the reign of Queen Mary, the island was surprised by a company of Flemings, who probably did not retain it long; and it participated deeply in the civil wars of Charles I. and his son. From that period Jersey seems to have enjoyed profound repose until 1779, when an unsuccessful attempt to take it was made by a body of French troops. In January 1781, the Baron De Rullecourt endeavoured to capture it by a coup-de-main, with 1200 men. But part of his force being wrecked, only 700 gained the shore, who surprised the town of St. Helier, took the lieutenant governour prisoner, and compelled him to sign articles of capitulation, and likewise to direct the troops and fortresses to surrender. But the officers who held the fortresses, having learned that these orders were given by the lieutenant governor while under restraint, refused obedience; and a body of military, having collected under Major Pierson, speedily expelled the enemy, though with the loss of their own brave commander. Distant 17 miles from Carteret and Bail on the coast of Normandy; 21 from Guernsey; 75 from Weymouth; and 120 from Southampton. Lat. of St. Aubin 49° 12′ 59″ N. Long. 2° 10′ 44″ W. (*c*)

JERSEY, New, one of the United States of America, situated between 39° and 41° 24′ North Lat. and between 25′ West and 1° 20′ East of the meridian of Philadelphia. It is bounded on the north by a line running from Hudson's river at 41° of N. Lat. to the Delaware river in

41° 24′ N. Lat.; on the east by Hudson's river and the Atlantic ocean; on the south by the same ocean and Delaware bay; and on the west by the Delaware bay and river. Its length, from north to south, is 163 miles. Its least breadth, about the middle of the state, does not exceed 45 miles. In the north its greatest breadth is about 70 miles, and in the south about 75 miles. It is reckoned to contain nearly 8320 square miles, and 5,324,000 square acres. It is said to have been first discovered by Capt. Hudson, in 1609, then in the service of the Dutch; and by them a part of it was settled, about the year 1614. Its original inhabitants were the Delaware Indians, who, after a series of contentions with the Iroquois, or Five Nations, were, by the latter, subdued and reduced very low, when William Penn landed in Pennsylvania in 1682.

This state, when owned by the Dutch, formed a part of a much larger tract of country, called New Belgium, or New Netherlands. It was ceded to the English, and granted, with what is now the state of New-York, by Charles II. in 1664, to his brother James, Duke of York; who made over New-Jersey to Lord Berkley and Sir George Carteret. In or about the year 1675, Lord Berkley sold his half of the province of New-Jersey, which was the western part: and hence the province was divided, in 1676, into two parts, called East New-Jersey and West New-Jersey—a division which is still recognised. The proprietors of East Jersey derive their claims from Sir George Carteret, who gave name to the province, in compliment to his family, who came from the Isle of Jersey, on the coast of Normandy, belonging to Great Britain. The West Jersey proprietors trace their claims to Lord Berkley. It was originally intended to divide the state equally. The present division line may be seen on Lewis' map of New-Jersey. The celebrated William Penn was one of the chief instruments in settling West Jersey, before he became proprietor of Pennsylvania. It was his concern in settling West Jersey that made him acquainted with the eastern part of the province which he afterwards owned, and to which he gave his name.

New-Jersey is now divided into 13 counties, which contain 116 townships, viz.

No. of Counties.	No. of Town-ships.	Population.		Chief Towns.
		1800.	1810.	
Cape May	3	3,066	3,632	Bridgetown.
Cumberland	8	9,529	12,670	
Salem . .	9	11,371	12.761	Salem.
Gloucester	10	16,115	19,744	Woodbury. Gloucester.
Burlington	12	21,521	24.979	Burlington. Bordentown.
Hunterdon	10	21,261	24,553	Trenton.
Sussex . .	15	22,534	25,549	Newton.
Bergen .	7	15,156	16,603	Hackinsack.
Essex . .	10	22,269	25,984	Newark. Elizabeth-town.
Middlesex	8	17,890	20.381	Amboy.
Monmouth	7	19,872	22 150	Freehold.
Somerset .	7	12,815	14,728	Boundbrook.
Morris .	10	17,750	21.828	Morristown.
Total 13	116	211,149	245,562	

The capital of the state is Trenton, where a handsome and commodious state-house is erected.

The three northern counties of this state are mountainous, and the next four are agreeably diversified with hills and vallies. The south mountain, which is one great ridge of the Alleghany range, crosses the state in Lat. 41°, and the Kittatinny ridge passes a little to the north of the south mountain. The highlands of Navesink, on the coast, near Sandyhook, are about 600 feet above the sea. The greater part of the six southern counties are occupied with that long range of flat land, which commences at Sandyhook, and lines the coast of the middle and southern states. Much of this range is entirely barren, producing only shrub oaks, and yellow pines; but the rest of the state contains good soil, and excellent pasturage. Great numbers of cattle are raised in the mountainous parts for the markets of New-York and Philadelphia; and wheat, rye, maize, buckwheat, potatoes, oats and barley, are raised for home consumption. Large dairies are also kept, and great quantities of butter and cheese made. Jersey is also remarkable for an excellent breed of horses.

Great quantities of leather are manufactured at the valuable tanneries of Trenton, Newark, and Elizabeth-town. There is a considerable shoe manufactory at Newark, a glass house in Gloucester county, and paper mills and nail manufactories are erected and wrought to advantage in several parts of the state. The iron works, which are a great source of wealth, are erected in Gloucester, Burlington, Sussex, Morris, and other counties. There are no fewer than seven rich iron mines in Morris county, two furnaces, two rolling and slitting mills, and about 30 forges, with from two to four fires each. The annual produce of these works is about 540 tons of bar iron, 800 tons of pigs, besides large quantities of hollow ware, sheet iron, and nail rods. In the whole state, the annual produce is computed at 1200 tons of bar iron, 1200 tons of pigs, and 80 tons of nails, exclusive of small articles.

The annual amount of articles exported from the seaports of New-Jersey was, in 1810, 430.267 dollars. The aggregate tonnage of the state for 1807, was 22,958. The exports through New-York and Philadelphia are very great. The exports are, flour, wheat, horses, cattle, hams, cider, lumber, flax seed, leather, and iron.

The principal river of New-Jersey, which lies wholly within the state, is the Raritan; the two branches of which, passing through the north-eastern parts of the state, unite about 20 miles above New-Brunswick. It becomes navigable for small vessels about 2 miles above that city, at a place called Brunswick Landing. Passing by New-Brunswick, and gradually becoming broader and deeper, so as to receive vessels of considerable burthen, it passes Amboy, to which vessels of the largest size may have access, and then widens into Raritan bay, which is immediately connected with the ocean. The distance from New-Brunswick to Amboy by water is about 20 miles. The general course of the Raritan is a little to the south of east. The Passaic river is navigable for 10 miles by small vessels. There is on this river a cataract, of about 60 feet fall, at the town of Patterson, which is much resorted to, as an interesting natural curiosity. The Passaic, after it becomes a considerable stream, runs nearly south, and falls into Newark bay. The Hackinsack river is navigable 15 miles, runs nearly south, and falls into Newark bay. The Mullicus river runs south east, and falls into the ocean at Little Egg-Harbour. The Great Egg-Harbour river is navigable for 20 miles, for vessels of considerable burden. It runs east, and falls into the ocean at Great Egg-Harbour. Morris river is navigable for 20 miles, by sloops of 100 tons. It runs south east, and falls into Delaware bay. There are a large number of creeks and rivers which fall into the Delaware. Some of the principal are, Cohansey creek, Alloway creek, Salem creek, Racoon creek, Mantua creek, Timber creek, Cooper's creek, Ancocus creek. Musconecunk river, Pequest river. Pawlin's kiln, and Flat kiln. Millstone river, and Boundbrook, fall into the Raritan; and Ringwood, Rockyway, Persippany, and Whippany rivers, fall into the Passaic. The Delaware river on the west, and the Hudson on the north-east of the state, forming a large part of its boundaries, will more properly be noticed under the articles Pennsylvania and New-York.

The principal towns of the state are, *Newark*, a flourishing well built town, with a population of 8008 in 1810; *Trenton*, the seat of government, with a population of 3002; *Perth-Amboy*, so called from James Drummond, Earl of Perth and Ambo, with a population of 815; *Burlington*, with a population of 2419; *New-Brunswick*, where there is a college, founded in 1770, and a population of 6312; *Princeton*, a village of 100 houses, including public buildings; and *Elizabeth-Town*, with a population of 2977.

Besides 15 incorporated academies, this state has 2 colleges, viz. the college at Princeton, and Queen's College at New-Brunswick. The college at Princeton traces its origin to the pious and enlightened zeal of a number of individuals in the then province of New-Jersey, with a few in Pennsylvania and New-York, who were deeply impressed with the importance of providing for the liberal education of youth, especially of such as were intended for the gospel ministry. Among these individuals none was more conspicuous, or more active, than the Rev. Jonathan Dickinson, pastor of the Presbyterian church at Elizabeth-Town. Under his care and instruction the first pupils of this institution were placed, before it received a charter. He died in 1747; and the pupils who had been with him appear to have been transferred to Newark, and to have joined others then under the care of the Rev. Aaron Burr, the pastor of the Presbyterian church in that place, who was, in fact, the first president of the college; though Mr Dickinson is so represented in the public catalogues of the institution, from the circumstance stated above. The institution, thus located at Newark by accident, remained there for ten years. In 1748, a royal charter was granted to it, by George II. by the style and title of *The College of New-Jersey*, which is its corporate name at present. This charter, with some improvements, has been confirmed by the state of New-Jersey, since the American Revolution. Jonathan Belcher, at the time governor of the province, was the chief instrument in procuring the original charter, and was at first its most liberal benefactor. In consequence of this, the trustees were desirous of calling the college edifice Belcher Hall. But on intimating this to the governor, he decisively declined it, and requested that the building might be called Nassau Hall, in memory and honour of king William III. once prince of Orange and Nassau, whose love of civil and religious liberty the governor highly approved. By this name, accordingly, the edifice has always been called. This edifice is of stone, 175 feet in length and 54 in breadth, and four stories high. Besides a chapel about 40 feet square, in which all the religious exercises of the institution are performed, it contains 60 lodging rooms, capable of accommodating 3 students each. This edifice was consumed by fire in 1802, but was rebuilt in that and the following year; and at the same time two other considerable structures were erected; one on the east, and the other on the west side of the college yard. That on the east side contains the refectory of the college, and the apartments for the philosophical apparatus, and cabinet of natural history. That on the west side contains the library of the college, consisting of about 7000 volumes of select books; the orrery constructed by David Rittenhouse; three recitation rooms; and two rooms appropriated to literary societies. These buildings are all of stone. There are at present 150 students regularly matriculated in the college. The officers are, a president; vice-president, who is also professor of languages; a professor of mathematics, natural philosophy and chemistry; and two tutors.

A theological seminary, for the purpose of educating young men for the gospel ministry, was established in this place, in 1812, by the General Assembly of the Presbyterian church in the United States. There are, at present, two professors, one of didactic and polemic theology, the other of ecclesiastical history and church government; and between 50 and 60 theological students. A handsome stone edifice, 150 feet long, and 50 wide, and four stories high, capable, when completed, of accommodating 100 students, has lately been erected. The two lower stories are finished, and the upper part is expected to be finished shortly. The college and theological seminary are institutions entirely distinct from and independent of each other; though the most friendly intercourse exists between them, and they are mutually advantageous to each other.

Queen's College, at New-Brunswick, was founded by ministers of the Dutch church, for the education of their clergy, and was incorporated in 1770. Within a few years past a handsome stone building has been erected for the use of the professors of the college, and to furnish apartments for recitation rooms, and a grammar school. The exercises of the college, however, have, for some time past, been entirely suspended. There are, at present, no pupils, except in the grammar school. The new building has been granted by the trustees of the college (to be resumed at their option) to accommodate a theological school of the Dutch church, in which there are two professors, and about 17 pupils.

There are a number of different religious denominations in New-Jersey. The English Presbyterians, who are most numerous, have 74 churches, and 59 clergymen; the Dutch Reformed, 31 churches, and 20 clergymen; the Episcopalians 24 churches, and 11 clergymen; the Baptists 30 churches, and 23 clergymen; the Congregationalists 9 churches, and 5 clergymen; the Friends have 44 meeting houses in the state. The Methodists are numerous; the number of their communicants was about 6739 in 1811.

The inhabitants are a collection of Low Dutch, Germans, English, Scotch, Irish, and New-Englanders, or their descendants. In 1810, the population was,

Males	115,357
Females	111,511
Total population in 1810,	226,868

The militia, in 1810, amounted to 33,710 men.

JERUSALEM, a city of Palestine, in the pachalic of Damascus, and the capital of the ancient kingdom of the Jews. It occupies the declivity of a barren basaltic mountain, at the extremity of an extensive plain, in a climate comparatively cold, from its elevated situation, where much snow falls, together with copious rains. The plan of the city is irregular; but, excluding the citadel at the west end, it approaches to a quadrangular form. It is surrounded by crenated walls of reddish freestone, of considerable height, strengthened by square towers, and mounting a few old 24-pounders, on carriages without wheels. The walls are modern, having been built by Soliman, the son of Selim, as appears from inscriptions upon them. They are too thin to admit of defence, and Jerusalem is not tenable as a military post, being commanded by neighbouring heights on all sides. There are six gates, whose names are partly of Hebrew origin. The total circuit of the city does not exceed two miles and a half. Some authors exaggerate its ancient limits to a great extent, while others conclude that it has scarcely ever exceeded its present boundaries. The streets are narrow, as is usual in the east, but straight and well paved. Several of them have foot-paths, and they are kept cleaner than is common in Palestine. Vacant spaces, and some covered by ruins, are seen towards the west, but no open square has been purposely left within the walls. In general, the houses are well built of free-stone, and for the most part two or three stories high, with a plain simple front, without windows in the lower stories, so that it has been said that a passenger walking the streets of Jerusalem may conceive himself in the corridor of a vast prison: the door, besides, is so low, that a person must bend almost double to gain admission. The roofs are either terraced, or rise in domes, and the dull uniformity of the whole is interrupted by the steeples of the mosques and churches, and the tops of a few cypress trees, and tufts of nopals. Some houses have small gardens.

The total population of Jerusalem amounts to 30,000; but from having been peopled by Jews originally, this city exhibits a great mixture of other nations, whose appearance, habits, and sentiments, are at considerable variance. Of these it is computed that 20,000 are Christians of different sects and denominations; 7000 Mahometans, Turks, or Arabs; and only a few Jews. About 2000 of the Mahometans are fit to carry arms. The men are distinguished by no peculiar character. Handsome women are rarely seen: they are in general of a melancholy disposition, of a pale deadly white complexion, and ungraceful mien. The circumstance of wearing a white veil or a fillet round their faces makes them resemble so many walking corpses; but the faces of the Christian females are exposed as in Europe. Much variety of costume is beheld in the streets; every one, whether Jew, Arab, Syrian, or Turk, adopting what he prefers. The lower orders, however, usually wear a shirt of white or black, or one of broad striped brown, as in Arabia. Christians and Jews wear a blue turban as a mark of distinction, though a few diversify the colour; and shepherds in the neighbourhood have theirs white or striped like the Mahometans. It ought not to escape observation, that blue is in many parts of the East a characteristic of Christianity; and it is not unlikely that its frequency among the lower classes in some parts of Europe has a similar origin. Persons in easy circumstances adopt the Turkish costume, with a high turban. Both the Turkish and Arabic languages are common in Jerusalem.

The mode of life among the inhabitants is dull and monotonous. They have little to interest them: no active pursuit of manufactures, arts, or sciences; no general bond of union; no object of common interest in view. They labour under the oppression of a despotic government, which exercises incessant extortions, without encouraging the means which would enable the people to satisfy its avarice; and so obnoxious is the pasha, that on his approach the inhabitants desert the city. Almost all the Christians entertain a decided antipathy to each other, independent of which a strong aversion subsists between them and the Mahometans. All the different sects reciprocally consider the rest as schismatics and infidels. Those of each persuasion, believing that they alone possess the true light of heaven, and an exclusive right to enter paradise, consign the rest without distinction to the infernal regions. Nevertheless, this apparently goes no farther than words; for there is more unrestrained intercourse among the inhabitants of Jerusalem, than of any other place under the sway of Mahometans, which is supposed to arise from the predominant number of Christians. Some sociality is practised among them; and even Christians and Mahometans mix indiscriminately together. All the former, of whatever sect or denomination, devoutly implore the downfall of the Turks; and certainly with sufficient reason, for one leading feature in the political economy of Mahometans is extortion from those who are incapable of resistance.

The sciences have entirely disappeared from Jerusalem. Formerly, there existed large schools belonging to a Mussulman temple, but at present hardly any traces of them remain, and only a few subsist, where children of every sect learn to read and write the tenets of their respective religion. The grossest ignorance is found to prevail among persons of the highest rank, who, on the first interview, seem to have received a liberal education. The arts are nearly in a state of equal degradation: a late traveller affirms that he did not see a single lock or key of iron during his abode in the city. There are some weaving looms, and very handsome yellow slippers are made, but the other manufactures are apparently inconsiderable. An immense quantity of relics was wont to be made for the convents, as it is not evident that these were fabricated within their walls; which was either for export to Catholic countries, or to supply those whose devotion led them hither in pilgrimages. The traffic is not yet abandoned. Jerusalem forms a kind of central point between Arabia, Egypt, and Syria, and is a rendezvous for the Arabs of these three countries, who come for the purpose of commercial concerns. But the chief trade of all Palestine consists in exporting oil and importing rice by the way of Acre. However, little benefit seems to be derived from it by Jerusalem. Possibly those who have contemplated its former grandeur in history draw a contrast with its present state, which is scarcely warranted by the reality; for the activity required by the very supplies which a city of 30,000 inhabitants demands is inconsistent with the picture of desolation which some travellers, such as Chateaubriand, give of the streets. “ Enter the city; nothing will console you for its sad exterior: you wander over an unequal surface in narrow unpaved streets, walking, amidst clouds of dust, or among rolling flints. The darkness of this labyrinth is heightened by cloths stretched between the houses. Vaulted bazars, replete with infection, deprive the desolate city of the remaining light. Some mean shops display nothing but misery to the sight; and they are frequently shut up, from the dread of a cadi passing near them. No one appears in the streets—no one stands at the gates of the city. Sometimes only a peasant glides along in the shade, concealing the fruit of his labour under his vestments, in the apprehension that a soldier may despoil him of it. All the noise which is heard in the city is the galloping of a horse in the desert, bearing a janisary out on his way to pillage, or carrying him home with the head of a Bedouin Arab.” Jerusalem is abundantly supplied with game: provisions of all kinds are cheap, and the wine is good. The shops and markets are, in the ordinary streets, not restricted to a separate bazar, as is usual elsewhere.

Independent of the stationary inhabitants and the other subjects of the Turkish government, Jerusalem is a great resort of pilgrims, among whom were many Europeans in former times. But though the zeal for pilgrimage has greatly declined, yet it is still very considerable. In 1806, the number amounted to 1500, which was thought small; but there were only two Europeans, of whom one was a traveller. It has been believed that the visits of Catholic pilgrims were the source of great riches to the convents of Jerusalem—a point disputed by Chateaubriand, who quotes various instances to confute the assertion. The city swarms with mendicants, allured thither in expectation of alms from the pilgrims.

Jerusalem has a governor, who lives in state, and receives strangers in a dignified manner; a cadi, or civil judge, who is sent annually from Constantinople; a governor of the citadel; a sheik el haram, or chief of the Mahometan temple; and a mufti, or chief of the law.

This city is particularly interesting to Europeans, in having been the capital of a people from whom all their religious opinions are derived, and from being the theatre of some events, which not only excited great sensation at the time, but have been carefully transmitted to posterity. Its public edifices are still numerous; the spots which are mentioned in Scripture in the environs are yet pointed out with pious anxiety; but it must not be disguised, that some recent travellers, leaning more to ancient history than the affirmation of the moderns, begin to question the identity of the localities which have remained undisputed for ages. The present citadel, which is supposed to occupy the site of David's palace, is a Gothic edifice throughout, with interior courts, fosses, and covered ways. No cannon are seen on its walls; and in one deserted apartment, full of old helmets, lie numbers of weapons resembling musket barrels, of which the use is now unknown. This structure is also called the Pisan's Tower, having been built, according to Doubdan, by the republic of Pisa, when the Christians were in possession of the Holy Land. But the religious edifices are more important and interesting. There are several convents of Christian monks, whose total number in 1807 amounted to 61; and of these no less than 43 were natives of Spain. The Franciscan convent of St Salvador is a spacious structure like a fortress, which, with all its conveniences in relation to the usual accommodations of Palestine, has been compared to "a sumptuous and well furnished hotel, open to all comers who may be attracted hither by curiosity or devotion. Meals are served up in an apartment called the Pilgrim's Chamber, consisting of sufficient variety, and adapted to every national taste. Even the beverage of tea is copiously supplied to the Dutch and English, and abundance of liqueurs may be obtained." All pilgrims are received here: on their arrival, they undergo some ceremonies, and the feet of Europeans are washed by the superior of the convent. They are lodged and supplied with whatever they require, and conducted to every sanctified place; but the duration of their residence is limited to a month. It is common for persons of condition to make a present to the convent on their departure, which, in Pococke's time, amounted to about 6*l.* sterling. At present, however, their table is apart from that of the fathers: they bear their own expences, and the convent derives no advantage from their residence. Only the poor are gratuitously maintained. The funds of the convent are ample, being the result of donations from Catholics of all ranks, and especially Catholic princes, either in money or in goods and merchandise. But the monks were lately reduced to great distress from the interruption of their European supplies by the war; and they are also occasionally harrassed by the exactions of the Turkish officers. In eight years of the present century, they were compelled to pay 40,000 piastres, or about 6000*l.* Nevertheless, they have obtained the esteem of the people among whom they dwell, by their excellent organization and the regularity of their conduct. The Armenian convent is the largest in Jerusalem. It is maintained in a degree of splendour, attended with neatness, cleanliness, and good order, unexampled in Palestine. "Every thing pertaining to it is oriental. The patriarch appears in a flowing vest of silk instead of a monkish habit, and all around him bears the character of eastern magnificence. He receives his visitors in regal stateliness, sitting amidst clouds of incense, and regaling them with all the luxuries of a Persian court."

The church of the Holy Sepulchre has been celebrated for ages, as containing within its precincts a tomb believed to be that in which the body of Jesus Christ was deposited. This structure stood on Mount Calvary. It consisted of several churches united; and, besides the tomb, covered about twelve places, consecrated as the scenes of remarkable transactions. The tomb itself, a white marble sarcophagus of ordinary dimensions, occupies a subterraneous chamber highly decorated. Its sanctity, however, is denied by Mahometans; and the later travellers, though they rest their opinions on very different principles, have called its identity in question. The former deny its sanctity, because Christ ascended to heaven after imparting his likeness to Judas, who was crucified in his stead; and the latter doubt its identity, because there is no evidence that the tomb attracted any notice until centuries subsequent to the event. Nay, they are disposed to go much farther, and to question the identity of all the localities pointed out as those of scripture, partly because the topography of the moderns is inconsistent with ancient descriptions, and partly from the cause above assigned, that such points were not determined until the age of the Empress Helena, who lived some centuries after the death of Christ. Under this impression, the real sepulchre has been sought for among the neighbouring catacombs of a hill facing Mount Sion. The empress now named is said to have founded the church of the Holy Sepulchre, from the real cross on which Christ suffered being discovered on the spot; and the tomb was covered by a superb rotunda, forming one end of that structure, which has been lately destroyed by fire. This conflagration is ascribed to the Armenians, who sought, by these means, to gain possession of the whole edifice, which was partitioned into churches and chapels belonging to various sects professing the Christian religion. The monks who superintended the sepulchre were particularly the objects of Turkish oppression, which the sincerity of their devotion alone could enable them to support. They not only suffered grievous exactions, but were repeatedly exposed to personal insult and danger. The Musselmen of Jerusalem themselves revere the tombs of many saints, which afford a profitable speculation to individuals, either from the pious endowments annexed to them, or the collection of alms.

At present the Jewish synagogue is a miserable structure, consisting of three or four apartments, with roofs so low that they may be reached by the hand; the whole is covered with filth and cobwebs, and disgustingly dirty. The Jews of Jerusalem are restricted to a certain quarter, and are represented as living in a very miserable condition.

This city is equally sanctified in the eyes of Mahometans as of Christians. They call it *el Kods*, or the holy, and have a magnificent temple here, whose interior has been anxiously veiled from the latter. Their presence would be deemed profanation; and although Dr Clarke was furnished with the most powerful of all recommendations, the governor of Jerusalem declared, that the forfeiture of his own life would follow his consent to give him access. But we are now in possession of a detailed description of it from an enterprising traveller, who more recently traversed much of the east, under the guise of a Mahometan.

The disciples of the prophet acknowledge two sanctified temples, that of Mecca, and that of Jerusalem; both are named *el Haram*, by way of distinction, and are alike prohibited to Jews, Christians, and all who do not profess the Mussulman faith. Mosques are merely named the place of assembly; and although the entrance of infidels is not specially prohibited, it is unwelcome, and must be sanctioned by an order of some public authority. "But no Mussulman governor dares to allow an infidel to pass into the territory of Mecca, or into the temple of Jerusalem. Such a permission would be deemed a horrid sacrilege; it would not be respected by the people, and the infidel would become the victim of his own temerity." Solomon's temple, which has so often been held up to admiration, while many superior works have passed unnoticed, was totally destroyed when the city was sacked by the Romans. An Arabian historian relates, that, on being taken by the Caliph Omar, he enquired what would be the most suitable place for erecting a mosque of the patriarch Sophronius, who led him to the ruins of the temple. A new edifice was raised upon their site, which consists of a court, or enclosed square, 1369 feet long by 825 broad. The whole has not been constructed at once, however, as it is a group of mosques erected at different times. Access is gained by nine gates, entering on the north and west sides. The principal part of the structure is composed of two piles of magnificent buildings, called *el aksa* and *el Sahara*, which, in their respective situation, may be considered as two distinct temples, but together form one consistent and symmetrical whole. *El Aksa* is composed of seven naves supported by columns, and the centre nave is surmounted by a fine spherical cupola, with two rows of windows, and richly ornamented with arabesque paintings and gildings of exquisite beauty. This cupola is 32 feet in diameter, and is sustained by four arches, reposing on four square pillars, the different sides of which are enlarged with handsome columns of brown marble. Each side of the nave which it crowns rests on seven arches slightly pointed, springing from cylindrical pillars above two feet and a half in diameter, and sixteen high. The walls rise thirteen feet above the tops of the arches, and each contains two rows of windows. A frontispiece, inlaid with pieces of beautiful marble, ornaments the niche from whence the Imam directs the prayer, with six small columns of white and green decorating the entrance. In a vault at one side the Caliph Omar was accustomed to pray. A causeway 284 feet long, fronts the principal gate of the temple, in the middle of which is a fine marble basin, with a fountain in form of a shell that formerly supplied the water; and at the end of the causeway is a fine staircase leading to the other temple *Sahara*, which takes its name from a rock greatly revered in the centre of the edifice. This temple is octagonal, 61 feet of a side, and 159 in diameter. It occupies a platform 460 feet long, 399 broad, raised 16 feet from the ground, which is ascended by eight staircases. The exterior is incrusted to half its height with various kinds of marble, and the remainder covered with small bricks, or squares of different colours. On each side of the octagon are five large windows, filled with glass finely painted in arabesques. The temple is entered by four gates, on the north, east, west, and south, and is surmounted by a cupola also, elevated 93 feet above the surface below, which is a superb spherical segment, with two rows of large windows, and is supported by four large pillars, together with 12 magnificent columns ranged in a circle. The rock of Sahara approaches the segment of a sphere 33 feet in diameter: It is of its natural shape; the surface rugged and uneven. Here the Mahometans exhibit the print of their prophet's foot when he came to pray; and they believe, that next to the temple of Mecca, the prayers of mankind offered up at the rock of Sahara are the most acceptable to heaven. It is surrounded by a high gilt railing, and the sacred impression itself is protected by a cage of gilt wire. The Mahometans are taught that it is surrounded by an ordinary guard of 70,000 angels, which is daily relieved, and that other invisible troops of angels and prophets resort hither, to offer up their prayers. In the pavement near the rock is a piece of waved green marble or jasper, fastened down by four or five gilt nails, which, however uninviting, they affirm is the gate to paradise. Some of the nails they relate to have been removed by the devil attempting to pass, but he was overheard in time and beaten back for ever. In this temple there is preserved a koran of enormous size, being four feet long, and above two and a half broad, which was used by the Caliph Omar. Every night 180 lamps are lighted up here, and 175 in the mosque Aksa. Besides these two structures, there are several others, and also platforms for oratories, within the spacious limits of the Mahometan temple, on one of which the throne of Solomon is supposed to have stood. Not far from the centre of the city is a magnificent building called the hospital of St Helena, which is still devoted to charitable purposes. Every Mahometan presenting himself at the gate formerly received a supply of food, but the extent of the charity has declined.

It must not be conceived, that the few edifices hitherto named exhaust the curious and venerable remains of the capital of the Jews. On the contrary, they are so numerous, that authors divide them into six different classes: 1. Those purely Jewish; 2. Greek and Roman monuments in the time of the Pagans; 3. Greek and Roman monuments under Christianity; 4. Arabian or Morisco monuments; 5. Gothic monuments under the kings of France; 6. Turkish monuments. Many places without the walls of the city are alike interesting, as the brook Kedron, the pool of Siloe, the valley of Jehosaphat, and the mount of Olives. On this last, which is called Djebel Tor by Mahometans, the Christians assert 7200 prophets have been buried; and here also is a Christian church, containing a marble slab with an impression of the foot of Christ left as he ascended to heaven. The city occupies a portion of mount Sion. In the neighbourhood there are numerous ancient catacombs excavated in the sides of the hills, where brief Greek inscriptions are seen on some of the tombs, and ancient paintings on the walls, executed after the manner of those discovered in the subterraneous cities of Herculaneum and Pompeii.

According to the Jewish chronology, Jerusalem was founded by their high priest Melchisedeck in the year of the world 2032, and was originally named *Salem*, which signifies peace. But its principal glory was reserved for Solomon, a wise and politic prince, who lived a thousand years later, and founded the celebrated temple, whose riches are the admiration of posterity. The history of the temple is thenceforward in a great measure to be considered as the history of Jerusalem. It was destroyed 600 years anterior to the Christian era, but afterwards rebuilt; and Alexander the Great is said to have offered a sacrifice in it to the deity worshipped by the Jews. Jerusalem frequently became an object of contention among surrounding nations, and suffered all the vicissitudes common to eastern cities. It was repeatedly pillaged; its inhabitants slain or led into captivity; and the conquerors erected statues of their own divinities in the temple. At length Judæa became a Roman province, and our Saviour was soon after put to death by order of the governor, for declaring that he was king of the Jews. Probably the governor thought the punishment too severe; but being viewed as a political offence, he found it expedient to yield to the voice of the people. Judæa being treated as a conquered country, the inhabitants revolted; which led to the celebrated siege of Jerusalem by Titus, in the year 71. All the sufferings induced by famine were endured; the vilest substances were welcome food; and parents even devoured their own children. The city was stormed, after a brave and vigorous defence; and the miserable citizens inhumanly tortured to death and butchered by the ferocious Roman soldiery. Not less than 200,000 were computed to have died of hunger, and 1,100,000 perished in the assault. In a new revolt of the Jews, Adrian, in the year 118, completed the destruction of what had been spared by Titus: but a new city called Ælia Capitolina was immediately built, where the presence of the Jews was absolutely prohibited. The name of Jerusalem at length became so utterly obliterated, that, during the persecution of Dioclesian, a martyr having said he belonged to it, the governor who heard him supposed it some factious city secretly erected by the Jews. Towards the close of the seventh century, its new name of Ælia Capitolina was still retained. The Christian religion at length found a protector in the empress Helena, and her son Constantine, who demolished the images of heathen deities, to make way for the erection of crucifixes. An attempt to rebuild the temple by the mild and philosophic emperor Julian, about 37 years later, is recorded to have proved abortive, from fiery eruptions escaping out of the earth and dispersing the workmen. Jerusalem was taken by Chosroes, King of Persia, in 613, but recaptured by Heraclius in 627. Nine years later, it fell into the power of the Caliph Omar, the third in succession from Mahomet, after a seige of four months; and having undergone still farther revolutions, suddenly became an object of ambition among European potentates, who, notwithstanding their reciprocal contentions, united in disturbing the peaceful possessors of Palestine. During the crusades of 1099, they conquered Jerusalem, and established a sovereignty in Syria, which continued with some interruption until the year 1291, when they were totally expelled. Selim, emperor of the Turks, early in the sixteenth century, finally annexed all Syria to the Ottoman empire, under which it still remains. (*c*)

JESSO, a large island of Asia, the situation, extent, and description of which have presented the most embarrassing problems to modern geographers. Some have supposed it to be a continent little inferior to Europe in dimensions; others reduce it to an inconsiderable island; and it has also been conceived to be a portion of eastern Asia, very nearly united to the western shores of America. Later observations, however, combined with those of older date, forgotten and neglected, have dispelled these obscurities, and satisfactory illustrations can now be given of this particular portion of the globe. The figure of Jesso approaches to that of an irregular triangle, extending about 300 miles in length from north to south, and little less in extreme breadth. It stretches from Cape Nadeshda, in 41° 25′ 10″, north latitude, to Cape Romanzoff, in latitude 45° 25′ 50″, the most southern and northern points; and the centre of the island lies in about 217° of east longitude. This island is washed on the west by the Gulf of Tartary; on the east by the North Pacific Ocean; it is divided from Japan by the straits of Sangar, which are of dangerous and intricate navigation; and separated from the island or peninsula of Saghalin on the north by Perouse's Channel. Its whole circumference is indented by deep bays and inlets, in many places forming secure harbours, by the numerous capes and promontories projecting around them. One of those best known to Europeans is Volcano Bay, towards the south-east secure and spacious, and containing Endermo harbour, which is completely sheltered by the land. Two lakes are said to be in the centre of the island, each the source of a river flowing into the sea; but none of the estuaries have been surveyed by recent navigators. The general aspect of Jesso is wild and mountainous; a barren and rugged chain traverses it from north to south, parallel to which it is conjectured that another ranges at some distance. Several of the mountains exhibit active volcanoes, and some of them are extinct volcanoes; three of the former, separated by short intervals, stand on the shore of Volcano Bay. The mineral and vegetable productions are imperfectly described. Gold and silver mines are reported to have been wrought in the eastern parts of the island by the Japanese during the seventeenth century; but they seem to be now abandoned. Neither of these metals, nor precious stones, are valued by the inhabitants. The soil is of unequal quality, and much of the surface is uncultivated. Perhaps also the climate is unfavourable for agriculture.

It is remarked, that the northern extremity of Jesso seems to possess many advantages over the southern. Nevertheless, about Endermo harbour the soil is good, and the produce luxuriant. Wild grapes are abundant. The woods contain elm, oak, ash, and all the common trees of England; while the gardens exhibit the ordinary esculent plants. Millet and other grain are plentiful; but the natives are very little addicted to agriculture, as they subsist principally on wild fruits or roots, as the saranna, and by hunting and fishing, although the houses of the Japanese are environed by gardens and plantations. Fish is found in great variety in the surrounding seas. A particular species of anchovies, called nising, of delicious flavour, appears in vast shoals on the surface, driven towards the coast by whales; and quantities of salmon are caught, either for immediate use or winter store. Whales, porpoises, and turtle, are also numerous; but it has been affirmed that the first are unmolested, on account of their services in pursuing the nising. Tripang, or biche de mar, a kind of holothuria, prized in eastern repasts, is obtained by diving among the rocks, as also various other animals of the mollusca tribes, whose names are not yet recognised in the works of naturalists; and many crustacea. Of birds, there are numerous aquatic species resembling those of Europe. Eagles are kept tame in cages, and supposed to be an article of food, though it is more probably on account of their feathers for arrows; two kinds of hawk, one of a yellow colour; crows, pigeons, and a yellow bird resembling a linnet. The quadrupeds are horses, which have perhaps been introduced within a century by the Japanese; wolves, foxes, dogs, bears, deer, and rabbits. Deer and bears inhabit the mountains. The latter are seen in considerable numbers among the natives, by whom they are taken young, domesticated, and then killed, and ate as dainties at a certain season, while a portion is used as a medicine. The dogs resemble those of Kamtschatka, but are of a smaller breed. They are trained for draught, and harnessed to sledges in winter, which would indicate, that during a portion of the year the ground is covered with snow. These, however, it is likely, do not exhaust the list of the quadrupeds on this island.

Jesso is inhabited by two distinct races of mankind; the aborigines, who call themselves Ainos, and the Japanese, who have wrested the island from their possession, and now hold them in subservience. The opinions entertained regarding the former, who also inhabit the island or peninsula of Saghalin, are so singular and discordant as to merit a brief investigation. They have been commonly denominated wild Kuriles, and are supposed to be covered with hair in unnatural profusion—a peculiarity at this day ascribed to the inhabitants of the Kurile Islands. Nor is this opinion more prevalent among the natives of the neighbouring countries than among Europeans who have visited the country. Mozin, a name formerly given to the island by the Japanese, signifies the land of hairy people; and

Kannemon, an intelligent interpreter of that nation, by whom it was visited in 1652, says the beards of the men are sometimes two feet long; that the whole face, excepting the eyes and nose, is covered by it; and that the portion depending from the upper lip is raised when they drink. Froes, a Portuguese missionary, who was at Miaco in Japan in 1565, had previously been acquainted with this latter fact, as also that the people were very hairy all over the body; and Saris, an English navigator, learned at Jedo in 1613, that they were as hairy as monkeys. In the fragment which is preserved of the journal of the Castricum in 1643, the hairiness of the whole body, and the size of the beard almost totally covering the face, were both the subjects of observation. It was likewise remarked from her consort the Breskens, a Dutch vessel, which navigated the coasts of Jesso in the same year, that the people leaving the south part in a boat, had long stiff black beards; and in 1738, Captain Spanberg, a Russian, landed on a large island in 43° 50′ north latitude, which if not Jesso itself, as there is some reason to believe, is in its immediate vicinity, where the bodies of the men were wholly covered with long hair. Further, the last English navigator who visited Jesso towards the close of the preceding century, employs these words in describing the natives of the southern extremity. "Their beards were thick and large, covering the greatest part of the face, and inclining to curl. The hair of the head was very bushy, which they cut short before on the forehead, and behind the ears; behind it was cut straight. *Their bodies were almost universally covered with long black hair, and even in some young children we observed the same appearance.*" This combination of testimony would assuredly seem conclusive, did not the still more recent visitors of Ainos, in the present century, deny that any such characteristic is common among them. Their intercourse, indeed, was more with the northern inhabitants. But in Saghalin they admit that a child of this description was seen, though its parents were distinguished by nothing of the same kind. —We are induced to conclude, upon the whole, that the aborigines of Jesso are more hairy than the generality of mankind. They are somewhat below the middle size, strong and swift, of a dark brown complexion, almost black, with black eyes, and an agreeable physiognomy, and resemble the Kamtschadales, but have more regular features; however, new born children are perfectly white. The women have rather pleasant countenances to the south, while to the north they are ugly, and are scarcely any fairer than the men. The long rough black hair of the latter hangs down from the head behind, and that of the women of the same colour is frequently tied above in a knot, or combed over the face. It is not said that the men lacerate their bodies in any fashion for the purpose of ornament; but the women are tattooed on the hands, face, and feet, and in some parts of the island around the mouth, in flowers or other figures, which are executed by the mother during the earlier age of her offspring. Children go entirely naked. There is little difference between the dress of adults of either sex, but the feet are usually bare. A tobacco box, pipe, and knife, are carried in a belt girding their vestments around the waist. The men wear large ear-rings of gold, silver, or baser metals, according to their rank; the women an ornament of the same kind, consisting of a short chain of two or three silver rings of still greater dimensions. Besides strings of glass beads, and other ornaments, a small shining silver plate or mirror hangs from the neck. Their fashions seem to have undergone little alteration since the earliest visits of Europeans. The Ainos testify a remarkably quiet and placid disposition, intermixed with a large portion of liberality and benevolence. They freely part with their property without any expectations of return, and are always ready to be serviceable. The women are exceedingly timid and reserved, but preserving less gravity than the men, who seem tinctured with jealousy, if this may be inferred by their withdrawing them from the view of strangers, and never quitting them for a moment while in their presence. Their oldest visitors describe them as very jealous of strangers when approaching their wives and daughters. Their salutations are exceedingly humble, approaching the strangers who visit their shores in an attitude of abject submission, sitting down cross-legged, stroking their beards, often stretching forth their hands, and bowing almost to the ground.

They speak in a slow and timid accent; and their language, which is peculiar, is intermixed with many Japanese words. They call themselves Ainos, but the real import of this word is not fully understood, whether simply meaning *people*, or distinguishing a particular race.

The Ainos around Endermo harbour, and indeed throughout the island, subsist principally on dried fish, boiled with sea-weed, and mixed with oil. They have also some fruits and vegetables, but, excepting about Matzumay, their cultivation of the earth extends no farther than to scanty patches; and subsistence, on the whole, seems precarious. According to the older Eastern authors, all the tame bears are killed in winter, the flesh ate, and the liver reserved as medicinal against poison, and various diseases. But they have little skill in medicine; and in cases of small-pox, or any contagious disorder, they are said to send the sick person to the top of a lofty mountain, or to some remote place. Their houses are built of wood, thatched with reeds, and are generally of an oblong form. The whole family sleep on mats or skins, on a platform around the fire-place, which is in the middle. Small openings to carry off the smoke are made at each end of the roof. Both sexes are very fond of smoking tobacco, yet that plant is not cultivated among them.

The men occupy themselves in the more laborious pursuits of hunting and fishing, while the women are engaged in domestic duties, making cloth of the bark of trees, and sewing and embroidering, which they do very neatly. However, the arts are but in a low state, as is seen in their arms, their boats, and habitations. All articles whose fabrication requires any portion of ingenuity, are supplied by the Japanese. The men are most expert archers, discharging their arrows with remarkable force and precision. The bow is only 37 inches long, the arrow 12 inches, feathered, barbed, and poisoned with so deleterious a substance for killing wild animals, that blood immediately gushes from the mouth and nose, and they die in a few minutes. Their other arms are, swords, pikes pointed with iron, and a weapon once known in Europe, which consists of a ball attached by a chain to a handle, somewhat resembling a flail. Their shields are made of seal skin, tripled. They are ignorant of the use of fire arms. The boats of these people are principally built of fir, sewed together with twisted willows, and sharp at both ends. In rowing, each oar or skuller is moved alternately, which prevents the boat from advancing in a straight line.

The transient visits of Europeans to Jesso scarcely enable us to speak of the manners and customs of the inhabitants with any degree of certainty, unless in what has casually been the subject of observation; and there is considerable risk of error in misinterpreting what the natives of Japan have written regarding them. Polygamy is said to be practised here without any regard to consanguinity: a brother marries his sister, and the men have from four to eight wives, according to their circumstances. Adultery is punished by cutting the hair off the offender. The infringement of ordinary contracts is attended with the forfeiture of something exceeding the value of the engagement. A tree is planted on the graves of their dead, and blood is then spilled, either by mutual encounters somewhat similar to the practice of the savages of New Holland, or by voluntary lacerations, as are frequent in other parts of the world. No external demonstrations of religion have been observed among the Ainos, in temples or places of public worship; neither does it appear that they adore supreme or intermediate deities, though before eating and drinking they offer up a prayer, and likewise pray during sickness.

In regard to the political state of this island, the Japanese seem to be masters of the whole, and to employ the natives exclusively for their own benefit. It is divided into five districts, and the government is committed to the prince of Matzumay, but whether he is resident here, or on a neighbouring island, or in Japan, is not explained. We should rather infer that the executive is committed to a viceroy, who lives in the town of Matzumay. It is certain that the Ainos are tributary to the Japanese, and among themselves they have no form of government. Each district is under a chief, whose consideration is proportioned to its extent and population. The inhabitants always add the name of their district to their own name; another peculiarity coinciding with the practice of the New Hollanders. Probably they are collected chiefly towards the coast, where a number of their villages appear; but it is not likely that the island is populous.

It is difficult to form any precise opinion regarding the degree of civilization which has been attained by the Ainos. They are considerably removed from the state of savages, not only in the absence of ferocity, a general attribute, but both in food and clothing. Yet they seem to have undergone only the slightest changes since they are first mentioned in history. A Japanese author of 1720 compares the condition of the Ainos to that of his countrymen 660 years before Christ: "They are ignorant of all ceremonies and social ties, and differ but little from brutes: thay eat raw flesh, and drink the blood of animals, nor are they aware that viands cooked are more savoury than raw. Nevertheless, at different places on the east coast they have for some time learned the cultivation of the earth, and to sow grain, from the Japanese; but they are unacquainted with the two seasons for planting rice."

Besides the aborigines, it rather appears that there is a different race dispersed in scanty numbers in the island, of which no correct intelligence is yet obtained. But the Japanese have been long settled here in different establishments on the coast, the principal of which is Matzumay, said to signify the town of firs. It is situated towards the south-west extremity of the island in Lat. 41° 32′ north, and Long. 219° 56′ east, extending along the margin of an open bay about four miles wide at the entrance, and ascending the rising grounds behind, interspersed with trees and gardens. This town, which has not been visited by modern Europeans, is of considerable magnitude, built of wood, and fortified. There are a light-house or observatory on the west side of the bay, which is much frequented by shipping, and two small islands opposite to the town. Between Matzumay and Japan constant and regular intercourse is carried on, but it would seem that the Ainos have always had some channel of communication with Corea or Tartary. They pay a tribute to the prince of Matzumay, which for those on the coast consists of fish, and for those in the interior of game: and this prince acknowledges the supremacy of Japan by presents and other acknowledgments to the sovereign.

During the greater independence of the Ainos, they resorted to the northern parts of Japan for the purposes of traffic with peltry and the skin of a kind of seal called rakko, a certain marine plant, eagles feathers for arrows, and other commodities; and at present, though subservient to that nation, it is probable some trade is carried on with them.

To trace the history of an island which has been enveloped in so much obscurity, doubt, and perplexity, would be no easy matter. In the words of a learned geographer, who wrote in the middle of the preceding century, "no country of the terrestrial globe has been so differently represented for these last 150 years as the land of Jeso, Jezo, Yeço, Eso, Jedso, Jesso, Yesso," names by which, as well as Insu, it was known. The Japanese seem to carry back the history of this island to a period corresponding with the second year of the Christian æra, at which time it was probably called Mozin; and according to the Chinese histories, it was divided into 55 provinces or districts. In 658 the sovereign of Japan sent a fleet hither with troops, who conquered part of the inhabitants, then divided into three races, one of which was characterised as savage. The Japanese had occasion to repress the natives in 762, when a great stone inscribed with their respective boundaries was erected, which still subsisted in 1720. But the proper history of Jesso is considered as commencing in 1443, when Fakeda Noboe Firo, crossing the straits, subdued one half of the island, while the other half submitted to him; and his descendants still inherit the government of it. On occasion of a revolt previous to 1652, which Japanese forces were employed to quell, that nation perhaps first gained a correct knowledge of the country and its inhabitants, who are now driven towards the coast. Before this period, however, Europeans, animated by the desire of propagating their religious opinions, had reached that remote territory. Whether Froes the Portuguese missionary, who gives the earliest account of the natives in 1565, had been in the island, is not evident; but other two missionaries of the same nation, J. Caravaglio, and Jerome de Angelis, were certainly at Matzumay in 1620 and 1621. The people were then represented nearly the same as at present, only very warlike, and much dreaded by the Japanese. The murder of these two missionaries soon after, upon the proscription of the Christian doctrines in Japan, terminated a source of information, which added so much to the geographical knowledge of different Asiatic countries. The loss was in some respects indemnified by the transient observations of successive mariners, which, conjoined to the writings of the Japanese, have illustrated the nature of Jesso, and the manners of its inhabitants. It is singular, however, and ought not to escape notice, that Saris, an English navigator of the beginning of the 17th century, was sufficiently aware of the insular nature of Jesso, its distance from Japan, the Straits of Sangar, and the position of Matzumay, from the information of the Japanese, which were all the subjects of doubt in Britain nearly 200 years later. Indeed, the accuracy of some early navigators is surprising, and there is a general coincidence between their narratives regarding the natives of Jesso, and those which the Japanese obtained somewhat more recently. (c)

JESSOP, William. This able engineer and excellent man was born January 12, O. S. 1745, at Plymouth dock, where he was educated. After making some progress in the classics, he acquired a perfect knowledge of the French language, and a considerable share of mathematical science. He early discovered a propensity to mechanical pursuits, and possessing a dexterity of working in wood and metals, he constructed with facility such articles as juvenile projects occasionally required; and his family are now in possession of a tolerably good violoncello of his workmanship when a boy.

These early dispositions recommended him to the notice of Mr Smeaton, then employed in rebuilding the Eddystone light-house, who confirmed his desire of learning the profession of a civil engineer; and he accordingly entered regularly into Mr Smeaton's service, under articles for seven years. This event not only afforded opportunities of employing his talents in a way suited to his natural inclination, but was the means of acquiring the friendship of an able and judicious man, who was well qualified to form his judgment and direct his labours.

Mr Smeaton having, after the completion of the Eddystone light-house, full employment as a civil engineer, his pupil of course benefited by the surveying, investigating, and executing the various works comphehended in such extensive practice. The construction of mills, drainages, harbours, and bridges, and the improvement of river navigations, (as may be seen in Mr Smeaton's reports,) during his seven years regular service, afforded an ample field for acquiring useful knowledge and practical skill. Even in canal making, the repeated surveys, discussions, and progressive practical operations, during the execution of the inland navigation between the rivers Forth and Clyde in Scotland, which was under Mr Smeaton's direction, enabled him to obtain, at an early period of life, competent information upon an important part of his profession, which was at that time almost new in British engineering.

The advantages which Mr Jessop thus derived from Mr Smeaton were certainly great; yet there is reason to believe, that his early and constant connection with this eminent engineer, created a degree of timidity in the exercise of his own talents; for we have good authority for stating, that, for some years after the expiration of his articled service, he was almost unwilling to undertake business on his own account. He therefore continued to live with Mr Smeaton, and to act under his immediate direction, and, even when occasionally engaged in business for himself, he took no step without consulting his preceptor. This conduct may, no doubt, be partly attributed to his having become necessary to Mr Smeaton, and to the uninterrupted mutual confidence and esteem which always subsisted between them.

In 1773, he was appointed engineer to the Aire and Calder River navigation in Yorkshire, which, (according to a memorandum in our possession) he states as having found with an income of only 5000*l.* a year, whereas twenty-five years afterwards he left it in the receipt of 30,000*l.* per annum. For several years the improvement of river navigations and drainages constituted his chief employment, though he was also on several occasions consulted in regard to bridges and harbours. In the year 1783 he was appointed engineer for directing the improvements upon the river Trent, in which capacity he continued to act during the rest of his life. He made several surveys and reports for improving the rivers Severne, Mersey, and Irwell; and also the upper part of the Thames.

After Mr Smeaton withdrew from business, Mr Jessop stood at the head of his profession: In the prime of life, and with a sufficient fund of knowledge and experience, his talents became eminently useful during the rapid progress which, at this time, inland navigation made in England. To enumerate the objects of his labours, from the year 1780 to 1800, would be to give a list of nearly all the improvements of this kind, which were projected and executed during that period: But as this would exceed our prescribed limits, we shall here only observe, that the map of the canals in the counties of Derby, Nottingham, Leicester, and Lincoln, were planned and executed under his direction, as was likewise the grand junction canal which connects the midland counties with the metropolis. Besides these, he was occasionally consulted in regard to most of the other canals which were then carrying on in other parts of the kingdom. For several years, previous to his death, he acted jointly with Mr Telford in conducting the great Caledonian canal in the north of Scotland, and that engineer embraced every opportunity of acknowledging, in the warmest manner, the advantages and satisfaction which he derived from the able, upright, and liberal conduct of his enlightened colleague and friend.

In consequence of Mr Jessop's merited reputation, he was consulted respecting the inland navigation of the sister kingdom, which was for many years conducted solely under his direction. The leading arrangements were then made in order to establish a water communication from the city of Dublin on the east, to the river Shannon in the interior, and by it to Limerick on the west; besides various collateral branches to the southern and northern parts of that fine island. The principal and most difficult operations required to accomplish these desirable objects, were performed under his direction, and the whole put into a state of progress, which afterwards only required to be regulated by the financial resources and growing demands of that rising country.

In regard to harbours, besides many of comparatively inferior importance, which we have not room to enumerate, the great canal and magnificent West India docks in the Isle of Dogs; the extensive improvements in the ports of Bristol, Hull, and Dublin, were planned and executed un-his direction. These undertakings, upon an unexampled scale of magnitude and perfection, afford unequivocal evidence of his abilities as an engineer, and at the same time formed a valuable school for others who had occasion to construct similar works.

From being scarcely of sufficient importance to constitute a separate profession when he entered into it, works requiring the attention of a civil engineer were, in a short time, so greatly increased, that Mr Jessop found that the most unremitting exertions were unequal to the demands upon his services; he, therefore, in the year 1785, introduced Mr Rennie as engineer to the Lancaster canal. This selection is a striking evidence of his discernment of human character, and although as the demand about that time became urgent, such natural talents and assiduity must ultimately have acquired distinction, yet their progress was not a little facilitated by the long continued aid of so experienced and enlightened a friend.

The preceding narrative contains only a rapid sketch of the professional career of this valuable man, who departed this life on the 18th Nov. 1814.

It will be evident to the reader, that in the course of discussing the important article *Inland* NAVIGATION, we shall have frequent opportunities of stating more at length the share that Mr Jessop had in the public works which are here only slightly alluded to, and also the peculiarities in his mode of practice, as well as the particular benefits for which his profession was indebted to him.

His mind was comprehensive, inventive, and sincere. At the age of threescore his mental energies were unabated. Unshackled by prejudices, he retained a youthful ardour for professional improvements; and he would even then not unfrequently display a degree of jealousy, lest a more perfect mode was possible. He constantly devoted his whole mind to the subject before him, and from which all personal considerations seemed excluded. Under these impressions his uniform aim was to accomplish his purposes by the simplest and most economical means: these he sometimes carried to a length to which the average talents of mankind could not always do justice in the execution; but he invariably disdained to screen personal responsibility by unnecessary expenditure, upon the grounds, that it was the business of an engineer, and what ought chiefly to distinguish him from the common workman, to effect his purposes rather by ingenuity of construction, than quantity of materials: that it was an imperative duty rather to risk occasional partial failures from imperfect workmanship, than uniformly to persevere in an unpardonable waste of capital; and that no clamour of ignorance, or prejudice, or consideration of personal interest, should for a moment deter him from this conduct.

His discerning and ingenious mind led him to found his practice upon observation and just principles, rather than precedent. In the important articles of Locks, Wharfs, and Retaining Walls, he introduced an entirely new form, composed of nearly one half the quantity of materials employed by the French and early English engineers; he contrived an excellent method of draining morasses and boggy land, more especially for the purpose of constructing a navigable canal through it; he communicated very judicious views respecting the management of flood waters; he seized with eagerness the idea of acquiring an expeditious mode of conveying heavy materials by iron rail roads; and was particularly zealous for the general use of cylindrical broad wheels upon roads composed of gravel. But all these matters, as has been already observed, will be discussed under their proper heads, our intention in mentioning them at present being merely to exhibit the general tenor of Mr Jessop's mind and conduct.

Besides these extensive pursuits in the British islands, his reputation as an engineer led to his being consulted respecting a proposed canal in Spain. What the practical result was, in that distracted and feeble kingdom, it is easy to conjecture. He was also applied to by the American states, to select a properly qualified person for investigating and arranging several proposed inland navigations in that extensive region. In consequence of this, Mr Weston, a very ingenious and well-informed person, was for several years employed in North America; but we suspect that some centuries must yet elapse, before the introduction of this expensive improvement can, with propriety, become general in that infant country.

Like most men of truly great minds, his manners were simple when disengaged from business, and in the company of intimate friends, he not unfrequently displayed a playfulness of disposition, and a fund of entertaining anecdotes. Totally free of all envy and jealousy of professional rivalship, his proceedings in business were free from all pomp and mysticism, and persons of merit never failed in obtaining his friendship and encouragement. Although indefatigable in performing all the duties of an active life, the writer of this article, who for more than twenty years enjoyed his uninterrupted intimacy, has heard it said that he had a natural tendency to indolence; no symptom of it, however, could ever be discovered in his conduct, but rather, as has already been noticed, a degree of anxiety to be of the utmost service to his employers, and to render as perfect as possible the works under his consideration.

A mind thus constituted, and exercising the profession of a civil engineer, was, as might be expected, never behind in regard to physical knowledge and experimental philosophy: His acquirements in these branches of knowledge, joined to his well-earned reputation, led to intimacy with eminent persons of similar characters, such as the celebrated Mr Watt and Dr Franklin. For an acquaintance with the latter he was indebted to an accidental discovery, made as early as the year 1772, with regard to the repelling property of oil on water, and which the Doctor mentions in his works as having been communicated to him by an ingenious pupil of Mr Smeaton.

Mr Jessop has not appeared before the public in the character of an author: for although many of his reports were printed, yet, as this was done at the expence of private companies, and as they were not exposed to sale, they are of course in the hands of few. As he was always perfectly master of the subject, his mode of treating it was singularly distinct, comprehensive, and laconic.

JESUITS, or SOCIETY OF JESUS, one of the most celebrated monastic orders of the Romish church, was founded in the year 1540 by Ignatius Loyola. This extraordinary person was a native of Biscay; and while serving as an officer in the army of Ferdinand V. of Spain, was dangerously wounded in the defence of Pampeluna in 1521. During the progress of a lingering cure, he happened to have no other amusement than what he found in reading the lives of the saints. The perusal of their history inspired his enthusiastic and ambitious mind with an ardent desire of emulating their fabulous exploits. Forsaking the military for the ecclesiastical profession, he engaged himself in the wildest and most extravagant adventures, as the knight of the blessed Virgin. After performing a pilgrimage to the Holy Land, and pursuing a multitude of visionary schemes, he returned to prosecute his theological studies in the universities of Spain, when he was about thirty-three years of age. He next went to Paris, where he collected a small number of associates; and, prompted by his fanatical spirit or the love of distinction, began to conceive the establishment of a new religious order. He produced a plan of its constitutions and laws, which he affirmed to have been suggested by the immediate inspiration of heaven, and applied to the Roman pontiff (Paul III.) for the sanction of his authority to confirm the institution. The Pope referred the petition to a committee of cardinals; and, upon their representing the proposed establishment to be unnecessary and dangerous, refused to grant his approbation. Loyola, however, soon found means to remove the scruples of the court of Rome. He proposed, that the members of his society, besides the usual vows of poverty, chastity, and monastic obedience, should take a fourth vow of subserviency to the Pope, binding themselves, without requiring reward or support, to go wherever he should direct for the service of the church, and to obey his mandate in every part of the globe. At a time when the papal authority had received so severe a shock from the progress of the Reformation, and was still exposed to the most powerful attacks in every quarter, this was an offer too tempting to be resisted. The reigning pontiff, though naturally cautious, and though scarcely capable, without the spirit of phophecy, of foreseeing all the advantages to be derived from the services of this nascent order, yet clearly perceiving the benefit of multiplying the number of his devoted servants, instantly confirmed by his bull the institution of the Jesuits, granted the most ample privileges to the members of the society, and appointed Loyola to be the first general of the order.

The simple and primary object of the society was, to establish a spiritual dominion over the minds of men, of which the Pope should appear as the ostensible head, while the real power should reside with themselves. To accomplish this object, the whole constitution and policy of the order were singularly adapted, and exhibited various peculiarities, which distinguished it from all other monastic orders. The immediate design of every other religious society was, to separate its members from the world; that of the Jesuits to render them masters of the world. The inmate of the convent devoted himself to work out his own salvation by extraordinary acts of devotion and self-denial; the follower of Loyola considered himself as plunging into all the bustle of secular affairs, to maintain the interests of the Romish church. The monk was a retired devotee of heaven; the Jesuit a chosen soldier of the Pope. That the members of the new order might have full leisure for the active service, they were exempted from the usual functions of other monks. They were not required to spend their time in the long ceremonial offices and numberless mummeries of the Romish worship. They attended no processions, and practised no austerities. They neither chaunted nor prayed. "They cannot sing," said their enemies, "for birds of prey never do." They were sent forth to watch every transaction of the world which might appear to affect the interests of religion, and were especially enjoined to study the dispositions and cultivate the friendship of persons in the higher ranks. Nothing could be imagined more open and liberal than the external aspect of the institution, yet nothing could be more strict and secret than its internal organization. The gates of the society were thrown open to the whole world, as if there were nothing in its nature to dread disclosure. Men of every description were invited to enter, and talents of every kind were drawn together. It was a company, such as had never yet appeared, of which all mankind might be free at pleasure, but of which every member became in reality an irredeemable slave. Other religious orders were in a manner voluntary associations, of which the executive authority might be vested in certain heads; but whatever affected the whole body as an act of legislation was regulated by the common suffrage of all its members. Loyola, however, influenced perhaps by the notions of implicit obedience which he had derived from his military profession, resolved that the government of the Jesuits should be absolutely monarchical. A general, chosen for life by deputies from the several provinces, possessed supreme and independent power, extending to every person, and applying to every case. By his sole authority he nominated or removed every officer employed in the government of the society. He administered at pleasure the revenues of the order; and disposed of every member by his uncontroulable mandate, assigning whatever service, and imposing whatever task, he pleased. To his commands they were required not only to yield outward obedience, but to resign to his direction the inclinations of their wills, and the sentiments of their understandings. Every member of the order, the instant that he entered its pale, surrendered all freedom of thought and action; and every personal feeling was superseded by the interests of that body to which he had attached himself. He went wherever he was ordered; he performed whatever he was commanded; he suffered whatever he was enjoined; he became a mere passive instrument, incapable of resistance. The gradation of ranks was only a gradation in slavery; and so perfect a despotism over a large body of men, dispersed over the face of the earth, was never before realised. To render the subordination more complete, and to enable the general to avail himself to the utmost of his absolute dominion, he was provided with effectual means of perfectly ascertaining the characters and abilities of the agents under his controul. Every novice, who offered himself as a candidate for admission into the order, was required to *manifest his conscience* to the superior, or to a person of his appointment; and not only to confess his defects and vices, but to discover the inclinations, passions, and bent of his soul. This manifestation was renewed every sixth month during the novitiate, which was of considerable length; and every member was also constituted a spy upon the candidates, whose words and actions, and every thing of importance concerning them, he was bound to disclose to the superior. They were required, under this scrutiny, to pass through several gradations of rank, and to have attained the full age of thirty-three years, before they were permitted to take the final vows, and to become professed members. The superiors, under whose immediate inspection they were placed, were thus thoroughly acquainted with their dipositions and talents; and the most minute details of every one's character and capabilities were regularly transmitted to the head office at Rome. These reports were digested and entered into registers, where the general could survey at one view the state of the society in every quarter of the world; the qualifications and talents of its members; and the kind of instruments awaiting his selection for any department in the service. The number of these reports, from the whole thirty-seven provinces of the order, have been calculated at 6584 annually. Besides these, there may be "extraordinary letters," or such as are sent by the monitors or spies in each house; and the provinces were farther bound to state the civil and political circumstances of the various countries where they had their residence. These statements, when relating to matters of importance, were conveyed by a particulr cypher, known only to the general. The situation and interests of every department were thus intimately known by the head of the whole body; and the employment of every individual member was precisely adapted to his faculties. The meanest talents were in requisition; and, according to their own expression, "the Jesuits had missionaries for the villages, and martyrs for the Indians." There was thus a peculiar energy imparted to the operations of this singular society; which has been compared to a system of mechanism, containing the greatest possible quantity of power distributed to the greatest possible advantage. "The Jesuits," it was said with justice, "are a naked sword, whose hilt is at Rome."

The maxims of policy adopted by this celebrated society were, like its constitution, remarkable for their union of laxity and rigour. Nothing could divert them from their original object; and no means were ever scrupled, which promised to aid its accomplishment. They were in no degree shackled by prejudice, superstition, or real religion. Expediency, in its most simple and licentious form, was the basis of their morals, and their principles and practices were uniformly accommodated to the circumstances in which they were placed; and even their bigotry, obdurate as it was, never appears to have interfered with their interests. The paramount and characteristic principle of the order, from which none of its members ever swerved, was simply this, that its interests were to be promoted by all possible means, at all possible expences. In order to acquire more easily an ascendency over persons of rank and power, they propagated a system of the most relaxed morality, which accommodated itself to the passions of men, justified their vices, tolerated their imperfections, and authorised almost every action, which the most audacious or crafty politician would wish to perpetrate. To persons of stricter principles they studied to recommend themselves by the purity of their lives, and sometimes by the austerity of their doctrines. While sufficiency compliant in the treatment of immoral practices, they were generally rigidly severe in exacting a strict orthodoxy in opinions. "They are a sort of people," said the Abbé Boileau, "who lengthen the creed, and shorten the decalogue."

They adopted the same spirit of accommodation in their missionary undertakings; and their Christianity, cameleon-like, readily assumed the colour of every region, where it happened to be introduced. They freely permitted their converts to retain a full proportion of the old superstitions, and suppressed without hesitation any point in the new faith, which was likely to bear hard on their prejudices, or propensities. They proceeded to still greater lengths; and, besides suppressing the truths of revelation, devised the most absurd falsehoods, to be used for attracting disciples, or even to be taught as parts of Christianity. One of them, in India, produced a pedigree to prove his own descent from Brama: and another in America assured a native chief that Christ had been a valiant and victorious warrior, who, in the space of three years, had scalped an incredible number of men, women, and children. It was in fact their own authority, not the authority of true religion, which they wished to establish; and Christianity was generally as little known, when they quitted the foreign scenes of their labours, as when they entered them.

But the most singular regulations, which principally contributed to extend the power of the Jesuits, and to form that enterprising and intriguing spirit by which they were distinguished, were long unknown to the rest of mankind, and were concealed with a degree of care, which might alone have excited the worst suspicions of their nature. It was their favourite maxim, from their first institution, never to publish even the ordinary rules and registers of the order. These were preserved as an impenetrable mystery, not only from strangers, but even from the greater part of their own members. They refused to produce them, when required by courts of justice; and it was not till the public prosecutions against them in Portugal and France, which terminated in their overthrow, had commenced, that the mysterious volumes of the institute were unveiled to the world. But the "*Secreta Monita*,"* or hidden rules of the society, which were not discovered till nearly fifty years after the abolition of the order, and which most unequivocally unfold the detestable nature of the institution, were most anxiously withheld from every eye, except those of the most thoroughly initiated. They were directed to be communicated, even to professed members, with the utmost caution, and then only as the result of personal experience, not as the recorded rules of the institution. In the event also of their falling into the hands of strangers, it was expressly enjoined, that they must be positively denied to be the rules of the society. A few extracts from these hidden precepts will furnish the reader with the best exposure of the spirit and tendency of jesuitism. "Princes and distinguished persons must by all means be so managed (by the members of the society,) that they may gain their ear, which will easily secure their hearts; so that all persons will become dependent upon them, and opposition be prevented.—Since ecclesiastics secure the greatest favour by winking at the vices of the great, as in the case of incestuous marriages, &c. such persons must be led to hope, that, through their aid, a dispensation may be obtained from the Pope, which he will no doubt readily grant.—It will further their object, if their members insinuate themselves into foreign embassies, but especially in those to the Pope. Favour must, above all, be obtained with the dependents and domestics of princes and noblemen, who, by presents and offices of piety, may be so far biassed as to impart intelligence of their employer's inclinations and intentions. Princesses and females of rank may be gained by women of their bed-chambers, who must therefore be particularly addressed, whereby there will be no secrets concealed from their members.—Their confessors must allow greater latitude than those of other orders, in order that their penitents, being allured with such freedom, may relinquish others, and entirely depend on their direction and advice.—Prelates must be engaged to employ the Jesuits both for confessors and advisers. Care must be taken, when princes or prelates found either colleges or parish churches, that the society always have the right of presenting, and that the superior of the Jesuits for the time being, be appointed to the cure, so that the whole government of that church and its parishioners may become dependent on the society. Wherever the governors of academies thwart their designs, or the Catholics or heretics oppose their foundations, they must endeavour, by the prelates, to secure the principal pulpits.—Their members, in directing the great, must seem to have nothing in view but God's glory; and not immediately, but by degrees, interfere in political and secular matters, solemnly affirming, that the administration of public affairs is what they engage in with reluctance, and only as compelled by a sense of duty.—In order to induce rich widows to be liberal to the society, they must be provided with confessors, who may urge their remaining unmarried, by assuring them that they will thereby infallibly secure their salvation, and effectually escape the pains of purgatory.—That the widow may dispose of her property to the society, she must be told of those who have devoted themselves to the service of God, and be led to expect canonization from the court of Rome. Confessors must also enquire of their penitents, what family, relations, friends, and estates they possess, and what they have in expectancy, as also their intentions, which they must endeavour to mould in favour of the society. Such members as make a scruple of acquiring riches for the society must be dismissed; and if they appeal to the provincials, they must not be heard, but pressed with the statute, which commands implicit obedience from all.—Such as retain a love for other orders, for the poor, or their relations, must be dismissed, since they are likely to prove of little service.—All, before dismission, must be prevailed upon to subscribe and make an oath, that they will never, directly or indirectly, either write or speak any thing to the disadvantage of the order; and the superiors must keep an account of the sins, failings, and vices, which they formerly confessed, to be used against them, if occasion requires, in order to prevent their future advancement in life; and noblemen and prelates, with whom they may have credit, must be prevailed upon to deny them their protection.—All must be caressed, who are distinguished either for their talents, rank, or wealth, especially if they have friends attached to the society, or possessed of power; such must be sent to Rome, or some celebrated university, for study; but, if they prefer the provinces, the professors must inveigle them into a surrender of their effects to the society, and the superiors must shew a particular regard to such as have allured any promising youths into the society. The preceptors must not chastise or keep in subjection young men of good genius, agreeable persons, and noble families, like their other pupils: they must be won by presents, and the indulgence of liberties peculiar to their age; but on other occasions, especially in exhortations, they must be terrified with threats of eternal punishment, unless they obey the heavenly invitation of joining the society. If any member expects a bishopric or other dignity, he must take an additional vow, always to think and speak honourably of the society; never to have a confessor who is not a Jesuit; nor determine any affair of moment, without first consulting the society. The society will contribute much to its own advantage, by fomenting and heightening (but with caution and secrecy) the animosities that arise among princes and great men, in order that they may weaken each other."

These detestable objects and principles, however, were long an impenetrable secret; and the professed intention of the new order was, to promote with unequalled and unfettered zeal the salvation of mankind. Its progress, nevertheless, was at first remarkably slow. Charles V. who is supposed, with his usual sagacity, to have discerned its dangerous tendency, rather checked than encouraged its advancement; and the universities of France resisted its introduction into that kingdom. Thus roused by obstacles, and obliged to find resources within themselves, the Jesuits brought all their talents and devices into action. They applied themselves to every useful function and curious art; and neither neglected nor despised any mode, however humble, of gaining employment or reputation. The satirist's description of the Greeks in Rome, has been aptly chosen to describe their indefatigable and universal industry.

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* These and other institutions, which contributed most essentially to the power and permanence of the society, are attributed to the genius of Laignez and Aquaviva, the two generals who succeeded Loyola, and who were far superior to their fanatical master in the science of government and the knowledge of human nature.

> *Grammaticus, rhetor, geometres, pictor, aliptes,*
> *Augur, schenobates, medicus, magus, omnia novit*
> *Græculus.*——

They laboured with the greatest assiduity to qualify themselves as the instructors of youth; and succeeded, at length, in supplanting their opponents in every Catholic kingdom. They aimed, in the next place, to become the spiritual directors of the higher ranks; and soon established themselves in most of the courts which were attached to the Papal faith, not only as the confessors, but frequently also as the guides and ministers of superstitious princes. The governors of the society, pursuing one uniform system with unwearied perseverance, became entirely successful; and, in the space of half a century, had in a wonderful degree extended the reputation, the number, and influence of the order. When Loyola, in 1540, petitioned the Pope to authorize the institution of the Jesuits, he had only ten disciples; but in 1608, the number amounted to 10,581. Before the expiration of the sixteenth century, they had obtained the chief direction of the education of youth in every Catholic country in Europe, and had become the confessors of almost all its noblest monarchs. They thus formed the minds of men in their youth, and retained the ascendancy over them in their advanced years. They took part in every public measure, and possessed at different periods the direction of the principal courts in Europe. They preserved the highest degree of influence with the Roman pontiffs, as the most zealous champions of their authority; and were equally celebrated by the friends, and dreaded by the adversaries of the Catholic faith, as the ablest and most enterprising order in the church. In 1710, they possessed 24 professed houses, 59 houses of probation, 340 residences, 612 colleges, 200 missions, 150 seminaries, and 19,998 members.

In spite of their vow of poverty, their wealth increased with their power; and they soon rivalled, in the extent and value of their possessions, the most opulent monastic fraternities. Besides the sources of wealth common to all the regular clergy, they possessed one peculiar to themselves. Under the specious pretext of facilitating the success and support of their mission, they obtained as pecial license from the court of Rome to trade with the nations whom they laboured to convert; and though these mercantile schemes tended ultimately to accelerate their ruin, they proved, during a century and a half, a most lucrative source of property and influence. Besides carrying on an extensive commerce both in the East and West Indies, and opening warehouses in different parts of Europe for the purpose of vending their commodities, they aimed at obtaining settlements, and reigning as sovereigns. It was in this latter capacity, unsuitable as it may seem to their whole character, that they exhibited the most wonderful display of their abilities, and contributed most essentially to the benefit of the human species. About the beginning of the 17th century, they obtained from the court of Madrid the grant of the large and fertile province of Paraguay, which stretches across the southern continent of America, from the mountains of Potosi to the banks of the river La Plata; and, after every deduction which can reasonably be made from their own accounts of their establishment, enough will remain to excite the astonishment and applause of mankind. They found the inhabitants in the first stage of society, ignorant of the arts of life, and unacquainted with the first principles of subordination. They applied themselves to instruct and civilize these savage tribes. They commenced their labours, by collecting about fifty families of wandering Indians, whom they converted and settled in a small township. They taught them to build houses, to cultivate the ground, and to rear tame animals; trained them to arts and manfactures, and brought them to relish the blessings of security and order. By a wise and humane policy, they gradually attracted new subjects and converts; till at last they formed a powerful and well organized state of 300,000 families. Over these they exercised a mild and patriarchal government, and their subjects, docile and grateful, revered their benefactors as divinities. The country was divided into 47 districts, over each of which a Jesuit presided. A few magistrates, chosen by the Indians themselves, assisted in every town to secure obedience to the laws. In other respects all the members of the community were as one family, on a footing of perfect equality, and possessed all things in common. Every individual was obliged to labour for the public, and the fruits of their industry were deposited in common store houses, from which every person received whatever was necessary for the supply of his wants. Punishments were rare, and always of the mildest description, such as an admonition from the Jesuit, a slight mark of disgrace, or at most a few lashes with a whip. Industry was universal, but wealth and want were equally unknown; and most of those passions, which disturb the peace of society, were deprived of every opportunity to operate. Even the elegant arts began by degrees to appear, and full protection was provided against every invader. An army of 60,000 men was completely armed and regularly disciplined, consisting of cavalry, infantry, artillery, and well provided with magazines of all the implements of war. The Indians of Paraguay, in short, under the government of the Jesuits, were an innocent and happy people, civilized without being corrupted, and yielding with entire contentment the most perfect submission to an absolute but equitable government. Yet, even in this most meritorious effort for the welfare of mankind, the peculiar spirit of the order was sufficiently disscernible. In order to preserve their influence, they found it necessary to keep their subjects in a state of comparative ignorance; and, besides prohibiting all intercourse with the adjacent settlements of the Spaniards and Portuguese, they endeavoured to inspire them with a hatred and contempt of those nations. They prevented their subjects from learning any language, except a native dialect, (the Guarani,) which they endeavoured to improve as a general standard, and plainly aimed at establishing an independent empire, subject only to their order, which could scarcely have failed, from its excellent constitution and police, to have extended its dominion over all the southern continent of America.

Though the power of the Jesuits had become so extensive, and though their interests generally prospered during a period of more than two centuries, their progress was by no means uninterrupted; and, by their own misconduct, they soon excited the most formidable counteractions. Scarcely had they effected their establishment in France, in defiance of the parliaments and universities, when their existence was endangered by the fanaticism of their own members. John Chastel, one of their pupils, made an attempt upon the life of Henry IV.; and Father Guiscard, another of the order, was convicted of composing writings favourable to regicide. The parliaments seized the moment of their disgrace, and procured their banishment from every part of the kingdom, except the provinces of Bourdeaux and Toulouse. From these rallying points, they speedily extended their intrigues in every quarter, and in a few years obtained their re-establishment. Even Henry, either dreading their power, or pleased with the exculpation of his licentious habits, which he found in their flexible system of morality, became their patron, and selected one of their number as his confessor. They were favoured by Louis XIII. and his minister Richelieu, on account of their literary exertions; but it was in the succeeding reign of Louis XIV. that they reached the summit of their prosperity. The Fathers La Chaise and Le Teltier, were successively confessors to the king; and did not fail to employ their influence for the interest of their order; but the latter carried on his projects with so blind and fiery a zeal, that one of the Jesuits is reported to have said of him, "he drives at such a rate, that he will overturn us all." The Jansenists were peculiarly the objects of his machinations, and he rested not till he had accomplished the destruction of their celebrated college and convent at Port Royal. Before the fall, however, of this honoured seminary, a shaft from its bow had reached the heart of its proud oppressor. The "Provincial Letters of Pascal" had been published, in which the quibbling morality and unintelligible metaphysics of the Jesuits were exposed in a strain of inimitable humour, and a style of unrivalled elegance.* The impression which they produced was wide and deep, and gradually sapped the foundation of public opinion, on which the power of the order had hitherto rested. Under the regency of the Duke of Orleans, the Jesuits, and all theological personages and principles, were disregarded with atheistical superciliousness; but under Louis XV. they partly recovered their influence at court, which, even under Cardinal Fleury, they retained in a considerable degree. But they soon revived the odium of the public by their intolerant treatment of the Jansenists, and probably accelerated their ruin by refusing, from political rather than religious scruples, to undertake the spiritual guidance of Madame de la Pompadour, as well as by imprudently attacking the authors of the *Encyclopedie*. Voltaire directed against them all the powers of his ridicule, and finished the piece which Pascal had sketched. Their power was brought to a very low ebb, when the war of 1756 broke out, which occasioned the famous law-suit that led to their final overthrow. By that time the society had indicated many symptoms of decay, both in point of talents and activity, and had rendered themselves at once contemptible and odious. They had disgusted the court by their scruples, irritated the philosophers by their clamours, exasperated the other religious orders by their persecutions, and alienated the public by their long and insolent domination. A reasonable pretext was all that was wanted to put down a sect, which had long ceased to be either popular or formidable. The opportunity was soon furnished by their own impudent obstinacy. The war recently commenced, had occasioned great losses in their trade with Martinico, the weight of which would have fallen in part upon the society's correspondents at Lyons and Marseilles. These merchants, however, alleged that the Jesuits in France were responsible for the debts of their missionaries in America, and insisted upon being indemnified from the funds of the order. The claim was resisted, and a law suit commenced, which the Jesuits, by virtue of their privilege, removed from the provincial parliament to the great chamber at Paris. This measure rendered the dispute and their defeat subjects of more general notoriety. They were condemned to pay large sums to the adverse party, and prohibited thenceforth from meddling in commercial concerns. The sources of their wealth were thus diminished, and their enemies encouraged to renewed attacks. The questions at issue in the commercial dispute had given the magistrates a plausible occasion for demanding to inspect the constitutions of the society; and in a luckless hour for themselves, they consented to produce their books. The parliament instantly saw and seized the advantage which they had gained, and resolved to effect the destruction of the order. By an arrest of the 11th August, 1761, the Jesuits were required to appear at the end of a year to receive judgment on their constitution, which, it was now discovered, had never been approved with the requisite forms. In the mean time the king of Portugal was assassinated; and Carvalho, the minister, who detested the Jesuits, found means to load them with the odium of the crime. Malagrida, and a few more of these fathers, were charged with advising and absolving the assassins, and having been found guilty, were condemned to the stake. The rest were banished with every brand of infamy, and were treated with the most iniquitous cruelty. They were persecuted without discrimination, robbed of their property without pity, and embarked for Italy without previous preparation; so that no provision having been made for their reception, they were literally left to perish with hunger in their vessels. These incidents prepared the way for a similar catastrophe in France. During the year allotted for the investigation of their rules and records, the court evinced a disposition to protect them, and the bishops declared unanimously in their favour; but an unforeseen public calamity rendered it necessary to appease the nation by some acceptable measure; and the Jesuits, after all, are supposed to have been sacrificed more as a trick of state than as an act of justice.

In March 1762, the French court received intelligence of the capture of Martinico by the British; and dreading a storm of public indignation, resolved to divert the exasperated feelings of the nation, by yielding the Jesuits to their impending fate. On the 6th of August 1762, their institute was condemned by the parliament, as contrary to to the laws of the state, to the obedience due to their sovereign, and to the welfare of the kingdom. The order was dissolved, and their effects alienated. But still the members, though no longer dressed in their religious habit, continued to hover about the court; and had they preserved their original cautions and patient policy, might have succeeded in recovering their privileges. But former successes inspired them with a fatal confidence. One of the archbishops, indignant that the parliament should presume to dispense with ecclesiastical vows, issued a mandate in favour of the Jesuits, and the fathers were accused of having employed themselves too industriously in the circulation of this paper. The parliament took the alarm, and pronounced a decree that every Jesuit, whether professor or novice, should, within eight days, make oath that he renounced the institution, or quit the kingdom. In a body whose moral principles were so relaxed, and whose members, while it existed, scrupled no subtleties in promoting its interests, it is a remarkable circumstance that, as securalised individuals, they acted in this instance with strict integrity, and refused the alternative of the oath. They were therefore ordered to quit the kingdom, and this judgment was executed with the utmost rigour. The poor, the aged, the sick, were included in the general prescription. But in certain quarters, where the provincial parliaments had not decided against them, Jesuits still subsisted; and a royal edict was afterwards promulgated, which formally abolished the society in France, but permitted its members to reside within the kingdom under certain restrictions.*

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* See also *La Morale Pratique des Jesuits*, per Arnauld.

In Spain, where they conceived their establishment to be perfectly secure, they experienced an overthrow equally complete, and much more unexpected. The necessary measures were concerted under the direction of De Choiseul, by the Marquis D'Ossun, the French ambassador at Madrid, with Charles III. King of Spain, and his prime minister, the Count D'Aranda. The execution of their purpose was as sudden as their plans had been secret. At midnight, (March 31st 1767,) large bodies of military surrounded the six colleges of the Jesuits in Madrid, forced the gates, secured the bells, collected the fathers in the refectory, and read to them the king's order for their instant transportation. They were immediately put into carriages, previously placed at proper stations; and were on their way to Carthagena before the inhabitants of the city had any intelligence of the transaction. Three days afterwards, the same measures were adopted with regard to every other college of the order in the kingdom, and ships having been provided at the different sea ports, they were all embarked for the ecclesiastical states in Italy. All their property was confiscated, and a small pension assigned to each individual as long as he should reside in a place appointed, and satisfy the Spanish court as to his peaceable demeanour. All correspondence with the Jesuits was prohibited, and the strictest silence on the subject of their expulsion was enjoined, under penalties of high treason. A similar seizure and deportation took place in the Indies, and an immense property was acquired by the government. Many crimes and plots were laid to the charge of the order; but whatever may have been their demerit, the punishment was too summary to admit of justification; and many innocent individuals were subjected to sufferings beyond the deserts even of the guilty. Pope Clement III. prohibited their landing in his dominions; and, after enduring extreme miseries in crowded transports, the survivors, to the number of 2300, were put ashore on Corsica. The example of the king of Spain was immediately followed by Ferdinand VI. of Naples, and soon after by the Prince of Parma. They had been expelled from England in 1604; from Venice in 1606; and from Portugal in 1759, upon the charge of having instigated the families of Tavora and D'Aveiro to assassinate King Joseph I. Frederick the Great of Prussia was the only monarch who shewed a disposition to afford them protection; but in 1773, the order was entirely suppressed by Pope Clement XIV. who is supposed to have fallen a victim to their vengeance.† In 1801, the society was restored in Russia by the Emperor Paul; and in 1804, by King Ferdinand in Sardinia. In August 1814, a bull was issued by the present Pope, Pius VII. restoring the order to all their former privileges, and calling upon all Catholic princes to afford them protection and encouragement. This act of their revival is expressed in all the solemnity of Papal authority; and even affirmed to be above the recal or revision of any judge, with whatever power he may be clothed; but to every enlightened mind it cannot fail to appear as a measure altogether incapable of justification, from any thing either in the history of Jesuitism or in the character of the present times.

It would be in vain to deny, that many considerable advantages were derived by mankind from the labours of the Jesuits. Their ardour in the study of ancient literature, and their labours in the instruction of youth, greatly contributed to the progress of polite learning. They have produced a greater number of ingenious authors than all the other religious fraternities taken together; and though there never was known among their order one person who could be said to possess an enlarged philosophical mind, they can boast of many eminent masters in the separate branches of science, many distinguished mathematicians, antiquarians, critics, and even some orators of high reputation. They were in general, also, as individuals, superior in decency, and even purity of manners, to any other class of regular clergy in the church of Rome. Their active and literary spirit furnished, likewise, a most beneficial counteraction to the deadening influence of their contemporary monastic institutions. Even the debased species of Christianity, which they introduced among the savage tribes of America, and the more civilized nations of the East, was infinitely superior, both in its consolations and morals, to the bloody and licentious rites of idolatry. But all these benefits by no means counterbalanced the pernicious effects of their influence and intrigues on the best interests of society.

The essential principles of the institution, viz. that their order is to be maintained at the expense of society at large, and that the end sanctifies the means, are utterly incompatible with the welfare of any community of men. Their system of lax and pliant morality, justifying every vice, and authorizing every atrocity, has left deep and lasting ravages on the face of the moral world. Their zeal to extend the jurisdiction of the court of Rome over every civil government, gave currency to tenets respecting the duty of opposing princes who were hostile to the Catholic faith, which shook the basis of all political allegiance, and loosened the obligations of every human law. Their indefatigable industry, and countless artifices in resisting the progress of reformed religion, perpetuated the most pernicious errors of Popery, and postponed the triumph of tolerant and Christian principles. Whence, then, it may well be asked, whence the recent restoration? What long latent proof has been discovered of the excellence, or even the expedience, of such an institution? The sentence of their abolition was passed by the senates, and monarchs, and statesmen, and divines, of all religions, and of almost every civilized country in the world. Almost every land has been stained and torn by their crimes; and almost every land bears on its public records the most solemn protests against their existence. Even they who loved popery, but dreaded the atrocities and ambition of Jesuitism; even an infallible pontiff, in his cool judicial capacity, after a most solemn hearing, and in the face of its most powerful advocates, pronounced its condemnation. What new witness has appeared to testify its virtues? What adequate cause been made out for its revival? If an instrument is wanted, (says an able opponent of Jesuitism[*],) which may at once quench the flame of charity—throw us back in the career of ages—sow the seeds of everlasting division—lay a train which is to explode in the citadel of truth, and overturn her sacred towers—we venture confidently to affirm that Jesuitism is that instrument. But, as for any other advantages either to Protestantism or Popery, it is for the pope, or any other infallible reasoner, to shew. Till some such superior being shall stoop down to instruct us on this point, and to establish a fact which the Jesuits themselves for two centuries, and by a whole regiment of folios, endeavoured to establish in vain, we must venture to conclude, with our forefathers, with the kings, and queens, and parliaments, and judges, and churches, of Europe, and with the infallible Pope Clement XIV. that Jesuitism is a public nuisance; and that he who endeavours to let it loose upon society, is chargeable with high treason against the common interests and happiness of his species." See Robertson's *History of Charles V.* vol. ii. *and the authorities there cited;* D'Alembert's *Narrative of the destruction of the Jesuits; A short view of the Polity of the Jesuits in Paraguay*, attributed to the pen of Mr Burke, and to be found in the 1st vol. of *The European Settlements in America*; Southy's *History of Brazil*; Adolphus' *History of England* vol. i.; Mosheim's *Ecclesiastical History*, vol. iv.; *Christian Observer*, vol. vi.; and *A Brief Account of the Jesuits*, &c. London, 1815. (*q*)

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* The Duke de Chosieul, the French minister, was a principal agent in procuring their final suppression, and the following origin has been assigned to be the hostility with which he pursued the whole order in every quarter of Europe. The Duke having no employment in the government of France, happened one evening at supper to say something very strong against the Jesuits. Some years afterwards he was sent ambassador to Rome, where, in the usual routine of his visits in that situation, he called upon the general of the Jesuits, for whose order he professed the highest veneration. "Your Excellence did not always, I fear, think so well of us," replied the General. The Duke, much surprised at this observation, begged to know what reasons he had for thinking so, as he was not concious that he had ever mentioned the order but in terms of the highest respect. The General, to convince him of the contrary, shewed him an extract from a large register book belonging to the society, in which the particular conversation alluded to, and the day and year in which it happened, were minuted down. The Ambassador blushed, and excused himself as well as he could, and soon went away, resolving within himself, whenever he should become prime-minister, to destroy a society that kept up such particular and detailed correspondences, of which it might make use to the detriment of administration and government."— Seward's *Biographiana.*

† It was long a current story at Rome, that this pontiff was accustomed to withdraw in the course of the grand mass to take some refreshment; that a young priest, on one of these occasions, brought chocolate to his Holiness, and immediately withdrew; that the proper officiating priest soon after appeared with another cup, the pope shook his head, as concious of having received a fatal potion; that he pined from that day of a lingering disease, which reduced his body to the appearance of a skeleton; and that he was known to have said, in allusion to the secret cause of his death, "I am going to eternity, and I know for what."

JESUS. See Christianity, Ecclesiastical History, and Theology.

JET. See Mineralogy.

JET D'EAU. See Hydrodynamics.

JEWELS. See Gems and Mineralogy.

JEWS.

In the present article, we propose to lay before our readers, in the first place, a brief sketch of the history of the Jews, from the period of their return to Jerusalem from Babylon, and the rebuilding of their city and temple under Ezra and Nehemiah, when the scriptures leave off any farther accounts, and when profane historians begin to take notice of them, till the destruction of Jerusalem under Titus;—in the second place, notices of their history since that event, especially such as relate to their history in England;—and lastly, a general view of their opinions, traditions, rites, and ceremonies.

I. In the year 534 B. C. the foundations of the temple at Jerusalem were laid; and after a great many obstacles and delays it was finished, as related in the books of Ezra and Nehemiah. The last of these chiefs died about the year 409 B. C. He justly may be ranked among the great characters of ancient history. He forsook a place of influence at the most splendid court of Asia to encounter every hardship, actuated by the patriotic and beneficent wish of bestowing independence and happiness upon his poor, ignorant, and wretched countrymen, and of raising them, by moral and religious education, to the rank of a brave, industrious, and comparatively virtuous nation. Before Nehemiah, the Jews were addicted to idolatry, and totally ignorant of a future state; he however succeeded, by a wise and judicious selection of their laws and traditions, and by directing their attention more to practice than to disputation, in rendering them austerely moral, and brave defenders of their independence.

Still there existed sources of calamity and distress among them; their country was only a province of Syria, subject to the kings of Persia. The Syrian governors, in order to secure and extend their influence and power, conferred the administration of affairs upon the high-priests. The bad effects of this measure soon became apparent, in creating jealousies among those who thought they had a claim to this office. The first public calamity that befel the Jewish nation, after their return from Babylon, occurred in the year 351 B. C.; when, in consequence of their having offended the king of Persia, he took Jericho, and carried off all the inhabitants captives. When Alexander invaded Persia, they seem to have pursued commerce with such great success, that it appeared to that monarch an object to obtain the settlement of Jewish colonies in his sea ports. He also favoured them in many other respects; but the story of his interview with the high-priest seems of very doubtful credit. On the death of Alexander, Judea from its locality, lying between Syria and Egypt, was exposed to all the revolutions and wars which his successors waged with each other. After Ptolemy had succeeded in wresting Syria and Phœnicia from Leomedon, he laid siege to Jerusalem. The Jews were prepared for a long and obstinate resistance; but Ptolemy, being informed that they would not fight on their Sabbath, assaulted the city on that day, and easily took it. When this monarch, five years afterwards, was obliged to yield Judea to Antigonus, the latter behaved to the Jews in such a tyrannical manner, that great numbers of them fled into Egypt and Syria, and Judea seemed in danger of being entirely depopulated, till it was recovered by Ptolemy in the year 292 B. C. In the reign of Ptolemy Philopater, a dreadful persecution was carried on against them, in consequence of their attempting to prevent that monarch from profaning the temple, by entering into the sanctuary.

On their ready submission, in the year 204 B. C. to Antiochus the Great, they gained such a strong hold on his favour, that he promised to restore Jerusalem to its former splendour, to recall the Jews, and to replace them as far as possible in their ancient privileges. He actually granted an exemption of taxes to all the dispersed Jews that would come, within a limited time, to settle in Jerusalem; and he ordered all who were slaves in his dominions to be set free. But the Jews were not long to enjoy this prosperity. About the year 176 B. C. a quarrel happened between the high-priest and the governor of the temple, which was attended with the most fatal consequences, a civil war ensuing, in which many fell on both sides. When Antiochus Epiphanes ascended the throne of Syria, Jason, the high-priest's brother, purchased from that monarch the high-priesthood; and afterwards introduced Grecian customs, and the ceremonies of paganism among the Jews. From this time the service of the temple was neglected, and a general apostacy took place. The power of Jason, however, was not of long continuance; for his brother Menelaus having offered to the Syrian monarch a higher price than Jason gave for the priesthood, and having moreover promised to renounce Judaism, and embrace the religion of the Greeks in all respects, that monarch gave Menelaus a force sufficient to drive Jason out of Jerusalem. Menelaus conducted himself with great tyranny towards the Jews, who complained of him to Antiochus; but that monarch paid no attention to their complaints so long as Menelaus could procure money to bribe him. About the year 170 B. C. Antiochus marched against Jerusalem, in consequence of the Jews having rebelled, and made great rejoicings on the report that he had been killed at the siege of Alexandria. He soon made himself master of the city, where he behaved with such cruelty, that it is supposed, in the course of three days, 40,000 Jews were killed, and as many sold for slaves. Menelaus still retained the protection and favour of the Syrian monarch, and if possible exceeded his former acts of tyranny and cruelty. But the Jews were reserved for yet greater calamities; for, about the year 168 B. C. Antiochus, having been most severely mortified by the Romans, resolved to wreak his vengeance on the Jews. He accordingly dispatched an army of 22,000 men to plunder all their cities, to murder all the men, and to sell the women and children for slaves. The Jews, incapable of resistance, beheld their city taken, their temple profaned, and their religion abolished. About 10,000 of them, who escaped the slaughter, were carried away captive. In order still more effectually to accomplish his purpose, the Syrian monarch ordered the temple to be dedicated to Jupiter Olympius, and his statue to be set up on the altar of burnt-offering. All who refused to come and worship were massacred, or tortured till they complied. Altars, groves and statues were raised throughout Judea, at which the inhabitants were compelled to worship, while it was instant death to observe the Sabbath circumcision, or any other of the rites and ceremonies instituted by Moses.

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[*] *Christian Observer*, vol. xiv.

The Jews now yielded to despair, when an eminent priest named Mattathias, had the courage to oppose the orders of the king, and, by his example and exhortations, roused the spirits and the zeal of his countrymen. In the year 167 B. C. Mattathias, finding that his followers daily increased in number, attacked the Syrians and apostate Jews, marching from city to city, overturning the idolatrous altars, and opening the synagogues. He was so successful, that in the space of a year he had extended his reformation throughout a considerable part of Judea, and he could probably have completed it had he not died.

He was succeeded by the famous Judas Maccabeus, who at the head of 6000 men made himself master of some of the strongest fortresses in Judea, and after defeating the Syrians in five pitched battles, drove them entirely out of the country, except from a strong fort built over against the temple. In the year 163 B. C. after the death of Antiochus, a peace was concluded upon terms very advantageous to the Jewish nation; but it was not of long continuance. Judas was again successful in five engagements; in the sixth however, having been abandoned by all his troops except 800, he, together with his gallant band, was slain in the year 161 B. C. Jonathan and Simon, his brothers, succeeded him. The latter drove the Syrian garrison from the fortress of Jerusalem, but was at last treacherously murdered by his son-in-law about 135 B. C.

Simon was succeeded by his son Hyrcan, who made himself master of all Palestine, as well as of Samaria and Galilee. He was successful and happy till the last year of his life, when he became involved in a quarrel with the Pharisees, which is supposed to have shortened his days. The factious and turbulent spirit of this sect also proved very troublesome to Alexander Jannæus, who obtained the royal power in the year 105 B. C. and who seems to have been a monarch of great activity, enterprise and talent. While he was engaged in subduing his foreign enemies, the Pharisees raised a rebellion at home, but this he quashed in the year 86 B. C. and by treating them with very great severity, not to say cruelty, he prevented them from again disturbing his reign. Alexander having made several conquests in Syria, died about 79 B. C. He left two sons, Hyrcanus and Aristobulus, but bequeathed the government to his wife as long as she lived. The Pharisees by this time had again put forth their power, and became so turbulent as to render the situation of the queen very unpleasant; they even compelled her to persecute the Sadducees in a most cruel manner. On her death, contests began between her sons: the Pharisees supported Hyrcanus, but his army deserting to Aristobulus, the former was obliged to abandon all title both to the Royal and pontifical dignity. His party, notwithstanding, still existed and were active; and having obtained the assistance of the King of Arabia, invaded Judea, defeated Aristobulus, and closely beseiged him in Jerusalem. In this situation the latter called in the Romans, and by their means drove the Arabians out of the country.

After this both the brothers agreed to constitute Pompey, at that time commander in chief of all the Roman forces in the east, the arbitrator of their differences. Pompey had resolved to take the part of Hyrcanus, and Aristobulus suspecting this, prepared to defend himself against the Romans. On this the Roman general summoned him to appear before him, which he reluctantly did. Pompey insisted that he should deliver up all the fortified places he possessed. Upon this he fled to Jerusalem, but being quickly followed by Pompey, to prevent hostilities, he promised to pay him a large sum of money. Some troops were accordingly sent to receive the stipulated sum, but they were repulsed by the garrison of Jerusalem. This exasperated Pompey so much that he immediately marched against that city. The Jews were still so scrupulous, that they would not do any thing on the Sabbath to prevent the besiegers from carrying on their works. The city was therefore taken in the year 63 B. C. Twelve thousand of the inhabitants were slaughtered, and many more put an end to their own lives. Hyrcanus was restored to the dignity of high-priest, with the title of prince, but forbidden to assume the title of king, or to extend his territories beyond Judea. The walls of Jerusalem were destroyed, and a Roman governor and garrison were left in it. Aristobulus, and his two sons Alexander and Antigonus, were carried by Pompey to Rome; but Alexander escaped into Judea, and raised an army of 11,500 men. Hyrcanus on this applied to the Romans for assistance: Alexander ventured a battle, but was defeated with considerable loss. After this, his mother contrived to make his peace with the Romans. Judea was at this period divided into five districts, in each of which a separate court of judicature war erected. The first of these was at Jerusalem; the second at Gadara; the third at Amath; the fourth at Jericho; and the fifth at Sephoris in Galilee.

The Jews having ingratiated themselves with Cæsar, during the civil wars between him and Pompey, were so highly favoured while he lived, that they could scarcely be said to feel the Roman yoke. After his death, however, great commotions prevailed among them, which were not put down till Herod, who was created King of Judea by Marc Anthony in the year 40 B. C. was firmly established on the throne by the taking of Jerusalem by the Romans in 37 B. C. But the Jews soon found that they had only changed civil commotions for the most dreadful tyranny. The whole conduct of Herod was so cruel, that an attempt was made to destroy him. This, however, did not succeed; and Herod, having discovered the authors of the plot, caused them and their families to be put to death. Shortly after this, however, he regained, in some degree, the confidence and attachment of his subjects, by his generosity to them during a famine. About the year 23 B. C. he rebuilt the temple with great splendour and magnificence. These, however, were only intervals of his cruelty and tyranny. At length, he was seized with a most loathsome and incurable disease, of which he died. He divided his kingdom among his sons in the following manner: To Archelaus, he allotted Judea; to Herod, or Antipas, Galilee and Pirea; and to Philip, Trachonitis, Gaulon, Batanea, and Panias.

No sooner was his death known, than tumults, seditions, and insurrections arose. An appeal was made to Augustus, who made the following division of the kingdom: Archelaus had one half, with the title of Ethnarch. His portion contained Judea Proper, Idumea, and Samaria. The remainder was divided between Philip and Herod; the former of whom had Trachonitis, Batanea, and Auranitis, together with a small part of Galilee; the latter had the rest of Galilee, and the countries beyond the Jordan.

A few years after this division, Archelaus was summoned to Rome by the Emperor, in consequence of complaints against his tyranny. His effects were confiscated, himself banished, and a Roman governor appointed over Judea, which was declared a Roman province. The Jews, dissatisfied at this arrangement, and, moreover, excited to tumult by the taxes imposed upon them by their new masters, were seldom quiet; their restlessness was increased by their expectation at this time of their Messiah; and, as they anticipated in him a temporal prince, they looked forward to his coming as the era of their emancipation from the Roman yoke, and their restoration to national independence and power. The governors appointed by the Romans were frequently changed, but seldom was the change beneficial to the Jews. About the 16th year of Christ, Pontius Pilate was appointed governor: his administration was one continued scene of rapine, tyranny, and cruelty. Seven years after his condemnation of our Saviour, he was removed from the government, and Agrippa, the grandson of Herod, was raised to the royal dignity. His character and conduct were similar to those of his grandfather, and his death was equally dreadful and singular. On his death, Judea was again declared a Roman province. The governors appointed to rule over it were distinguished for every species of vice; and from them the Jews suffered so much, that many of the inhabitants emigrated. About this time it was computed that there were in Jerusalem between 2,500,000 and 3,000,000 Jews.

In the year 67 A. D. that fatal war between the Jews and the Romans commenced, which ended in the destruction of Jerusalem and the dispersion of the Jews. The immediate cause of this war was, a dispute between the Jews and the Syrians respecting the city of Cæsarea. Nero decided the question against the former, who immediately took up arms. Dreadful cruelties were committed by both parties, but the Jews suffered most: 20,000 of them were massacred by the Syrians and Romans at Cæsarea; 50,000 at Alexandria; 2000 at Ptolemais; and 3500 at Jerusalem. Soon after these massacres, the Jews obtained some partial and temporary successes, in consequence of which Vespasian was sent into Judea with an army of 60,000 men in the year 68 A. D. His success was great and rapid, while the Jews, instead of uniting to oppose him, and save their country, were divided into two parties: one were for submitting to the Romans, the other opposed all peaceable measures. This dissention was not confined to Jerusalem, but spread through all the cities, towns, and villages of Judea; even houses and families were divided against each other. Jerusalem was the scene of their contentions. The city was filled with butcheries of the most horrid kind. Twelve thousand persons of noble extraction, and in the flower of their age, were put to death by the Zealots, for so that party who were for war with the Romans were called. The Zealots, after having massacred or driven away the opposite party, turned their arms against themselves, till, in the year 72 A. D. Titus advanced at the head of a powerful army against Jerusalem. This for a while suspended their mutual animosities; but they soon returned to them, and thus facilitated the triumph of the Romans.

As Titus wished, if possible, to preserve the city, he sent the besieged offers of peace, but they were rejected; upon which he resolved to carry on the seige with vigour; a fortnight after it commenced, a breach was made in the outer wall, by which the Romans entered, the Jews retiring behind the next inclosure. Five days after gaining this advantage, the Romans entered into the second inclosure. Famine and pestilence now raged in the city to a dreadful degree; and these scourges were increased by intestine feuds. As soon as Titus learned their condition, he again offered them peace; but his offer was rejected. Upon this, he caused the city to be surrounded with a strong wall, which, though nearly five miles in circuit, was finished in three days. By means of it, the besieged could not escape, nor receive provisions or succour. Nothing could be more dreadful than the famished condition to which they were now reduced. It was at this juncture, according to Josephus, that a mother butchered and ate her own child. When Titus heard of this horrid deed, he swore he would effect the total extirpation of the city and people. About the end of July, the Romans gained possession of the fortress Antonia, which obliged the Jews to set fire to the galleries which joined it to the temple. The factious in the city, instead of mutually yielding and opposing the enemy, grew more embittered against each other; and one of them actually plundered the temple. On the 8th of August, Titus having in vain endeavoured to save that edifice, ordered the gates of it to be set on fire; but he afterwards caused the fire to be extinguished before the temple itself was destroyed. On the 10th of that month, he determined on a general assault; but before this took place, the temple was set on fire, whether by the Jews or the Roman soldiers is uncertain. Titus in vain endeavoured to extinguish the flames: his soldiers would not obey his orders for that purpose. A dreadful massacre followed soon afterwards, in which many thousands perished. In the meantime, great preparations were making for an attack on the palace, which took place on the 8th, when the city was entered by Titus. The whole number of Jews who perished during this war is computed at nearly 1,500,000. Three castles were still untaken, two of which soon capitulated; but the third, Massador, made a desperate resistance. It was extremely strong; and the Roman general, having in vain tried his engines and battering rams against it, ordered it to be surrounded with a high wall, and the gates to be then set on fire. In this dreadful situation, the commander persuaded the Jews to kill their wives and children, and afterwards to choose ten men, by lot, which should kill all the rest, and lastly, one out of these ten to dispatch them and himself; having previously to his own destruction set fire to the place. This was accordingly done. Two women, however, who had concealed themselves, came out, when the Romans were preparing to scale the wall, and acquainted them with the fate of their town's people. Thus ended the Jewish nation and worship in their own country.

II. It is uncertain at what period the Jews first settled in England. From the preface to Leland's *Collections*, it appears that Mr. Richard Waller believed them to have settled here during the government of the Romans. This opinion was founded on the circumstance of a Roman brick having been found at London, having on one side a bas-relief representing Sampson driving the foxes into a field of corn. From the elegance of the sculpture, and other circumstances, it was inferred that this brick could not be the work of later ages; and if Roman, of Roman Jews, from the subject. However this may be, it is certain that the Jews were numerous in England so early as the year 740, since the 24th paragraph of the Canonical Excerptions, published by Egbright, Archbishop of York, in that year, forbids any Christians to be present at the Jewish feasts. In a charter of Witglaff, King of Mercia, made to the monks of Croyland, there are confirmed to them not only such lands as had been given to the monastery by the kings of Mercia, but all their possessions whatever, whether they were originally bestowed on them by Christians or Jews. During the feudal ages, the Jews, from their aversion to war, and their love of gain, seem to have been the most opulent, as well as the most polished and enlightened portion of the laity. They were the only bankers of the period. They conducted foreign trade, and in the course of it often visited the countries of southern Europe. Most of the gold and silver ornaments for altars were wrought by them. William Rufus encouraged them to enter into solemn contests with his bishops concerning the true faith; swearing, by the faith of St. Luke, his favourite oath, that, if the Jews were victorious in the dispute, he would turn Jew himself. Accordingly during his reign there was a public meeting for this disputation, at which the Jews opposed the Christians with so much vigour, promptitude, and acuteness, that the clergy felt considerable anxiety respecting the issue.

Henry II. in the 24th year of his reign, granted a burial-place to the Jews on the outside of every city where they dwelt. At this period, one Joshua, a Jew, furnished the rebels in Ireland with great sums of money; and another Jew of Bury St. Edmunds took in pledge certain vessels appropriated to the service of the altar. Such was the confidence they felt either in their numbers or their wealth, that at this time they underrated the highest dignitaries of the church. In the year 1188, the parliament of Northampton proposed to assess the Jews at 60,000*l.*, and the Christians at 70,000*l.* towards carrying on a projected war. In the reign of Richard I. the prejudices of the people of England seem to have been for the first time generally and strongly excited against them. A crusade had been resolved on; the populace, roused by the declamations of the clergy, easily turned their zeal against the Jews. In London their houses were broken open and plundered. On this occasion, three persons only were punished, who through mistake had damaged the houses of Christians. In the space of six months, the persecution of the Jews became general throughout the kingdom. The most dreadful outrage against them was committed at Stamford fair. Here were collected an immense number of the populace, who were preparing to go with the king to the Holy Land. As for this enterprise they had already expended the little property they possessed, they resolved to force the Jews also to contribute their share. With this intention, they attacked them when assembled in great numbers at this fair, and quickly made themselves masters both of their persons and fortunes; the former of which they treated with all kinds of barbarity. A few of them were so fortunate as to obtain shelter in the castle. The king did not endeavour to prevent this outrage, nor did he punish it. At this period, it is supposed by some writers that they invented bills of exchange, since mention seems to be made of them by the name of Starra, (from the Hebrew *Shetar*,) in certain Latin documents of this era. By an edict of Richard I. for registering their property, it appears that they were still permitted to exercise the liberal professions; this edict ordering that their contracts should be made in the presence of two assigned lawyers who were Jews, two who were Christians, and two public notaries. This king also appointed *Justicers* of the Jews, whose business it was to collect and pay into the exchequer the taxes assessed upon them. The Jews found their situation under Richard so intolerable, that nearly all the wealthier of them emigrated, and there was a consequent defalcation of the revenue. This was so considerable in the reign of John, that that monarch, in the year 1199, used his utmost endeavours to tempt them back to England; not only confirming their ancient privileges, but granting them new ones, particularly that of appointing a high-priest. Upon this, many of them returned; but they were more cruelly plundered than ever. It has been remarked, that Magna Charta sanctions an injustice to this ill-used race, by enacting, that "if any persons have borrowed money of the Jews, more or less, and die before they have paid the debt, the debt shall not increase while the heir is under age;" but, in our opinion, this clause had no reference to the Jews *as Jews*, but merely as money-lenders, and as they were the only money-lenders of that period, they alone are mentioned.

As long as the rage for crusading lasted, the Jews were liable to great indignities and oppression, particularly from those who had performed a pilgrimage to Jerusalem. Against these, Henry III. ordered them to be protected; he also liberated such as were in prison. In order to distinguish them, he directed them to wear upon the fore part of their upper garment two broad stripes of white linen or parchment. It was in this reign that the Archbishop of Canterbury, and the Bishops of Lincoln and Norwich, published injunctions throughout their respective dioceses, that no Christian should presume to have any communication with the Jews, or sell them any provisions, under pain of excommunication. The king, however, interfered in their behalf; and thus rescued them from starving. The prior of Dunstable was more liberal than his superiors; for, about this time, he granted to several Jews liberty to reside on his land, and to enjoy all the privileges which his other vassals enjoyed, in consideration of the annual payment of two silver spoons.

In the year 1230, the Jews took advantage of the protection and favour of Henry, and erected a very costly and magnificent synagogue in London; but the people petitioned the king to take it from them, and have it consecrated, which was accordingly done. In the 18th year of his reign, on a petition of the inhabitants of Newcastle, he granted them the privilege that no Jew should ever reside among them. It was during the reign of Henry that the Lombards settled in England, and by gradually superseding the Jews in the lending of money, and thus rendering them less necessary, paved the way for worse treatment than they had hitherto experienced. To such a pitch of hatred was the prejudice which had been gradually instilled into the people against the Jews arrived, that in 1262, the barons, being then opposed to the king, and wishing to bind the citizens of London to their cause, ordered 700 Jews to be slaughtered at once, their houses to be plundered, and their new synagogue burnt. It was, however, rebuilt; but in 1270 it was taken from them, on the complaint of the Friars

Penitents, that they were not able to make the body of Christ in quiet, on account of the great howlings which the Jews made during their worship.

In the third year of Edward I. a law passed the Commons concerning Judaism, which seemed to promise them some security. Nevertheless, in the year 1290, this monarch seized on all their real estates, and banished the whole of them from the kingdom. From 15,000 to 16,000 Jews were thus ruined, and then expelled. They left behind them several valuable libraries, particularly at Stamford and Oxford. The latter being sold among the students, most of the Hebrew books were bought by the famous Roger Bacon, who, in a short note written in one of them, declares they were of great service to him in his studies. The expulsion of the Jews at this time was so complete, that no farther traces of them in England occur till long after the Reformation.

Oliver Cromwell made the first attempt to restore to England the industry and wealth of the Jews: the intercourse between them was managed by means of one Henry Martin, who persuaded a deputation from the Jews at Amsterdam to wait upon the English ambassador there: from him they obtained permission to send a public envoy with proposals to London. Manasseh Ben Israel, who stiled himself a divine and doctor of physic, but who was in reality a printer and bookseller, was selected for this embassy, of which he published a particular account. On his arrival in England, he presented an address to Cromwell, recognising his authority, and solicting his protection. On the 4th of December 1655, the Protector summoned a convention, consisting of two lawyers, seven citizens, and 14 noted preachers, to consult upon this request of the Jews; but he found so much prejudice and opposition, that, after a conference of four days, he dissolved the meeting. While this affair was pending, a Rabbi propagated the opinion that Cromwell was the expected Messiah. About this time a few appear to have settled in London, since, in the year 1663, their register of births contained twelve names; and during the whole reign of Charles II. who introduced the sale of patents of denization, their numbers increased. In 1684, James II. remitted the alien duty upon all goods exported in favour of the Jews. This privilege was opposed by the English merchants, petitions from the Hamburgh company, from the Eastland company, and from 57 of the leading merchants of the city, being presented against it. After the Revolution, this privilege was taken away from the Jews. In the first year of Queen Anne, a statute was passed to encourage the conversion of young Jews, by emancipating such converts from all dependence upon their parents; and in the 6th year of George II. it was proposed that the Lord Mayor and Court of Aldermen of London should apply to Parliament for the suppression of Jew brokers; no public proceeding, however, ensued.

In the 7th year of James I. an act was passed, preventing all persons from being naturalized, unless they first received the sacrament of the Lord's supper, according to the rites of the church of England. This act effectually excluded the Jews from being naturalized. In the year 1753, a bill was brought into the House of Lords, and passed there without opposition, which provided that all persons professing the Jewish religion, who had resided in Great Britain or Ireland for three years, might be naturalized without receiving the sacrament of the Lord's supper. On the 16th of April this bill was sent down to the House of Commons, and, on its second reading, a motion was made for its being committed. The bill was supported by the petitions of a few merchants, chiefly dissenters: In behalf of it, it was argued, that it would increase the numbers and wealth of the people; that a great portion of the funds belonging to foreign Jews, it would be highly politic to induce them to follow their property; that connected as the Jews were with the great bankers and monied interests of Europe, their residence in England would, in future wars, give the nation a great command of capital, and facilitate loans; that even their prejudices as a sect would operate in our favour, and occasion our manufactures to be dispersed among the Jew-shopkeepers in Europe, who now had recourse to the Jew merchants of Holland and other tolerant countries; and lastly, that Poland had never risen so high a pitch of prosperity, as when her policy was most liberal to the Jews; and that the sect itself had always abandoned its offensive prejudices in proportion to its good usage. On the other side it was urged, that by naturalizing the Jews, we should import vagrants and cheats to burden our rates, and supplant the industry of our labouring classes; that the rites of Jews would always prevent them from incorporating with the nation, or becoming any real addition to its intrinsic strength; while their early marriages and frequent divorces would occasion such a rapid increase of their numbers, that in the end they might become troublesome or even dangerous; that Jewish nationality would intrigue all the trade into their own hand; that they were enemies upon principle to all Christians; and that it was endeavouring to oppose the plans, and to frustrate the prophecies of the Almighty, to gather together a sect, of which the Bible foretold the dispersion.

The lord mayor, aldermen, and livery of London, first presented a petition to parliament against the proposed naturalization, in which they expressed their apprehension that the bill, if passed into a law, would tend greatly to the dishonour of the Christian religion, and endanger the constitution. Alarm and prejudice spread rapidly and powerfully; a zeal, the most furious, vociferated in the pulpits and the corporations against the bill; and by the next sessions of parliament, instructions were sent to almost all the members to solicit a repeal of it; the minister yielded, and the bill was repealed by an act which received the royal assent the same session.

By the 10th of George III. cap. 10, whenever any Jew shall present himself to take the oath of abjuration, the words "upon the true faith of a Christian," shall be omitted out of the oath. In courts of justice, they are sworn according to their peculiar rites. If Jewish parents refuse to allow their Protestant children a suitable maintenance, the lord chancellor may make such order as he may think proper.

A few years since a society was formed in London for promoting Christianity among the Jews, and branches of the society have been established in different parts of the kingdom. They have published several reports; but the utility of this society has been questioned, and it has been alleged, we hope without reason, that they have not been sufficiently attentive to the investigation of the character and probable motives of their converts.

Our limits will not permit us to dwell long on the history or present state of the Jews in other countries; nor are we in possession of materials sufficient to enable us to enter into detail on these points. In France, the prejudices of Voltaire against the Jewish religion, for a long time prevented the philosophic sect in that country from extending their liberal ideas of toleration towards the Jews. In 1788, however, the academy at Mentz proposed, as a prize question, "Are there means of rendering the Jews in France usefuller and happier?" A Polish Jew, a counsellor of Nancy, and the celebrated Abbe Gregoire, shared the prize. The work of the Abbe on the moral, physical, and political regeneration of the Jews, is an admirable performance. In the constituent assembly, Mirabeau, Clermont, Tourere, and Rabaud, advocated their cause. The attention of the French government, however, does not seem to have been directed towards them till the year 1806, when Bonaparte issued a decree regarding them, in which he appointed an assembly of deputies from them at Paris in the month of July: when they met, they were attended by commissioners on the part of Bonaparte. After assurances of liberty and protection on the one hand, and of gratitude and obedience on the other, it was agreed that a grand Sanhedrim should be opened at Paris, at which should be preserved as much as possible the ancient Jewish forms and usages. This was announced to the Jews in France and Italy, in an address, which advised them to choose men known for their wisdom, in order to give to the Sanhedrim a proper degree of weight and consideration. The Sanhedrim assembled on the 9th of February, 1807: they drew up 27 articles for the re-organization of the Mosaic worship; and passed several regulations on the subject of divorce, polygamy, marriage, moral, civil, and political relations; useful professions, loans among themselves, and loans between Israelites and those who are not Israelites. At their second meeting in March, a law for the condemnation of usury was passed. Bonaparte soon found, however, that he was not likely to accomplish his object of constraining his Jewish subjects to assist in the cultivation of the land, and in furnishing their quota of conscripts. In March 1808, he issued another decree respecting them, in which he calls upon them to follow the pursuits of honest industry, and to purchase landed property. This decree also annuls all obligations for loans made by Jews to minors, without the sanction of their guardians; or to married women, without the consent of their husbands; or to military men, without the authority of their officers. There were also severe regulations respecting usury. At this period, the following return was made to Bonaparte of the number of Jews in all the different parts of the habitable globe, viz. in the Turkish empire, 1,000,000; in Persia, China, and India, on the east and west of the Ganges, 300,000; and in the west of Europe, Africa, and America, 1,700,000, making an aggregate population of 3,000,000. It would appear, however, from subsequent enquiries on this subject, that this number is very far below the truth. Indeed, in Poland alone, recent and well-informed travellers reckon that there are 2,000,000 Jews. The Prince Primate of Frankfort, following the example of Bonaparte, put an end to every humiliating distinction between the Jewish and Christian inhabitants of that city. Since the overthrow of Bonaparte, however, the inhabitants of Frankfort are said to have displayed great illiberality and intolerance against the Jews: and, indeed, this feeling has manifested itself generally throughout Germany. In this part of Europe, the popular prejudice against Judaism was attacked some years ago by Lessing, in his plays of Nathan the Wise, and the Monk of Lebanon; and, at the same time, Moses Mendelsohn published an excellent defence of general toleration, under the title of *Jerusalem.* C. W. Dohm, a Prussian, in the year 1781, published in German, *Remarks on the means of improving the civil condition of the Jews*, which called forth several pamphlets on the same topic, of which the best were those of Schlotzer and Michaelis. In Holland, the condition of the Jews has long been favourable. In Italy, the first attempts were made to prepare the minds of the people for their toleration. Simone Lazzarato, of Venice, is mentioned as a pleader in their cause; the friends of the Socini, also, were thought to entertain sentiments favourable to them; but the interference of the inquisition in 1546, to suppress the club of Vicenza, proved prejudicial to the Jews, in depriving them of several of their most zealous advocates or apologists. In Spain, they obtained a footing after the Mahomedan conquest of that country, but they were driven out of it by the decrees of Ferdinand and Isabella. Mr. Semple, in his second Journey in Spain, relates, that the Jews of Barbary, Smyrna, and Constantinople, generally speak corrupted Spanish, which he considers as a clear proof of the amazing numbers of that people that must have been driven out of Spain, and scattered all over the coasts of the Mediterranean. The laws, both of Spain and Portugal, are still most cruel against them, though they are not now often strictly enforced.

The Jews have long been very numerous and very favourably treated in Poland: it is said that they owe their privileges to Esther a fair Jewess, the favourite mistress of Cassimir the Great; but it is probable that this monarch protected and encouraged them in his dominions, rather because in his time, (A. D. 1370,) they were the richest and most commercial individuals in Europe. They still carry on the principal retail trade in all parts of Poland and Lithuania: a poll-tax is levied upon them.

Though it was not till after the Mahomedan conquest that the Jews obtained a "resting place for their feet" in Asia and southern Europe, yet in most of the Mahomedan states at the present day, they are treated with great cruelty and indignity. Mr Semple says, that the insults to which Christians are exposed in the states of Barbary, are nothing when compared with those which the Jews must hourly suffer. The Jews have larger settlements, and more permanent abodes in India, than they have any where in Europe. In Barbary, there are several thousand Jews, who do not refuse to communicate with the Mussulmans, or to bear arms. Cashmere also contains a large colony, supposed by Bernier to have settled there during the Babylonish captivity.

III. The Jewish history is generally divided into two periods: the first reaching from Abraham to Christ; the other from Christ to the present time; and the Jews of these two periods have been respectively distinguished as ancient and modern. The same distinction ought to be made with regard to Judaism, or the opinions, traditions, rites and ceremonies, of the Jews. Ancient Judaism may be defined as the system of doctrines and rites prescribed in the Old Testament; these were retained in their most essential points, though much corrupted, till the time of Christ: modern Judaism comprehends the opinions, traditions, rites and ceremonies, which began to be received before the destruction of the second temple, were afterwards systematised and embodied in the Cabalistic and Talmudic writings; and have been followed and professed by the great body of the Jewish nation ever since. Ancient Judaism is fully detailed in those parts of the Old Testament which treat of the law of Moses; in the remainder of this article, we propose to confine ourselves to a brief account of the most important parts of modern Judaism.

The Jews divide the books of the Old Testament into three classes: the law, the prophets, and the hagiographa, or holy writings. They have counted not only the large and small sections, the verses and the words, but even the letters in some of the books; and they have likewise reckoned which is the middle letter of the Pentateuch, which is the middle clause of each book, and how often each letter of the alphabet occurs in the Hebrew scriptures.

Besides the scriptures, the Jews pay great attention to the Targums, or Chaldee paraphrases of them: it seems probable that these were written either during the Babylonish captivity, or immediately afterwards, when the Jews had forgotten their own language, and acquired the Chaldee of the Targums, at present received by the Jews; the most ancient are that of Onkelos on the Law, and that of Jonathan Ben Uzliel on the Prophets: the former is supposed to be of greater antiquity than the latter, and it approaches in simplicity and purity of style to the Chaldee of Daniel and Ezra. The Targum on the prophets is believed to have been written before the birth of Christ, and though inferior in respect of style to the Targum of Onkelos, is much superior to any other Targum.

The Jews also regard, with great veneration, what is called the Talmud. This work consists of two parts; the Mishna, which signifies a second law; and the Gemara, which means either a supplement or a commentary. The Jews suppose that God first dictated the text of the law to Moses, which he commanded to be put in writing, and which exists in the Pentateuch, and then gave him an explication of every thing comprehended in it, which he ordered to be committed to memory. Hence the former is called the written, and the latter the oral law. These two laws were recited by Moses to Aaron four times, to his sons three times, to the seventy elders twice, and to the rest of the people once; after this the repetition was renewed by Aaron, his two sons, and the seventy elders. The last month of Moses's life was spent, according to the Jews, in repeating and explaining the law to the people, and especially to Joshua his successor. A prophet might suspend any law, or authorise the violation of any precept, except those against idolatry. If there was any difference of opinion respecting the meaning of any law or precept, it was determined by the majority. When Joshua died, all the interpretations he had received from Moses, as well as those made in his time, were transmitted to the elders; these conveyed them to the prophets, and by one prophet they were delivered to another. This law was only oral, till the days of Rabbi Jehuda, who perceiving that the students of the law were gradually decreasing, and that the Jews were dispersed over the face of the earth, collected all the traditions, arranged them under distinct heads, and formed them into a methodical code of traditional law; thus the Mishna was formed. It is written in a concise style, chiefly in the form of aphorisms, which admit of a variety of interpretations. On this account, a gemara or commentary was written by a president of a school in Palestine, which, together with the mishna, forms the Jerusalem Talmud. The Jews in Chaldea, however, not being satisfied with this gemara, one of their Rabbis compiled another, which, together with the mishna, forms the Babylonian Talmud.

One of the principal branches of modern Judaism is the Cabala, the study of which is regarded as the sublimest of all sciences. By the Cabala, the Jews mean those mystical interpretations of the scripture, and metaphysical speculations concerning the Deity, angels, &c. which they regard as having been handed down by a secret tradition from the earliest ages. The Cabala is of two kinds, theoretical and practical; the former relates to subjects only adapted to speculation; the latter is, in fact, a system of magic drawn from a mystical interpretation of the Scriptures. The Jews believe that Abraham, Moses, Solomon, &c. were adepts in this kind of magic. It was much cultivated in the middle ages; but now the Jews have in a great measure discarded faith in the practical Cabala.

In the 11th century, the famous Rabbi Maimonides drew up a summary of the doctrines of Judaism, which every Jew is required to believe, on pain of excommunication in this world, and condemnation in the next. This summary consists of 13 articles, which he calls foundations or roots of the faith. The articles are as follow:—1. That God is the creator and active supporter of all things. 2. That God is one and eternally unchangeable. 3. That God is incorporeal, and cannot have any material properties. 4. That God must eternally exist. 5. That God alone is to be worshipped. 6. That whatever has been taught by the prophets is true. 7. That Moses is the head and father of all contemporary doctors, and of all those who lived before or shall live after him. 8. That the law was given by Moses. 9. That the law shall always exist, and never be altered. 10. That God knows all the thoughts and actions of men. 11. That God will reward the observance, and punish the breach of the laws. 12. That the Messiah is to come, though he tarry a long time. 13. That there shall be a resurection of the dead when God shall think fit.

Before the delivery of a Jewess, her husband, or some friend, describes with chalk a circle on each of the walls round the bed, and on the outside and inside of the door he also inscribes on these, in Hebrew characters, the words Adam, Chara, Chuts, Lilith; *i. e.* Adam, Eve, rejoice; Lilith signifying a wish that if the child be a boy he may be like Adam, and blessed with a wife like Eve; but if a girl, that she may not, like Lilith, who, according to Jewish tradition, having been formed before Eve out of the ground, on that account deemed herself equal to Adam, and refused to be obedient to him. Lilith, also, is supposed to have the power of weakening and destroying young infants, and therefore the names of three angels are written on the inside of the chamber in which the pregnant woman lies. A Christian midwife must not be employed except in cases of most clear and urgent necessity, and then she must be surrounded and watched by several Jewesses. In order to accelerate the birth, a rabbi recites the 20th, 38th, 92d, and 102d psalms. On the evening of the Sabbath after delivery, if a boy is born, a feast is held called Jeshua Haben, or the safety of the son. Preparations are next made for circumcision. The guests must be at least ten in number, and must all have passed their 13th year. No woman or Christian is allowed to circumcise, except in cases of necessity. Where the latter performs the operation, some of the blood must be drawn afresh from the part by an Israelite. The regular circumcisers are distinguished by their very long and sharp nails; they are taught their business by operating on the sons of poor Jews, whose consent is obtained for money. Besides the circumciser, a person named Baal Berith, or the master of the covenant, must assist. The operation ought not to take place before the eighth, or later than the twelfth day after the birth. Two chairs are provided, one for the circumciser, and the other for Elijah, who is supposed to be present. As soon as the circumciser and his attendant have entered the room, some boys make their appearance bearing twelve wax tapers, bowls of wine, a knife, a plate of sand, and a platter with olive oil, in which the linen to be applied to the wound is steeped. The infant must be bathed before the ceremony. He is brought to the door by a woman, who is not allowed to enter the room. If a child die uncircumcised, he is circumcised in the burial ground, that the reproach of uncircumcision may be taken away. No prayers are said on this occasion, but a name is given him, that, at the resurrection, when every one will be called by his name, his parents may recognise him. The birth of a girl is attended with little feasting. The rabbis have abolished the distinction made by the Mosaic law between the period of the purification of a woman after the birth of a son and a daughter. They have also altered the law respecting the mode of redemption of the first born, if a son. According to them, the child cannot be redeemed before the thirtieth day, nor after the thirty-first. On that day the priest asks the father, whether he would prefer his child or the five shekels required for his redemption : to which the father replies, that he prefers his son, and that he wishes the priest to accept the money. The priest cannot accept less; but he may return what he accepts. If the father dies before the thirty-first day, the mother is not bound to redeem the child; but a piece of parchment is suspended on the child's neck, with an inscription that he is a son not redeemed, to teach him that he must redeem himself.

The education of the female children of the Jews is very much neglected. They are seldom taught more than to pronounce the words of a Hebrew prayer book, without understanding the meaning of a single sentence. The sons are taught to read the law, the mishna, the gemara, and the prayer-book. Very few of them learn the Hebrew grammatically. At the age of 13 years and one day, a Jewish youth receives the appellation of Bar Mitsrah, a son of the commandment, and is required to observe the 613 precepts which, according to the rabbis, comprehend the whole of the law. From this time he is deemed liable to punishment if he transgress them ; whereas the sins he commits before this age are ascribed to his father, who is liable to the punishment denounced against them. At this age the father, in the presence of several Jews, declares that he is no longer chargeable for the sins of his son. Jewish girls are accounted of full age at 12 years and a day old.

Marriage is reckoned the indispensable duty of every Jew. Men who live in celibacy long after eighteen are considered by the rabbis as living in sin. Polygamy is sanctioned by the Talmud, but is not practised by the European Jews. The betrothing sometimes takes place six months or a year before the marriage. Ten men at least must be present at the marriage, otherwise it is null. A velvet canopy is brought into the room where the ceremony is to take place, and extended on four poles. Under this canopy the bride, having her face covered with a veil, is led by two women, and the bridegroom by two men; these are always their parents, or near relations. After a short prayer the bride and bridegroom drink of the wine which is offered them by the rabbi. A ring is used, as at Christian marriages. The marriage contract is next read ; and as soon as the reading is ended, the priest takes another glass of wine, and repeats seven benedictions; then the married couple drink the wine; after which the empty glass is laid on the floor, and the bridegroom stamping upon it breaks it to pieces, indicating by this the frailty of life. The company next shout, "Good luck to you !" The ceremony is concluded by a contribution for the poor in the land of Canaan, and a nuptial feast.

A Jew is at liberty to divorce his wife at any time, or for any cause; but in order to counteract the consequences of this liberty, the synagogue has ordered a great many formalities to be observed, which allow time for the parties to become cool, and to reconsider the matter. When the divorce takes place, the parties are not allowed to marry again, nor to be together by themselves: if the woman has been divorced for adultery, she cannot marry her paramour. A man at a distance from his wife, may send her a bill of divorce by a messenger, which is legal, provided the messenger is specially appointed—heard the husband order the notary to write the bill—saw it written and signed—received it from the husband in the presence of two subscribing witnesses, with a special and formal commission, and provided he delivers it to the woman in the presence of two witnesses, with a prescribed declaration of its nature. A girl betrothed under ten years of age is entitled to a divorce any time before she arrives at the age of twelve years and a day, simply by declaring before two witnesses, who write out her declaration, that she will not marry the man; this is called a divorcement of dislike.

In reading the Jewish prayers for the sick, it is customary in cases of great and imminent danger, to change the name of the sick person, under the belief that thus the sentence of death which may have been issued against him in heaven may be averted or evaded. There is a particular form in their liturgy for changing the name, in which it is said to be done with the knowledge of God, and the approbation of the celestial tribunal; and that his change of name may annul all hard decrees, and reverse the sentence which may have passed against him. In this prayer, he is represented as another man, an infant just born, &c. When a Jew dies, all the water in the same and adjoining houses is instantly thrown away, and no priest must, on any account, remain in any of these houses till the body is removed. Immediately on his decease, the body is stripped and laid on the floor, with clean straw under it, and watched by a Jew till the ceremony of cleansing it with warm water is performed. During this ceremony great care must be taken that no water enters the mouth of the corpse. Near it are placed a lighted taper, a basin of water, and a clean towel, that the soul may cleanse itself from the defilements it contracted in this world. For this purpose it is supposed to return to the place every night for a month, during which period the things are kept in the room, and the water is changed every night. In cases where the relations of the deceased are too poor to defray the expence of this ceremony, a subscription is made by the richer Jews; and a few years ago a society was established in London for this purpose—so very sacred and imperative is this ceremony esteemed. The Jews do not make use of close coffins, but only four plain boards loosely joined together. This is done in order that the worms may the sooner destroy the body. The talleh, or square garment with fringes, is put over the sepulchral garment. At the place of interment, the coffin is opened, and some earth, said to have been brought from Jerusalem, is placed under the head in a small bag, or strewed about the body. The relations and friends of the deceased then take hold, one after the other, of his great toes, imploring him to pardon all their offences against him, and not to report evil against them in the other world. The nearest relations rend their garments. When the coffin is placed in the grave, each of the relations throws some earth on it. As soon as the grave is filled, all the attendants run away lest they should hear the knock of the angel, who is supposed to come and knock on the coffin, and to ask the deceased if he can repeat the passage in scripture which has an allusion to his name: if he is not able to repeat it, the angel beats him with a hot iron till he breaks his bones. When the relations return from the funeral, they all sit down on the floor, and eat a small portion of hard boiled eggs, salt, and bread, in order to break the fast which they are supposed to have kept from the moment of the decease of their relation. Morning and evening, ten Jews who have passed the age of thirteen repeat prayers for the dead ; and at the close of these prayers, the nearest male relatives repeat the Kodesh, a prayer which is supposed to deliver the deceased from hell. The Jews believe in a resurrection, but the rabbis say it will take place in the land of Canaan, and that Israelites buried in other countries will be rolled thither through subterranean caverns; hence Jews in neighbouring countries, if rich, are removed into Canaan before they die. On the decease of a brother, sister, wife, daughter, or son, the upper garment is cut on the right side, and then rent about a hand-breadth in length ; but on the death of a father or mother, the rent is made on the left side in all the garments. The mourning continues seven days, during which no business is to be transacted, nor is the house to be left; but the mourners are to sit on the ground without shoes, and to give free access to every visitant: they must not shave their beards, cut their nails, or wash themselves for 30 days.

There are very particular rules laid down by the rabbis respecting the materials, form, and colours of the garments to be worn by the Jews; but in general they conform to the mode of dress in the country where they reside. It is, however, deemed unlawful to wear any garment made of linen and woollen woven together, or made with either of these and sewed with the other. Every male is required to have a quadrangular garment, called taleh. It consists of two quadrangular pieces of woollen or silk joined together at the upper edge by two fillets. These rest on the shoulders, and the pieces hang down, one on the back, and the other over the breast. This is constantly worn as an inner garment. From each of the corners hangs a fringe, consisting of eight threads, and tied with five knots. The sanctity of this garment is supposed to depend upon these fringes. The threads composing them must be of wool that has been shorn, not pulled, and spun by a Jewess for the express purpose. There are also minute and very particular regulations regarding the colour and the folding of the threads. The talleh is not required to be worn at night, nor is the wearing of it obligatory on women, servants, or young children. It is never to be sold or pledged to a Christian. Other appendages of Jewish devotion are the phylacteries, one for the head, and one for the arm. The former is made of skin or leather stretched on a block, and sewed so as to form a leathern box, divided into four compartments, having impressed on one side of it the letter Shin, and on the other a character resembling that letter, only with four points instead of three. In the compartments are inclosed four passages of the law, written on parchment, which is bound round with hair pulled from the tail of a cow, and well washed. The strap which fastens the phylactery to the head ought to be black on the outside, and any colour except red on the inside. It is fastened in such a manner, that the little box including the parchments rests on the forehead below the hair, so that the divine precepts may be fixed in the brain. The phylactery for the arm is nearly similar, except that it has only one cavity, and is without the impression of the letter Shin. It is fastened to the naked skin, on the inner part of the left arm, so as to be near the heart. It would be tiresome to enumerate the directions for tying on these phylacteries, which are excessively minute and multifarious. Besides phylacteries, there are schedules for door-posts, which are generally placed on the right hand of the entrance, and touched or kissed by such of the Jews as wish to be deemed very devout.

No synagogue can be instituted except there be at least ten men who have passed the age of thirteen. The highest ground is chosen, and no Jew is permitted to build a house of superior or even equal height. In prayer, their faces are always turned towards the land of Canaan; the door of the synagogue, therefore, is always placed at the opposite point of the compass. A closet or chest called the Ark, in which the book of the law is deposited, is opposite to the entrance into the synagogue. Every copy of the Pentateuch must be in manuscript. The rabbis have laid down rules for transcribing it, which must on no account be omitted or infringed. The ink employed is to be made of prescribed ingredients. The book itself is to be in the form of a roll. Near the middle of the synagogue is a desk or altar where the law is read, and sermons delivered. No seats are admitted between the altar and the ark. The women are not allowed to sit with the men, and they are even screened from their notice by a wooden lattice. In each synagogue there is a reader or chanter, clerks for the management of pecuniary matters, besides inferior attendants. The general business of the congregation is superintended by wardens or elders. The privilege of folding and unfolding the law, and of performing other public services, is accounted a high honour, and, as such, is put up to public auction. The money arising from these sales is paid into the general stock of the synagogue.

In every country there is a chief, or presiding rabbi, who exercises not only a spiritual, but also a civil, jurisdiction: his authority is kept up by ecclesiastical censures, excommunications, &c. The title of rabbi is little more than an honorary distinction, and is easily obtained by any individual well versed in the Talmud.

The Jewish religion is, perhaps, more a religion of minute and trifling rites and ceremonies, than even the Catholic religion. The minutest circumstances in dressing and undressing, washing and wiping the face and hands, and other necessary actions of common and daily life, are enjoined by the rabbis to be performed exactly according to the prescribed regulations. Their prayers also are numerous, and some of them relate to the most trifling circumstances. Those esteemed the most solemn and important are called *Shemoneh Esreh*, or the Eighteen prayers, though they actually consist of nineteen, the last having been added against heretics and apostates. They are enjoined to be said by all Jews above the age of thirteen, wherever they may be, three times a-day. The members of the synagogue are required to repeat at least a hundred benedictions every day. A son who survives his father is enjoined to attend the nocturnal service in the synagogue every evening for a year, and to repeat the Kodesh, in order that his father may be delivered from hell. This service may be suspended by any person going up to the desk and closing the book. This is not unfrequently done in case of quarrels; and the prayers cannot be renewed till a reconciliation takes place.

Nothing is to be undertaken on a Friday which cannot be finished before the evening. In the afternoon they wash and clean themselves, trim their hair, and pare their nails. They begin with the left hand, but think it wrong to cut the nails on two adjoining fingers in succession. Even the parings are directed by the Talmud to be disposed of in a particular manner; for it says, "he that throws them on the ground is an impious man; he that buries them is a just man; he that throws them into the fire is a pious and perfect man." Every Jew, of whatever rank, must assist in the preparation for the Sabbath. Two loaves, baked on the Friday, are set on a table. This is done in memory of the manna, of which a double portion fell on the sixth day of the week. The table remains spread all the Sabbath. Before the sun is set, the candles are to be lighted; one at least with seven wicks, in allusion to the number of days in a week, is to be lighted in each house. The Talmudical directions respecting the wicks and oil form part of the Sabbath evening service; they are most ridiculously and childishly minute. The lesson appointed for the Sabbath is divided into seven parts, and read to seven persons at the altar. The first called up to hear it, is a descendant of Aaron, the second of Levi, the third an Israelite of any tribe; the same order is then repeated; the seventh may be of any tribe. The portion read from the law is followed by a portion from the prophets. There are three services, morning, afternoon, and evening. On their return from the last, a wax candle, or a lamp with two wicks, is lighted, and held by a child. The master then takes a glass of wine in his right hand, and a box of spices in his left. After a prayer, a little of the wine is spilled on the floor; and the wine being taken in the left, and the spices in the right hand, after another prayer, he and all the family smell to the spices, and taste the wine. This ceremony is called

Habdala, or the separation, because it separates the Sabbath from other days. The works forbidden on the Sabbath, according to the rabbis, may be reduced under thirty-nine general heads; of which writing, blotting out, ruling paper, kindling a fire or quenching it, form some. Other forbidden actions are brought under these heads by a very forced analogy. Thus, curdling milk is included under the forbidden head of building, because a whole is formed by the composition of different bodies. Filling ditches is deemed unlawful, and therefore some rabbis have forbidden the sweeping of a room on the Sabbath, lest any furrow or chink in the floor should be filled by the operation. Walking over new ploughed ground is also forbidden, lest a hole should thus be filled up. A tailor must not go out of doors with a needle stuck in any of his clothes. The use of stilts is prohibited, because, though the stilts seem to carry the man, yet in fact the man carries the stilts, and to bear a burden on the Sabbath is unlawful. Dirt on the coat, &c. may be scraped off with the nails while it is moist, but not if it is dry, because thus it would raise some dust, and that would resemble grinding or breaking to pieces.

The vulgar Jewish chronology reckons only 1948 years to the birth of Abraham, and in several other particulars it is at variance with the Bible. The modern Jews follow the practice of their ancestors, while in Egypt, of commencing the year at the autumnal equinox. The present Jewish calendar was settled by Rabbi Hittel, about the middle of the 4th century of the Christian era, and is constructed with great ingenuity and astronomical exactness, not equalled by Christians till the improvement of the Julian calendar by Pope Gregory.

Of the festivals of the Jews we can mention only a few, and those merely in a cursory manner. The principal are those of the new moon, of the Passover, of Pentecost, of the new year, the fast of atonement, and the feast of tabernacles. That the festival of the new moon might be celebrated as nearly as possible on the day of the moon's conjunction with the sun, most of the months contain alternately twenty-nine and thirty days; and the feast of the new moon is held on the first, or on the first and second days of the month; the women are not allowed to work, the men may. Good eating and drinking particularly distinguish this festival. The feast of the Passover commences on the 15th day of the month Nisan, and continues among Jews who live in or near Jerusalem seven days, and elsewhere eight days. The Sabbath preceding is called the Great Sabbath, and is kept with most scrupulous strictness. The mode and materials for making the unleavened cakes for the Passover, are most minutely described by the rabbis, as well as all the ceremonies of this feast. It is customary for every Jew to honour it by an exhibition of the most sumptuous furniture he can afford. The table for the feast is covered with a clean linen cloth, on which are placed several dishes; on one is the shank bone of a shoulder of lamb or kid, and an egg; on another, three cakes, wrapped in two napkins; on a third, some lettuce, parsley, celery, or other herbs; these are their bitter herbs. Near the sallad is a cruet of vinegar, and some salt and water. There is also a dish, representing the bricks which their forefathers were required to make in Egypt: this is composed of apples, almonds, nuts, and figs, formed into a paste, dressed in wine and cinnamon. The first two days, and the last two, are kept with particular solemnity and strictness. Contracts of marriage may be made, but no marriage is to be solemnized during this festival. The feast of Pentecost, on the 6th day of the month Sivan, continues two days, and is kept with the same strictness as the first two days of the Passover. It is a received opinion of the Jews, that the world was created on the day of their new year; and they therefore celebrate the festival of the new year by a discontinuance of all labour, and by repeated services in the synagogue. The fast of atonement is on the 10th day of Tisri; the first ten days of the month are called days of penitence, during which the Jews believe that God examines the actions of mankind, but he defers passing sentence till the tenth. On the eve of the fast, a ceremony, evidently designed as a substitute for their ancient sacrifices, is performed; this consists in killing a cock, with great formality. The cocks must on no account be red; white is the preferable colour. Before the fast begins, they endeavour to settle all their disputes. In the afternoon they make a hearty meal, to prepare for the fast, which is of the most rigid kind. The feast of tabernacles commences on the 15th of Tisri, and is kept nine days. Every Jew who has a court or garden is required to erect a tabernacle on this occasion, respecting the materials and erection of which the rabbis have given special directions. The eighth and ninth are high days, particularly the last, which is called the day of the rejoicing of the land.

The Jews are not permitted to taste the flesh of any four-footed animals, except those which both chew the cud and part the hoof; nor any fish, except such as have both scales and fins; they are not to eat the blood of any beast or bird. Cattle for their use must be slaughtered by a Jew, duly qualified and especially appointed for that purpose. If the carcase has the least blemish, it cannot be eaten; if it is perfectly sound, he affixes to it a leaden seal, with the word *casher*, right, and the day of the week. If there be no Jew butcher, a Jew appointed by the synagogue is stationed at the Christian butcher's, to superintend the cutting up of the carcase, and to affix the seal. The hind quarters are not to be eaten unless the sinew of the thigh is taken out. A cow and her calf, an ewe and her lamb, a she goat and her kid, must not be killed in the same day. The knife used for slaughter must be very sharp and free from notches. Meat and butter must not be eaten together, on account of the law, "not to seethe a kid in his mother's milk." For this reason, also, they make their cheese without rennet. No knife, fork, spoon, or culinary vessel, used for meat, is to be used for milk.

Such are the opinions, traditions, rites and ceremonies, of the great majority of the modern Jews; but besides these, there is, a small sect denominated Caraites, that is, textualists—persons attached to the text of the Scriptures. They reside chiefly in the Crimea, Lithuania, and Persia, and at Damascus, Constantinople, and Cairo; their whole number is very inconsiderable. They agree with other Jews in denying the advent of the Messiah. The principal difference between them consists in their adherence to the letter of the Scripture, and in their rejection of all paraphrases and interpretations of the rabbis. They also differ from the rabbis in various particulars respecting the feasts of the Passover, Pentecost, and Tabernacles. They observe the Sabbath with far greater strictness; they extend the degrees of affinity within which marriage is prohibited, but they are more strict in matters of divorce.

See Josephus' *Jewish Antiquities, and his own Life*; *Histoire de la Religion des Juifs pour servir de continuation à l'Histoire de Josephe, par* Basnage; Tovey's *Anglia Judaica*; *Monthly Magazine*, vol. i. for the year 1796; *Gentleman's Magazine* for 1810 and 1811; *Modern Judaism, by* John Allen. (w. s.)

IGNATIUS Loyola. See Loyola.

IGNIS Fatuus, commonly called *Will i'the Wisp*, or *Jack and the Lanthorn*, is a meteor which is commonly seen in dark nights, in marshy grounds and other damp places. A full account of it will be given under the article Meteors.

IGUANA. See Herpetology.

JHANSU-JEUNG. See THIBET.

JIDDA, JEDDA, JODDA, ZIYIA, or DSCHEDA, is a small trading town of Arabia Felix, situated in the district of Tahamah, about 40 miles distant from Mecca, north latitude 20° 28′ 1″, and east longitude from Greenwich 39° 16′ 45″. It is defended by a fort, and surrounded by a ruinous wall, built in the year 1514. Its harbour is very extensive, formed by numberless reefs of Madrapore, extending about four miles from the shore, and full of small islands and sunken rocks. The entrance is sufficiently dangerous, but the pilots are expert, steering safely by the eye alone, and easily perceiving the rocks below the smooth surface, especially when the sun is behind the vessel. Between these shoals and islands are deep channels, with a good bottom, where ships may lie at anchorage in six or twelve fathoms, and where the water is as smooth as glass, in the heaviest gales. The surrounding country is sandy, barren, and destitute of water, and the town is very ill supplied with provisions. A desert plain to the eastward is occupied by Bedouins, or country Arabs, who live in huts made of long bundles of bent grass, or spartum, and who supply the inhabitants of Jidda with milk and butter. The situation is as unwholesome as it is unproductive; and, besides several stagnant pools in the vicinity, the north-west wind, which chiefly prevails, blowing along the direction of the gulf, brings a great dampness through the greater part of the year. The highest degree of the thermometer observed by Mr. Bruce in July was 97°, and the lowest 78°. The barometer in June was between 26° 6′, and 25° 7′; wind north-west. The town of Jidda derives all its celebrity, and even its existence, from its vicinity to the city of Mecca, to which it is the nearest sea-port, and the great receptacle of the India trade, which arrives once a-year. The inhabitants of the place, indeed, derive little advantage from this rich traffic, which passes on to Mecca, and for which the payments return to the ships, without leaving much profit by the way to the townsmen. The influx of strangers, on the contrary, raises the price of provisions; and the native traders, after the market is over, which does not last above six weeks, retire to Yemen and the neighbouring countries, where every article of subsistence is found in abundance. Jidda, however, is also the great depot of all merchandize intended to be carried to Suez for the demands of Egypt; and great multitudes of the inhabitants find employment in landing and re-shipping these goods, in providing warehouses for their safe deposit, and in acting as factors in receiving and disposing of them. The English traders, in 1777, made an attempt to carry their cargoes directly to Suez, without passing them through Jidda into native vessels; and this trade, which continued about three years, was encouraged by the Egyptian Beys, as the English merchants paid them twice as much impost as the Jidda importers. But the Sheriffe of Mecca, who draws the customs of the port of Jidda, procured an order from the Grand Seignior, that all vessels bound for Egypt should stop at Jidda, and pay duty there; and obliged the merchants, when once in his harbour, to unship their goods, and send them forward to Suez in other vessels. The Sultan secured a share of these profits, and regularly appointed a pasha, who resided in the citadel of Jidda, and divided the receipts of the custom-house with the Sheriffe's Vizier. During the convulsions of Egypt, and the insurrections of the Wachabees, the Sheriffe contrived to expel the representative of the Sultan, and to appropriate the whole duties to himself. His extortions, however, in the name of presents to himself and his servants, have caused a great diminution of the trade formerly carried on by the English with Jidda; and many of the richest merchants have retired from the place. The Sheriffe, made aware of his folly by the reduction of his revenues, has become more moderate in his demands. The duties recently proposed amount to about eight per cent. and the presents to about half as much; but a merchant, when once in the harbour, from which he could scarcely escape without a native pilot, could never be secure against further demands. See Bruce's *Travels*, vol. ii.; Parson's *Travels;* and Valentia's *Travels*, vol. iii. (*q*)

ILANTZ, in the Rhetian language *Ilan* or *Ilon*, a town of Switzerland, in the territory of the Grisons, and the capital of the division of the Grey League. The town is situated in the widest part of the valley of the same name, at the foot of the mountain Mundaun, or Karlisberg. It is the first town that we meet with on the Rhine, and is the only town in the world where the Rhetian language is still spoken. It has two fauxbourgs, viz. that of St. Nicholas, and that of Portasura. The bridge built over the Rhine is remarkable. The inhabitants profess the reformed religion. The women in the neighbourhood are very much subject to the Goitre necks.

The tribunal of the Grey League meets at Ilantz, Thousis, and Trons, in rotation; but it is at Ilantz that the archives of the League are preserved. A great fair for cattle is held at Ilantz. Excellent fish, about 22 pounds weight, are caught in the Rhine.

At Rouvis, above Ilantz, on the left bank of the Rhine, a mine of galæna, containing silver, has been wrought. The mineral is contained in nests in the gneiss. The mine of Rouvis, and one of yellow copper at Ober-Sax, have been wrought since the year 1806 by M. Demengha. In descending the valley of Ilantz, the rocks are composed of argillaceous schistus as far as Tamino. See Ebel's *Manuel d'une Voyageur en Suisse*, tom. iii. p. 227.

ILAY. See ISLAY.

ILCHESTER, or IVELCHESTER, the *Ischalis* of Ptolemy, is a borough and market town of England, in Somersetshire. It is situated on the river Yeo, over which there is a stone bridge of two large arches, and consists of four streets, which are but indifferently built. The only remaining church out of six is dedicated to St. Mary, and has an octagonal tower 50 feet high, constructed of Roman stone. There are also places of worship for the dissenters. The assizes were formerly held here under a patent granted by Edward III. but they are now only held here in rotation with Wells, Taunton, and Bridgewater. The county court-house is a good building, and so is the new county gaol, which is built on Mr. Howard's plan. Opposite to it, on the other side of the river, stand the remains of the ancient hospital of White-hall, founded about 1226, by William Dennis or Dacus, for the entertainment of pilgrims or poor travellers. There is also to be seen here the remains of a house of Black Friars, which had a subterraneous passage leading to the White-hall nunnery.

When this part of the country was in the possession of the Romans, Ilchester was one of their principal stations, and was fortified with a strong wall and deep ditch, which they filled with water from the Ivel. Vestiges of these ancient works are still visible. There are held at Ilchester three fairs annually. The manufacture of thread lace, which was once considerable, has now declined; but it has been succeeded by a small silk manufactory. This town is famous as being the birth-place of the celebrated Roger Bacon. The following is the population of the burgh and parish for 1811.

Number of inhabited houses	85
Number of families	140
Do. employed in trade	42
Population	610

See Collinson's *History of Somersetshire*; and the *Beauties of England and Wales*.

ILFRACOMBE is a sea-port and market-town of England, in the county of Devon. It is situated on the sides and at the base of steep ground on the borders of the Bristol Channel. The town contains a number of good houses for the accommodation of bathers, which extend along the side of the harbour, and for nearly a mile to the west of it, where there is a good pebbly shore, and convenient bathing machines. The church stands in the upper part of the town. It is a large plain structure, and contains a handsome monument, erected at the national expence, to the memory of Captain Bowen.

The harbour of Ilfracombe resembles a natural basin, surrounded by craggy heights, covered with foliage. The rocks ascend in a semicircular sweep on three sides, and on the north side a mass of rock projects nearly half way across the mouth of the recess, and protects the little cove from the northern tempests. This rock rises almost to a point where a light house, resembling a church, is erected. "Along the side of the same rock," says Mr. Warner, in his *Walk through the Western Counties*, "to the opening of the harbour, runs an artificial pier, judiciously constructed, to prevent the accumulation of the sand; so that by the joint assistance of the natural barrier, and this piece of masonry, ships of 230 tons burthen may ride completely land-locked, and of course perfectly safe from all the violence of the weather." Before the year 1731, this pier was 850 feet long; but having been destroyed by the wind, an act of parliament was passed for repairing and enlarging it and the harbour. It was partly rebuilt, lengthened, and enlarged, in 1760, by Sir Bourchier Wrey, Bart.

There is a daily intercourse, by means of a packet, which sails every other tide, with the town of Swansea, on the opposite coast of Wales.

On a high point near the bay, is a summer house, erected by Sir Bourchier Wrey, which commands a fine prospect. Watermouth, the seat of Joseph Davie, Esq. is beautifully situated on an eminence about three miles to the east of the town.

The vessels which belong to Ilfracombe are chiefly employed in the coasting trade, in conveying ore, corn, &c. from Cornwall and Devonshire to Bristol, and also in fishing.

The following was the population of the town and parish in 1811.

Number of houses	434
Number of families	434
Do. employed in trade	118
Do. in agriculture	57
Population	1934

See Polwhele's *Survey of Devonshire*; Mason's *Observations on the Western Counties*; and the *Beauties of England and Wales*, vol. iv. p. 267.

ILIAC PASSION. See MEDICINE.

ILIAD. See HOMER.

ILLE AND VILLAINE, is the name of one of the north-west departments of France, which derives its name from the Ille and Villaine, two rivers which unite at Rennes, the capital of the department. The soil of this department is in general ill fitted for culture, nevertheless, below Rennes and St. Malo, corn, hemp, and fruits, are produced in abundance. At a short distance from Rennes is the farm of Prevalais, where the butter is made that is so famous in every part of France. The inland commerce of this department consists principally of its natural productions, which are, corn, lint, hemp, wood, cattle, butter, mines of lead, oysters, and fish. The department contains 7185 square kilometers, or 364 square leagues. The forests, of which three-fourths belong to the nation, occupy 54,000 or 55,000 acres. The contributions in the year 1802 were 421,093 francs; and the number of inhabitants is 488,605. The principal towns are,

	Population.
Rennes	25,904
St. Malo	9,147
Vitré	8,809
Fougeres	7,297
Redon	3,783
Montfort	1,118

ILLEGITIMACY. See LAW.

ILLINOIS, one of the western territories of the United States, is situated between 37° and 42° 30′ N. Lat. and 10° 25′ and 14° 25′ W. Long. from Washington; and is bounded on the north by the North-Western Territory of the United States, south by the Ohio river, separating it from Kentucky, east by Indiana, and west by the Mississippi river, which separates it from the Missouri Territory. This beautiful country stretches on a line from south to north 357 miles, and from east to west 210 miles, having an area of 61,000 square miles, or 39,041,000 acres. A great part of the territory yet belongs to the United States, subject to be sold at not less than two dollars per acre to individuals. In the north a tract of 3,500,000 acres has been appropriated as bounty lands for the soldiers who served in the war with Great Britain, in 1812–13–14–15. Until the year 1818, Illinois was under a territorial government. At the first session of the fifteenth Congress, an act was passed to enable the inhabitants to form a constitution for their government, with the right of admission into the Union as an independent state. The face of the country is beautifully variegated; in the south generally level, in the middle more elevated, in the north hilly, but no where mountainous: the soil is uniformly fertile, being well adapted to the culture of all kinds of grain, grass, fruit, flax, and hemp. Cotton succeeds in the southern sections. The climate is temperate, and agreeable. Minerals are found in considerable abundance; the principal of which are, coal, salt, flint, copper, lead, and iron. No country is better watered; being washed on the west by the Mississippi, and on the south by the Ohio rivers, and intersected by the Illinois, Wabash, Kaskaskia, and Stony rivers, besides innumerable streams of less magnitude. Illinois is divided into fifteen counties, viz.—Bond, Madison, St Clair, Monroe, Randolph, Jackson, Johnson, Pope, Gallatin, White, Edwards, Crawford, Union, Washington, and Franklin. The population is rapidly increasing. In 1810 it consisted of 12,282. It is probably now about four times that number. The chief town is Kaskaskia, with a population of 1200. The surplus produce of this country will naturally descend the Mississippi to New Orleans; and will soon render the inhabitants wealthy. From the temperature of the climate, the fertility of the soil, the facility of transportation, and many other advantages favourable to society, Illinois will shortly become a populous state.

The banks of the rivers abound with buffaloes, deers, elks, turkeys, ducks, teal, geese, swans, cranes, pelicans, pheasants, partridges. The sturgeon and the picannau, and plenty of fish, are found in the rivers.

The vegetables of this district are, the oak, hiccory, cedar, mulberry, hops, dying drugs, medical plants of various kinds, and excellent wild grapes, from which, in the year 1797, the French settlers made 110 hogsheads of strong wine.

Before the year 1756, the French had settlements at Kaskaskia, Cahokia, &c. but they were at that time driven out by the British, who held the country till the revolution.

ILLUMINATI, a secret association which existed in Germany, some time previous to the French revolution, and which has been supposed to have been connected with the masonic institutions on the continent. This association was founded in 1775, by Dr. Adam Weishaupt, professor of canon law in the University of Ingolstadt. The professed objects of the institution were, to introduce more enlightened ideas of government, to disseminate a knowledge of the sciences, and to promote the interests of virtue; but its members have been accused, not without some appearance of reason, of inculcating speculative opinions, equally hostile to the principles of sound religion and social order.

Soon after the commencement of the French revolution, the attention of the public was eagerly directed towards the plan and objects of this association, which then indeed no longer existed, but whose members were supposed to have exercised no inconsiderable portion of activity and influence, in producing the peculiar temper, and directing the political events of the times; and the works of the Abbé Barruel and Professor Robison, in which the secret views and active exertions of the order were sought to be developed, were perused with extraordinary interest and avidity. It seems, now, however, to be pretty generally acknowledged, that these, and other authors, were induced to ascribe to this institution an extent and an influence, which in reality it never possessed; and that, in particular, the secret machinations and wicked practices of the illuminati were excessively magnified by the heated imagination of the French priest, and the honest credulity of our distinguished countryman. The history of the order of the illuminati indeed is involved in much obscurity; and this circumstance, which has led some, perhaps naturally enough, to overrate its influence, (*omne ignotum pro magnifico*) affords to our mind no mean evidence of its insignificance. Time, however, has contributed to diminish the imaginary importance of this formidable association; and the following short statement contains the general result of all the information we have been able to obtain, relative to this once interesting, but now almost forgotten subject.

It is well known that since the period of the reformation, the various states and principalities of the German empire were not more strictly defined by territorial limits, than by different professions of faith. Throughout those provinces which had adopted the new doctrines a spirit of liberal enquiry was excited, which, if unobstructed by other causes, promised to prove highly beneficial to science, and to the interests of humanity; while, at the same time, the diffusion of useful knowledge and enlightened opinions was generally encouraged, in a greater or less degree, by the different governments. A sort of rivalry, indeed, took place among the several principalities, and each, according to its means, endeavoured to surpass its neighbours in the number and the splendour of its literary institutions. In those states, on the other hand, which adhered to the doctrines and discipline of the Romish church, an opposite line of policy was pursued by the rulers. Afraid, it would seem, lest the light of science should dispel those ancient prejudices, upon which they conceived that the security of their civil and religious establishments principally depended, they endeavoured to insolate themselves from their more enlightened neighbours, to exercise a species of *surveillance* over the intellects of their subjects, by means of edicts levelled against the commerce of literature, and to oppose the antidote of ignorance to the contagion of knowledge. But it was no easy matter to exclude this dreaded pestilence, or to keep the sick separate from the uninfected, in a country whose inhabitants boasted one common origin, and spoke one common language, and possessed the means of frequent intercourse with each other. Some scattered rays of the surrounding light would easily penetrate the intervening gloom,—enough at least to shew those upon whom they fell the darkness in which they were placed, and to excite in them a desire for a more extensive prospect. In none of the provinces of Germany was this interdiction of literature more strictly and oppressively exercised than in Bavaria, under the bigoted administration of the elector Charles Theodore; and accordingly, it is precisely in this province that we find the natural result of such absurd and barbarous policy. Men of enlightened minds could not fail to look with abhorrence upon regulations, which were calculated to check the natural progress of knowledge, and would readily endeavour to concert the means of evading the existing laws. These means, however, could only be concerted in secret; and to this simple origin, we believe, the institution founded by Weishaupt may truly be ascribed, however widely the conduct of its members may have afterwards deviated from the original object. There is undoubtedly something dangerous in the very nature and constitution of such a secret association, however pure the intentions of its founders may have been. Secrecy implies something illegal in the object; and such a society being under no regular control, its views may easily become enlarged, and its influence perverted to improper purposes. Some zealous enthusiasts among the illuminati may have contemplated the possibility of directing the existing governments, by means of the powerful but pacific influence of a secret association; others, imbued with the absurd theory of the infinite perfectibility of the human mind, may have considered such an institution as calculated to promote their romantic and unattainable views; while a third class, perhaps, consisting of men more cunning than enthusiastic, full of ambition, but destitute of principle, may have looked upon a society so constituted as best adapted to the concoction of their wicked designs. Yet the society of the illuminati never seems to have acquired any extensive influence; nor does it appear to have possessed any ramifications beyond the limits of Germany. Throughout the whole of that large empire it produced no extraordinary or permanent effects; and a few years after the suppression of the order in 1787, it was nearly forgotten in the very country where it had boasted an ephemeral existence. It was chiefly on account of its supposed influence in producing the catastrophe of the French Revolution, that the ashes of this short-lived association were raised up from the charnel-house of oblivion, and a degree of posthumous celebrity conferred upon its proceedings. The supposition, however, is entirely unsupported by evidence, and has been sufficiently refuted by M. Mounier and others.

But whatever may have been the extent, influence, and real objects of this society, there can be no doubt that its constitution was illegal, and the opinions and practices of its members highly dangerous to civil and religious government. The suppression of the order, therefore, was justifiable upon every principle of right and expediency. A great mass of publications has appeared upon the subject of this article; but the substance of the whole will be found in the works of the Abbé Barruel, Professor Robison, and M Mounier. (z)

ILMINSTER, a market town of England, in the county of Somerset. It has a low but healthy situation, at the intersection of two great roads, one from London to Taunton, and the other from Bristol to Exeter. Many of the houses, which are principally arranged along these roads for the length of a mile, are good stone and brick buildings; but the greater number are built from old walls, and are covered with thatch. The church, which is a fine Gothic building, is 120 feet long and 50 wide. A handsome quadrangular tower rises in the centre, surmounted by 12 pinnacles. In the north transept of the church is an ancient tomb, erected to the memory of Nicolas Wadham and his wife, who founded Wadham College, Oxford. In the centre of the town is a new built market-house and shambles. An excellent free school was founded here in 1550, by Humphry Waldron and Henry Greenfield, and well endowed. The cloth manufacture once flourished here in a very great degree, but, though still considerable, it has greatly decreased. Ilminster is surrounded with fine orchards, and very extensive prospects are commanded by the neighbouring eminences.

The following is the abstract of the population for the town and parish for 1811:

Number of houses	365
Number of families	403
Families employed in trade	251
Do. in agriculture	121
Males	1022
Females	1138
Total population	2160

See the *Beauties of England and Wales.*

IMAGE. See OPTICS.

IMAGINARY EXPRESSIONS or QUANTITIES, or impossible quantities in Algebra, are such as have the symbol $\sqrt{-1}$ in their analytic expression. They are so called, because the square root of a negative quantity can have no real existence; for whether a quantity be positive or negative, its square is a positive quantity.

The origin and nature of imaginary quantities have been explained in our article ALGEBRA, § 189—193. They are there shewn to be of two distinct kinds, one which is altogether impossible, and can denote no real quantity; and another which denotes real quantities.

The first class, when reduced to their most simple expression have this form $a+\sqrt{-b^2}$, or $a+b\sqrt{-1}$, where a may in some cases be $=o$. These occur, when a problem is to be resolved which from its nature requires that the *data* be contained within certain limits in respect of magnitude, while at the same time, in the particular case proposed, they pass those limits.

For example, if it be required to construct a right angled triangle, the hypothenuse of which shall be equal to a given line a, and one of the sides equal to another given line b; from the nature of the case, a must be greater than b; and if, in the particular state of the *data*, a be less than b, the thing required cannot be done.

The unknown side of the triangle expressed in symbols, algebraically is $\sqrt{(a^2-b^2)}$; now, if b be greater than a, the quantity a^2-b^2 is negative, and the expression for the side of the triangle has the form $\sqrt{-n^2}=n\sqrt{-1}$, which is imaginary. The impossibility of giving a significant numerical value to this symbol corresponds, in this instance, to the impossibility of placing between a given point, and a straight line given by position, a line of a given length, that is shorter than the perpendicular from the point on the line, or, which is the same, of determining the intersection of a straight line, and a circle which lies wholly on one side of the line.

In GEOMETRICAL *Problems*, passing the first order, the unknown quantities are determined either by the intersection of a straight line with a curve, or else by the intersection of two curves: Now, although it may be possible that the conditions to be fulfilled in a problem may be all satisfied at once, yet in many cases there will be limitations of the *data*; for example, by one condition a straight line may be required to be of a given length; and by another, that its extremities be on the circumference of a given circle. These can only be satisfied at once, when the straight line is less than the diameter. In like manner, one condition requiring that a straight line touch a circle, and another, that it pass through a certain point, can both be satisfied only when the point is without the circle. When the *data* of a problem are in this way limited, as often as they cannot be all satisfied at once, the incongruity is indicated geometrically, by there being no intersection of the lines, which should meet and determine the unknown quantities; and algebraically, by the impossible symbol $\sqrt{-1}$ entering into their values, and in such a way as not to admit of its being eliminated. The presence of the symbol $\sqrt{-1}$, in the algebraic expression for a quantity, serves not only to shew the impossibility of finding that quantity in the particular state of the *data*, but it also indicates the boundary which separates the possible from the impossible cases, and thus determines the greatest and least values that can be given to the different quantities concerned in the problem.

For example, let it be required to find a fraction which, together with its reciprocal, shall be equal to a given number, and also the limits within which the problem is possible.

Calling the fraction x and the given number $2a$, the condition to be satisfied will be expressed by this equation

$$x+\frac{1}{x}=2a,$$

which produces the quadratic equation $x^2-2ax=-1$; and, this resolved, gives

$$x=a\pm\sqrt{(a^2\ \ 1)}.$$

From this expression, it appears that the problem is impossible if a be a fraction, positive or negative, between the limits of $+1$ and -1; because then a^2 will be less than 1, and a^2-1 a negative quantity, and $\sqrt{(a^2-1)}$ an impossible quantity. However, if a be a positive quantity not less than $+1$. or a negative quantity not greater than -1, (here we reckon -2 to be less than -1, and -3 less than -2, and so on,) the problem will always be possible, and, excepting the cases $a=+1$, and $a=-1$, x will have two values, which will be reciprocals of each other, because their product is unity.

It also appears that the least positive value of the expression $x+\frac{1}{x}$ is $+2$, and its greatest negative value -2, reckoning, as before, that negative quantity to be greatest, which, independently of the sign, is expressed by the smallest number.

Hence, we learn that no real value of x can be found that shall make the expression $\frac{1}{2}\left(x+\frac{1}{x}\right)$ equal to a proper fraction either positive or negative, but that this expression may represent any positive or negative quantity whatever that is not between the limits of $+1$ and -1.

From this example, it appears that the theory of impossible quantities may sometimes be applied with great advantage to a very elegant and interesting class of problems, namely, such as require the determination of the greatest and least values of a variable quantity. The general method of proceeding is to suppose, that the quantity to be a *maximum* or *minimum* is equal to a given quantity; and then to inquire what is the greatest or least values which this quantity can have, without introducing the imaginary symbol $\sqrt{-1}$ into the resulting formulæ.

The second class of imaginary expressions, or those which indicate real quantities, involve the symbol $\sqrt{-1}$ in such a manner, that, by suitable transformations, it may at last be made to disappear. The two following expressions are of this kind, viz.

$$\sqrt{(a+b\sqrt{-1})}+\sqrt{(a-b\sqrt{-1})}\,;$$

$$\frac{1}{\sqrt{-1}}\left\{\sqrt{(a+b\sqrt{-1})}-\sqrt{(a-b\sqrt{-1})}\right\}$$

By taking the square, and then again the square root of each, the former is transformed to

$$\sqrt{\left\{2\sqrt{(a^2+b^2)}+2a\right\}}\,;$$

and the latter to

$$\sqrt{\left\{2\sqrt{(a^2+b^2)}-2a\right\}}\,,$$

which are both real quantities.

The general expression for the roots of a cubic equation has the form

$$\sqrt[3]{(a+b\sqrt{-1})}+\sqrt[3]{(a-b\sqrt{-1})},$$

when its roots are all real; but, unlike the two former, it cannot, by any means be transformed into a real algebraic expression, consisting of a finite number of terms; but its value may be found by an infinite series, or a table of sines. (Algebra, § 227—§ 230.)

It has been proved, in the Arithmetic of Sines, § 19, that, m being any whole number or fraction,

$$(\cos. x+\sin. x\sqrt{-1})^m=\cos. m\,x+\sin. m\,x\sqrt{-1}.$$

This formula was first given by De Moivre, (*Phil. Trans.* 1707, and *Miscel. Analytica*, lib. 2.) Lagrange calls it "a formula as remarkable for its simplicity and elegance as its generality and fertility in consequences," (*Calcul. des Fonctions*, p. 116); and Laplace considers its invention as of equal importance with the binomial theorem, (*Leçons des Ecoles Normales.*) As the sign of the square root of a quantity may be either + or —1, we may put in the formula $-\sqrt{-1}$ instead of $+\sqrt{-1}$; it then becomes

$$(\cos. x-\sin. x\sqrt{-1})^m=\cos. m\,x-\sin. m\,x\sqrt{-1}.$$

From this, and the former expression, we find, by addition and subtraction, that the imaginary expression

$$(\cos. x+\sin. x\sqrt{-1})^m+(\cos. x-\sin. x\sqrt{-1})^m$$

is equivalent to 2 cos. $m\,x$, or real quantity; also, that imaginary expression

$$\frac{1}{\sqrt{-1}}\left\{(\cos. x+\sin. x\sqrt{-1})^m-(\cos. x-\sin. x\sqrt{-1})^m\right\}$$

is equivalent to 2 sin. $m\,x$, another real quantity. These expressions, although the representatives of real geometrical quantities, viz. 2 cos. $m\,x$, and 2 sin. $m\,x$, considered by themselves, are utterly without any geometrical signification. It is impossible to translate the analytic formulæ into the language of strict geometry, because the symbols sin. $x\sqrt{-1}$ and $\frac{1}{\sqrt{-1}}$ correspond to nothing that admits of geometrical definition. Notwithstanding this incongruity, these very expressions have led to the discovery of some of the most beautiful and general theorems in geometry, and have enabled analysts to resolve questions which, without their aid, would have been altogether untractable. We have given examples of their application to the theory of angular sections, and the investigation of that elegant property of the circle called the Cotesian theorem, in the Arithmetic of Sines, § 19—§ 25.

If in the formula

$$(\text{Cos. } x+\sin. x\sqrt{-1})^m=\cos. m\,x+\sin. m\,x\sqrt{-1}$$

we write $\frac{1}{n}$ for m, it becomes

$$\left(\text{Cos. } x+\sin. x\sqrt{-1}\right)^{\frac{1}{n}}=\cos.\frac{x}{n}+\sin.\frac{x}{n}\sqrt{-1}.$$

Suppose now n to be indefinitely great, then, x being supposed a finite arc, the arc $\frac{x}{n}$ will be indefinitely small; in this case its cosine will be equal to the radius, and its sine equal to the arc itself, hence, n being indefinitely great,

$$\left(\text{Cos. } x+\sin. x\sqrt{-1}\right)^{\frac{1}{n}}=1+\frac{x}{n}\sqrt{-1}$$

or putting cos. n + sin. $x\sqrt{-1}=v$.

$$v^{\frac{1}{n}}=1+\frac{x}{n}\sqrt{-1}$$

and hence $n\left(v^{\frac{1}{n}}-1\right)=x\sqrt{-1}$.

Now it has been demonstrated in the introduction to the article Fluxions, § 12, that n being supposed infinitely great, $n\left(v^{\frac{1}{n}}-1\right)=$ Nap. log. v, therefore

$$\text{Nap. log. } v=x\sqrt{-1}$$

and hence e denoting the basis of the system, (Algebra, § 335 and § 356) we have $v=e^{x\sqrt{-1}}$, that is,

$$\text{Cos. } x+\sin. x\sqrt{-1}=e^{x\sqrt{-1}}$$

This is another imaginary formula of great value, because it exhibits under a finite form a relation between an arc or angle and its co-sine, sine, &c. It was first observed by Euler, and is justly regarded as one of the most important analytic inventions of the last century. Other investigations of this formula have been given in Arithmetic of Sines, § 29, and Fluxions, § 124. Observing, as before, that the square root of a quantity may be considered as negative as well as positive, we have from the formula,

$$\text{Cos. } x-\sin. x\sqrt{-1}=e^{-x\sqrt{-1}}\,;$$

and from the two expressions, by addition and subtraction,

$$\text{Cos. } x=\tfrac{1}{2}\left\{e^{x\sqrt{-1}}+e^{-x\sqrt{-1}}\right\}$$

$$\text{Sin. } x=\frac{1}{2\sqrt{-1}}\left\{e^{x\sqrt{-1}}-e^{-x\sqrt{-1}}\right\}$$

These formulæ, in their present state, are illusive; for the arc and sine, or co-sine, cannot, by means of them, be found, the one from the other. However, by expanding the exponentials into series, we have, (Algebra, § 357.)

$$e^{x\sqrt{-1}}=1+x\sqrt{-1}-\frac{x^2}{1.2}-\frac{x^3\sqrt{-1}}{1.2.3}+,\ \&c.$$

$$e^{-x\sqrt{-1}}=1-x\sqrt{-1}-\frac{x^2}{1.2}+\frac{x^3\sqrt{-1}}{1.2.3}+,\ \&c.$$

These being substituted in the formula, we get

$$\text{Cos. } x=1-\frac{x^2}{1.2}+\frac{x^4}{1.2.3.4}-,\ \&c.$$

$$\text{Sin. } x=x-\frac{x^3}{1.2.3}+\frac{x^5}{1.2\,3.4.5}-,\ \&c.$$

expressions which are altogether free from the imaginary symbol.

An example of the application of the same formulæ to the determination of the arc in terms of the tangent, is given in the ARITHMETIC OF SINES, § 30. They also admit of various applications to the investigation of rules in plain and spherical trigonometry. (See Legendre, *Elemens de Geometrie*, in App. to TRIG.)

Because Cos. x + Sin. $x\sqrt{-1} = e^{x\sqrt{-1}}$, therefore, Log. (Cos. x + Sin. $x\sqrt{-1}$) $= x\sqrt{-1}$. Let π denote half the circumference of a circle, of which the radius $=1$, and suppose $x = \frac{1}{2}\pi$, then Cos. $x = 0$, and Sin. $x = 1$; hence we get Log. $\sqrt{-1} = \frac{1}{2}\pi\sqrt{-1}$, and

$$2\pi = \frac{4 \log. \sqrt{-1}}{\sqrt{-1}}.$$

This remarkable expression for the circumference of a circle was first found by John Bernoulli. It is of no use as a rectification of the circle; but it shews, that if the expression should occur in any investigation, we may substitute, instead of it, the real quantity 2π.

The formula, Cos. x + Sin. $x\sqrt{-1} = e^{x\sqrt{-1}}$, becomes, in the case of $x = \frac{1}{2}\pi$, $\sqrt{-1} = e^{\frac{1}{2}\pi\sqrt{-1}}$.

Now, let both sides of this equation be raised to a power expressed by $\sqrt{-1}$, then, observing that $\frac{1}{2}\pi\sqrt{-1} \times \sqrt{-1} = -\frac{1}{2}\pi$, we have,

$$(\sqrt{-1})^{\sqrt{-1}} = e^{-\frac{\pi}{2}} = 0.207879.$$

This very singular imaginary expression was, we believe, first noticed by Euler.

D'Alembert first demonstrated a remarkable property of imaginary expressions, namely, that however complicated they may be, they may always be reduced to the form A + B $\sqrt{-1}$; so that every function of an impossible quantity $a + b\sqrt{-1}$ has the form A + B $\sqrt{-1}$, where, however, B may equal 0.

Let $r = \sqrt{(a^2 + b^2)}$, and suppose x to be such an arc, that Cos. $x = \frac{a}{r}$, then Sin. $x + \frac{b}{r}$, where r, Cos. x, and Sin. x will be all real quantities; by substitution, the imaginary formula $a + b\sqrt{-1}$ will be transformed into r (Cos. a+Sin. $a\sqrt{-1}$) If, now, $a' + b'\sqrt{-1}$ be another imaginary expression, by a like substitution it may be transformed into r' (Cos. x' + Sin. $x'\sqrt{-1}$), where, as before. r', Cos. x' and Sin. x' are all real. Suppose, now, an imaginary expression to be the product of the formulæ $a + b\sqrt{-1}$, and $a' + b'\sqrt{-1}$, this, by substitution, will be

$$rr' (\text{Cos. } x + \text{Sin. } x\sqrt{-1})\ (\text{Cos. } x' + \text{Sin. } x'\sqrt{-1}).$$

By actual multiplication and substitution of Cos. $(x + x')$ for Cos. x Cos. x' — Sin. x Sin. x'; also Sin. $(x + x')$ for Sin. x Cos. x' + Cos. x Sin. x' (ARITHMETIC OF SINES,) the product is equivalent to,

$$rr' \left\{ \text{Cos. } (x + x') + \text{Sin. } (x + x')\sqrt{-1} \right\}$$

which has manifestly the form A + B $\sqrt{-1}$. From this it is evident, that the continual product of any number of imaginary quantities, a + $b\sqrt{-1}$, $a' + b'\sqrt{-1}$, &c. will be an imaginary quantity of the same form.

Consider now the fraction $\frac{a + b\sqrt{-1}}{a' + b'\sqrt{-1}}$. This, by substituting the trigonometrical formulæ, will be changed to

$$\frac{r\,(\text{Cos. } x + \text{Sin. } x\sqrt{-1})}{r'\,(\text{Cos. } x' + \text{Sin. } x'\sqrt{-1})}$$

Multiply the numerator and denominator by r' (Cos. x' — Sin. $x'\sqrt{-1}$), and substitute Cos. $(x - x')$ for Cos. x Cos. x' + Sin. x Sin. x', and Sin. $(x - x')$ for Sin. x Cos. x' — Cos. x Sin. x', it then becomes,

$$\frac{r}{r'} \left\{ \text{Cos. } (x - x') + \text{Sin. } (x - x')\sqrt{-1} \right\}$$

a quantity which has the form A + B $\sqrt{-1}$ as before.

The function $(a + b\sqrt{-1})^n$ becomes, in like manner,

$$r^n (\text{Cos. } x + \text{Sin. } x\sqrt{-1})^n = \\ r^n (\text{Cos. } n\,x + \text{Sin. } n\,x\sqrt{-1})$$

which is still a quantity of the same form.

By employing the same substitution it is easy to prove, that the very general imaginary function

$$(a + b\sqrt{-1})^{m + n\sqrt{-1}}$$

is still of the form A + B $\sqrt{-1}$.

In applying imaginary expressions to analytical investigations, it becomes an important question, what is the nature of the evidence it affords for the truth of the results? It must be confessed that this part of their theory is involved in some degree of obscurity. John Bernoulli and Maclaurin allege, that when imaginary expressions are put to denote real quantities, the imaginary characters involved in the different terms of such expressions do then compensate or destroy each other. To this it has been objected, that an imaginary character being no more than a mark of impossibility, such a compensation is altogether unintelligible; for to suppose that one impossibility can remove or destroy another, would be to bring impossibility under the predicament of quantity, and to make it the subject of arithmetical computation.

Professor Playfair, of the university of Edinburgh, has advanced a different theory in the London *Philosophical Transactions* for 1778. He there observes, that impossible expressions occur only when circular arcs or hyperbolic areas are the subject of investigation, and that corresponding to every imaginary formula, there is a real formula perfectly analogous; one of these is the analytic expression of some property of the circle, and the other the expression of a like property in the hyperbola. Thus, supposing that in either curve the semiaxis $= 1$, let c denote any abscissa, reckoned from the centre, s the ordinate, and x the double of the area contained by the semiaxis, a semidiameter drawn to the top of the ordinate, and the intercepted hyperbolic arc; also let e denote the number of which Nap. log. $= 1$: In the circle

$$c = \tfrac{1}{2}\left(e^{x\sqrt{-1}} + e^{-x\sqrt{-1}}\right),$$

$$s = \frac{1}{2\sqrt{-1}}\left(e^{x\sqrt{-1}} - e^{-x\sqrt{-1}}\right),$$

and in the hyperbola (as will readily appear from FLUXIONS, § 150, Ex. 5.)

$$c = \tfrac{1}{2}\left(e^{x} + e^{-x}\right), \qquad s = \tfrac{1}{2} e^{x} - e^{-x}\Big)$$

These expressions are perfectly analogous in their form, so that if in the first set $\sqrt{+1}$ be put instead instead of the imaginary symbol $\sqrt{-1}$, it will be immediately transformed into the second. By the first set of formula, the whole theory of the Arithmetic of Sines may be investigated, and by the second, a corresponding theory relating to the co-ordinates of an hyperbola, many of the corresponding properties of the two curves will be identical, and some will differ only in the signs of the terms. In both, the results will be alike free from the imaginary sign, although in the one case the steps by which they have been found are unintelligible, and in the other they are perfectly significant. This agreement of two methods so very different in the discovery of truth, the ingenious writer attributes to the analogy that takes place between the subjects of investigation, which is so close, that every property of the one may, with certain restrictions, be transferred to the other. Hence it happens, that the operations performed with imaginary characters, although destitute of meaning themselves, are yet notes of reference to others which are significant: They point out indirectly a method of demonstrating a certain property of the hyperbola, and then leave us to conclude from analogy that the same property belongs also to the circle. All that we are assured of by the imaginary investigation is, that its conclusions may, with all the strictness of mathematical reasoning, be proved of the hyperbola; but if from thence we would transfer that conclusion to the circle, it must be in consequence of the principle which has been just now mentioned. The investigation, therefore, in every case resolves itself into an argument from analogy, and after the strictest examination, will be found to have no other claim to the evidence of demonstration. A proposition that is proved of the hyperbola only, and afterwards concluded to hold true of the circle, merely from the affinity of the curves, will have precisely the same degree of certainty as when a proof is made out by imaginary symbols.

Of late years another theory of impossible quantities has been brought forward by M. Buëe, in the London *Phil. Trans.* 1806, also by M. Argand, in a work with this title, *Essai sur une manière de représenter quantités imaginaires dans les constructions geométriques*, published in France in 1806, and again by M. J. F. Français, in *Nouveaux principes de geométrie de position et interprétation geométrique des symbols imaginaires*, published in *Annales de Mathématiques*. Sept. 1813. According to these writers, the impossible character $\sqrt{-1}$, is the sign of *perpendicularity*; so that the imaginary expression $a\sqrt{-1}$, instead of being the sign of an operation which cannot be performed, and which has no geometrical representative, is, according to these writers, represented geometrically by a perpendicular to a straight line: that is, if a line to the right be expressed by $+a$, and an equal line to the left by $-a$, then a third line perpendicular to and equal to either of these will be expressed by $\pm a\sqrt{-1}$.

To prove this, the last mentioned writer defines the *ratio of magnitude* to be the numerical ratio between the magnitudes of the two lines and the *ratio of position*, the inclination of the one line to the other, or the angle they contain. Again, he lays it down, that four straight lines are in *proportion of magnitude and position*, when between the two last there is the same ratio of magnitude and position as between the two first. That is, supposing a, b, c, d, to be the magnitudes, we must have $\frac{a}{b}=\frac{c}{d}$, also the angle contained by a and b equal to the angle contained by c and d.

When the consequent of the first ratio is the antecedent of the second, the proportion of magnitude and position is said to be *continued*, and the middle term is a mean proportional of magnitude and position between the other two. From this it follows, that the middle term bisects the angle made by the two extremes.

These observations being premised, he gives the following theorem as the foundation of his theory. *Imaginary quantities of the form $\pm a\sqrt{-1}$ represent in the geometry of position perpendiculars to the axis of the abscissæ, and reciprocally, perpendiculars to the axis of the abscissæ are imaginaries of this form.* For, putting $+a$ and $-a$ for straight lines lying in opposite directions, according to M. Français, the quantity $\pm a\sqrt{-1}$ is a mean proportional of magnitude and position between them. Now it has been premised, that a line, which is a mean proportional in magnitude and position between two lines, ought to bisect the angle they contain; therefore, in the present case, the mean must be perpendicular to the axis of the abscissæ, and will lie above and below the axis according as it is $+a\sqrt{-1}$, or $-a\sqrt{-1}$. Reciprocally, every perpendicular to the axis of the abcissæ must, according to the same principle, be a mean proportional between $+a$ and $-a$; it is therefore an imaginary quantity of the form $\pm a\sqrt{-1}$.

Such is the substance of M. Français' demonstration; but to us it seems to be by no means satisfactory. We should have supposed, that in seeking the mean of magnitude and position between $+a$ and $-a$, he would have sought the mean of magnitude independently of position, and then the mean of position independently of magnitude. These would have required different operations; the first would have given $\sqrt{a\times a}=a$ for the mean of magnitude, and, putting q for a right angle, the second would have given $\frac{1}{2}(q+q)=q$ for the mean of position. We cannot, however, see any useful conclusion deducible from the result. The author of the theory, by calling the lines $+a$ and $-a$, seems to have invested them at once with magnitude and position, while at the same time he seeks the mean by a process, which applies to them as things having only magnitude.

The proof offered by Mr. Buëe in support of the truth of the proposition, that $\sqrt{-1}$ is the sign of perpendicularity, is not more conclusive. He supposes three equal straight lines to meet in a point, two of them to be in one straight line, and the third to be at right angles to them both. He calls the line taken to the right $+1$, then that taken to the left, he says, must be -1; and the third, which must be a mean proportional between them, must be $\sqrt{-(1^2)}$, or more simply $\sqrt{-1}$. Hence he infers, that $\sqrt{-1}$ is the sign of *perpendicularity*. The inconclusiveness of this reasoning, has been well exposed by an able critic in the Edinburgh Review, vol. xii. July 1808, where it is observed, that any imaginable conclusion might have been derived in the same manner. For example, the third line, instead of being at right angles, may be supposed to make an angle of 120° with the one, and of 60° with the other, and still it would be a mean proportional between the other two; and its square would have been $+1\times-1,=-1$, and the line itself $=\sqrt{-1}$. It is farther observed, that it would be very unfortunate for science, and productive of inextricable confusion in mathematical language, if the character which denoted impossibility at one time, should at another signify something actually existing like perpendicularity, which, besides, is not a quantity, but the modification of quantity. It would therefore be strange indeed, if a character which applies only to quantity, whether as possible or not possible, should pass to the expression of something, of which quantity cannot be predicated.

A question has arisen, whether impossible expressions ought to be employed in a science, that above all others boasts of the accuracy of its reasoning, and the certainty of its conclusions? The question ought certainly to be answered in the negative, if in any case the theory led to error, or if it were of more difficult application than the analytic theories, which involve only possible quantities. But neither of these is the case. The conclusions it brings out, are in perfect agreement with those obtained by other methods; and although it cannot be doubted, but that every truth that can be discovered by the imaginary analysis, may also be found by methods of reasoning which are quite unexceptionable; yet, generally speaking, these last are less concise, and of more difficult application. Indeed such is the power of imaginary expression as an engine of analysis, that we are not sure whether some theorems have been proved in any other way. It would be extremely valuable, even if its conclusions were not stamped with the character of mathematical truth, until they had been verified by the more strict methods. It cannot be doubted, but that the theory of infinities in its loosest form, has brought to light truths which would hardly have been acknowledged, unless they had been afterwards established upon more unexceptionable principles. The vast improvement which that method of analysis has received between its first applications by Kepler, and the highly finished and almost perfect form under which it has been delivered by La Grange, gives us reason to hope, that the obscurity in which the doctrine of imaginary quantities has hitherto been involved, may in time be dispelled, and that it may be brought to the same state of perfection as the other more intelligible mathematical theories.

On the subject of impossible quantities, consult

D'Alembert, *Mem. de l'Acad. de Berlin An.* 1746, page 182. *Opuscules Math.* t. 5.

Euler, same work, *An.* 1749, page 122 and 139.

Foncenex, *Miscellan. Taurinensia*, t. 1 and 2.

John Bernoulli, *Commercium Epistolicum.*

Schubert, *Nova Acta Petrop.* t. 13, page 172.

Maclaurin, *Fluxions*, art. 669, 763.

Playfair, *Lond. Phil. Trans.* 1778.

Turemain-Missery, *Theorie purement Algébraique des Quantites Imaginaries.*

Edinburgh Review, vol. xii. July 1808.

Annales de Mathématiques, tom. iv. pages 20, 23, 61, 133, 222, 364.

Gompertz, *The Principles and Application of Imaginary Quantities*, book 1. Lond 1817. (ξ)

IMAGINATION. See LOGIC, MORAL PHILOSOPHY, and POETRY.

IMIRETTA, a principality of Asia, situated in the Caucasian regions, between the Black Sea and the Caspian. It is bounded on the north by the principal chain of Caucasus, on the east by Georgia, on the south by the pachalic of Aghalzighe, and on the west by the Black Sea. It exceeds 100 miles in length from east to west, and is probably nearly as many from north to south. Imiretta is watered by the Rioni and Kwrili, or Quirilia, said to signify the roaring rivers, besides numerous tributary streams, the course of most of which is interrupted by cataracts. The former rises in the mountains of Soanni, and after being swelled by the waters descending from the hills of Georgia, falls into the Black Sea at Poti. The climate is extremely mild; snow seldom lies on the ground; and the rivers in the southern parts are never frozen over. Much of the surface consists of rocks and mountains, interspersed with fertile vallies and plains. Abundance of fruit of the finest flavour grows wild and without cultivation; and the trunk of the vine is known to attain 15 inches in diameter. Entire hills are overgrown with olive, chesnut, and valuable timber trees; and the lower grounds are full of almonds, quinces, pears, and plums, the latter sometimes bearing twice a year. Copious harvests of grain, as also of cotton, hemp, and flax, are obtained by the inhabitants, who likewise cultivate the quantity of silk that may be required. From the variety and abundance of fruit, this country has been compared to one vast orchard. Imiretta yields a kind of green honey, which possesses a highly intoxicating quality; and another very singular product called *stone honey*, or *quatupli*, by the natives, whose nature is imperfectly explained. It is described to be quite solid, as hard as sugar-candy, brittle, and not viscous. The honey and wax form one mass, generally of a white colour, but growing yellow with age. It is endowed with a pleasant aromatic flavour, and is found in the clefts of rocks. The Imirettians frequently carry it about with them in their pockets.

The population of the principality is computed at 20,000 families, whose personal appearance is superior to that of their neighbours. They are, in general, an indolent, distrustful, and proud, though servile, race; bold and fearless. They are distinguished by the virtue of hospitality; and travellers are always offered honey, fruits, and wine. Honey, among several of the Caucassian nations, forms a common ingredient of food, which occasions the cultivation of bees to a great extent in this country. The Imirettians are fond of dress and ornaments; they wear several cloaks at a time; and those who can afford it ornament themselves with chains of gold and silver. But the larger portion, from indolence, insecurity, and other causes, are exceedingly poor, and even reduced to great necessities. They are dispersed in retreats on woody hills, by the sides of rivers or in valleys, courting solitude, it is said, in order to screen themselves from their enemies, as well as to be preserved from oppression. But they use certain calls or signals, by which, on extraordinary occasions, hundreds are collected in a moment, in places where no one could previously be discovered. As nearly the whole inhabitants dwell in solitary hamlets, the country contains scarcely any towns except Cotatis or Kuthais, the capital, situated on the right bank of the Phasis or Rioni, and Poti or Puti on the left bank of the same river, at its efflux into the Black Sea. Cotatis seems to consist of somewhat more than 100 houses, chiefly inhabited by Armenian merchants, and is now in a state of decay. Poti is geographically situated within the confines of Mingrelia, and is not known to be larger than the former. In 1806 it was in the possession of the Turks; and it was taken by the Russians in 1809.

The natives of Imiretta are chiefly occupied in agriculture. Some thousands emigrate annually to Georgia, where they hire themselves out as servants or porters. The remainder manufacture good silken stuffs and thick woollen cloths, but no linens. They make a kind of wine of superior quality to that of the countries in the vicinity, much of which is exported in skins to Georgia, and drank at Teflis; and they also export grain, honey, and wax. All the commerce of Cotatis is in the hands of Armenians, who carry their traffic as far as the Russian establishment of Mozdok.

The Imirettians profess the religion of the Greek church: they have a patriarch, who is usually of the royal family, but who nevertheless can seldom read or write. Their churches are wretched buildings, with a paper cross over the principal entrance, and some paintings of the Virgin Mary and their saints within.

Imiretta is governed by a prince dependent on Russia, with which country it is now incorporated. He is styled Mephe, and is under the controul of a national council, composed of the principal inhabitants, without whose consent he cannot undertake any important enterprize. The laws of Imiretta are founded on the will of the sovereign; but since the supremacy of Russia was acknowledged, he is deprived of the power of life and death. His ordinances were published on Fridays, the market days, by a crier who ascended a tree, and thence issued the procla mation. Judicial combats are practised by the nobles, and the trial by water ordeal prevails. The revenues of the king amount only to between 5000*l*. and 7000*l*. yearly, which arise from a contribution of the peasants in wine, grain, and cattle, and from the tribute of neighbouring princes. By the census of 1803, it was found that 13,000 families paid taxes.

This country is said to be the ancient Iberia. At the conclusion of the fifteenth century it belonged to Georgia, when King Alexander divided it, along with other states, among his sons. It was afterwards subdued by the Turks, who were expelled by the Russians in the year 1770. About that period, Solomon, King of Imiretta, threw off the Turkish yoke, and sought the protection of Russia. He quelled the civil broils of his country, strengthened its interests, protected it against foreign invasions, and made many internal regulations, among which was the abolition of traffic in slaves. It is said that he ordered the walls and citadel of Cotatis to be destroyed, observing that "the rocks of Caucasus were the only fortifications which were capable of being defended by an undisciplined army of 6000 men, unprovided with artillery." Solomon, after a prosperous reign, died in 1786. He was twice married, and appointed Giorgi, his son by the first marriage, to succeed him; but his reign was productive of tumults and dissatisfaction, and a civil war arose, which terminated either by his death or deposition in a year. David, the son-in-law of Solomon, who had married a Georgian princess, succeeded to the kingdom, and reigned till 1793. Heraclius, king of Georgia, desirous of seating his grandson Solomon on the throne, then sent an expedition into Imiretta, whereby an insurrection was excited, and David expelled from the country, while his son Constantine was imprisoned in a fortress. After wandering as a fugitive several years, David died at Aghalzighe, a Turkish town of the Caucasian regions. Meantime, the government of Solomon II. was confirmed; and in 1803, he conquered the province of Letschum. In 1802, Anna, the widow of David, and mother of Constantine, repaired to Petersburg, and obtained the liberation of her son, who had undergone a confinement of ten years. Solomon II., in order to secure himself in the government, acknowledged the supremacy of Russia in 1804; and he and his successors were declared the lawful sovereigns of Imiretta. Lat. 33° to 34° N. Long 43° E. (*c*)

IMPEACHMENT, in law, is a mode of trying great and enormous offenders, or a presentment by the Commons of Great Britain, as the most solemn grand inquest of the whole kingdom, to the House of Lords, as the most high and supreme court of criminal jurisdiction. The method of proceeding is to exhibit articles on behalf of the Commons, who also appoint managers to make good their charges. The articles are then carried to the Lords, before whom, as judges, every trial by impeachment must be conducted. A commoner cannot be impeached before the Lords for any capital offence, but only for high misdemeanours. A peer may be impeached for any crime. No pardon under the great seal can be pleaded in bar of an impeachment by the Commons of Great Britain in parliament. See COURT. (*z*)

IMPOSSIBLE QUANTITIES. See ALGEBRA, and IMAGINARY QUANTITIES.

IMPOTENCY, in law, or that corporal imbecility which renders a party naturally incapable of procreation, is a ground for annulling a marriage in the spiritual court. See MARRIAGE.

IMPULSE. See MECHANICS.

INCHKEITH, an island of the Frith of Forth, which derives its name from the Gaelic word *Innis*, an island, and *Keith*, the title of a noble family of Scotland, to whom with other lands this island was gifted about the year 1010, by Malcolm II. for eminent services rendered by that family against the *Danes* at the battle of Barry in Angusshire. The island afterwards came into the possession of the lords of Glamis in the reign of Robert II. along with the barony of Kinghorn, as part of the dowry of one of the King's daughters. From this period it appears to have passed through several hands, and came lately by inheritance into the possession of the noble family of Buccleuch.

In the reign of King James the IV. a *certain disease* had then been newly introduced into Scotland; in all probability from France. It first appeared about the year 1499, when it was thought to be so contagious, that the following order of the Privy Council was issued to the Magistrates of Edinburgh, viz. "That all manner of persons, being within the freedom of this burgh, who are infected of the said contagious plague called the Grandgore, devoid, rid, and pass furth of this town and compeer upon the sands of Leith at 10 hours before noon, and there shall have and find boats ready in the harbour, ordered to them by the officers of this burgh, readily furnished with victuals to have them to the Inch, (island of Inchkeith,) and there to remain till God provide for their health. And all other persons who take upon themselves to heal the said contagious infirmity, and take the care thereof, that they devoid and pass with them, so that none of those persons who take the cure upon them, use the same within this burgh." The penalty of contravention, either by the diseased or their physicians, was burning on the cheek.

Such had afterwards been the deserted and sequestered situation of this island, that James IV. in the course of his inquiries into the origin of language, caused a singular sort of experiment to be made, by delivering two infants to the charge of a dumb woman, with whom they were sent to Inchkeith as the scene of their solitary confinement, till the children should reach a certain age. It would, at this day, have been somewhat interesting to have known the result of this experiment; but owing to the death of the king, and the troubles of the times, it seems to have been entirely lost sight of, and all that we now learn regarding it is from Lindsay of Pitscottie, who, in speaking of the children, observes, "Some say they spake good *Hebrew!* but as to myself, (he added, with proper caution,) I know not, but by report."

During the period of the Reformation in Scotland, the Lords of the Congregation having applied to the English for assistance against the queen dowager, Mary of Guise, Edward VI. sent them a navy in 1549, consisting of 29 ships. The first object of this force was to have secured the port of Leith; but failing in this, they landed and took possession of Inchkeith. After rearing a temporary fort upon it, four companies of English, and one of Italians, were left for its defence, under the command of one Cotterel; who was soon afterwards attacked, and, after a very brave and gallant defence, was dislodged by the French auxiliary troops, then defending the town and citadel of Leith, under M. Desse, who, seeing the importance of this island as a military station, from its commanding position, at a narrow part of the Frith of Forth, he saw its utility both as a cover to Leith, and a place of retreat in case of any sudden disaster. Desse had no sooner made himself master of the island, than the temporary works of the English were thrown down, when a regular fortification was erected, by order of the Regent, under the sanction of her daughter Mary and the Dauphin of France, her husband. This fort consisted of several strong bastions, laid out for the defence of the place, with a strong wall of circumvallation, varying in height from a few feet to upwards of 20 feet, according to the situation of the ground. The principal parts of this work, were executed in square or aisler masonry, and from the inaccessible nature of the island, either as to landing places or roads, it must in those days have been considered an operation of no small magnitude and expence. It seems also to have been regarded by the Scottish Parliament as a place of so much importance, and one which might be turned to so much account against the country by an enemy, that the works were only allowed to remain in a perfect state for a few years, when, by an act of that legislative body, the whole of the fortification, and the greater part of the walls, were thrown down, excepting the eastern wall, and part of the southern wall, which still remains. The royal arms of Scotland is also preserved in one of the walls, with the initial letters M. R. and the date 1556.

Inchkeith lies, per compass, from Leith S. W. distant about 4 miles, and 3 miles from Kinghorn in Fife. It contains about 70 acres; is of a long, and somewhat irregular figure, measuring about one mile in length, and one-fifth of a mile in breadth. Its shores are much chequered with rocks, and indented with several small creeks or bays, capable of being converted into good boat harbours. Its surface, though in many parts rocky, and throughout extremely irregular, yet, in general, is covered with a good sward of grass; while in the more sheltered points, the soil is not only deep, but so extremely rich, that it produces the most luxuriant crops where cultivation has been attempted. It afforded indeed such excellent pasture, particularly for horses, that while it was in the possession of the French, they called it "*L'isle des chevaux.*" On the eastern and western sides, the island is precipitous and abrupt; while towards the north and southern ends, particularly the latter, it rises more gradually, to the height of 180 feet, calculating from high water mark to the summit or site of the lighthouse.

Inchkeith possesses several pretty abundant springs of the purest and most excellent water that is any where to be met with; and since a boat harbour and landing pier have been constructed, the water has been collected in the higher parts of the island, and conducted by a leaden pipe, from a large stone cistern, to the harbour, where it is served out by the light-house keeper. From this cistern the shipping in Leith roads is supplied, and seamen remark that this water is better, and keeps longer free of impurities, than any other with which they are supplied.

The rocks of this island belong to the coal formation, and are distinctly stratified upon the great scale. They consist chiefly of beds of trap-tuff, amygdaloid, slate-clay, bituminous shale, lime-stone, sand-stone, and green-stone. The lime-stone, in some places, is of a fibrous texture, somewhat resembling asbestus. On the south-west side of the island, under the lime-stone, there is a bed of flinty slate, containing the traces of madrepores and shells. Some very beautiful specimens of crystallized quartz are also found in various parts of the island; and detached masses of rock much impregnated with iron. Nodules of agate are not uncommon on the shores; they have been washed from the amygdaloidal rock, in which they occur imbedded. The stratification of this island has a south-western direction, dipping towards the east at an angle of about 45°. It is also worthy of remark, that the same strata of rocks, with a similar direction and dip, are observable on the Fife shores to the north; and in the direction of a chain of sunken rocks extending towards Prestonpans, they have been traced on the south side of the Frith.

Besides horses and black cattle, which thrive well on this island, sheep are sometimes pastured here; but the grass is considered too rank for sheep. There is a pretty numerous tribe of the common gray rabbit here, which would increase and become very numerous, were they not so much annoyed by occasional sportsmen visitors. An attempt has lately been made to introduce a species of the rabbit here, remarkable for the length and silkiness of its hair. The sea swallow, or pictarny, breeds on the island; and occasionally the eider duck make its nest on the least frequented part of the shore. Since the erection of the light house, birds of passage, particularly woodcocks, have been sometimes attracted by the light on stormy evenings, and have suffered themselves to be taken by the keeper. On one occasion a number of beautiful small birds (*fringilla flammea*), having a tuft of crimson feathers on the back of the head, took shelter about the light-house. The grey Norwegian rat is pretty numerous on the island, no doubt brought here originally by the shipping in Leith roads. The fishes found in the neighbourhood of Inchkeith are chiefly of the smaller kinds, and such as are common to the Frith of Forth; particularly rock-codling, podley, or young coalfish, and small whitings. One peculiarity, or change upon the habits of the fishes in the Frith of Forth, which has been well authenticated by several of the oldest fishermen of the contiguous village of Newhaven, may here be noticed, viz. that in former times, alluding to a period about the middle of the 18th century, great numbers of large haddocks and whitings were caught above, or to the westward of Inchkeith, but that such fishes are scarcely now to be found to the westward of the isle of May, 20 miles farther to seaward; so that the Newhaven fishers are now almost entirely confined to their employment as pilots, or to the dredging for oysters. At present codling, holibut, large coalfish, and skate, excepting at certain seasons, when the latter come up the Frith to spawn, are only to be met with in the deep sea as far off as the Bell-rock. To account for this change, the fishermen have the following theory: They suppose, from the much greater number of shipping which anchor in Leith roads, and the more frequent discharge of guns from ships of war, that the fish are prevented from resting on this ground. The number of seals, however, which haunt the sea rocks in the neighbourhood of Inchkeith, is certainly not less, especially in winter, as 70 of these animals have been counted upon one rock by the writer of this article. The seals indeed may rather be supposed to have increased of late years, as the hordes which formerly played about the Bell-rock have almost entirely deserted it since the erection of the light-house on that rock.

The importance of the safety, and facility of the navigation of the Frith of Forth, will best appear by viewing this great estuary as the principal inlet upon the eastern coast of Great Britain, to which ships in the North Sea can fly for refuge in storms of easternly directions. Independently, therefore, of this Frith opening the way to so great extent of commercial coast from the Red-head in Angusshire, on the north, to St. Abb's-head in Berwickshire, towards the south, with which its shores are bounded; it is, in fact, a matter of the greatest national importance to open the way, by proper land-marks, for the direction of the mariner to Leith roads, as a safe anchorage at all times of tide, and in all states of the weather. For it often happens, when the riding of ships is no longer safe or practicable in Yarmouth roads, and when the river Humber and Cromarty Frith are inaccessible, the Frith of Forth being now lighted and guarded nearly at all points, lies quite open for their reception.

The Light-house Board, aware of the advantages of the navigation of the Frith of Forth upon general grounds, proceeded to its improvement as their funds would admit; and these, not being at first adequate to the much more expensive works of the Bell-rock, commenced with the light-house of Inchkeith, forming an immediate guide to the roads of Leith. Upon an application being presented from the Trinity House of Leith, on the 18th May, 1803, the foundation stone of this useful building was laid, and the light fire exhibited on the evening of the 1st of September, 1804.

There was no built pier or landing place, nor any road upon the island for the conveyance of heavy materials to the site of the building; and if any such had existed in the early state of this island, which is indeed more than probable, they had been entirely destroyed along with the works of the fortifications, as not the least vestige of these works remained, or could be traced in 1803, when the light-house operations were begun. So completely was this an "unfrequented coast," to speak in the language of Dr. Johnson, that the light-house artificers were actually obliged to lodge in a cavern in the rocks, near the south-eastern part of the island, until they could rear a temporary barrack on the top of the island, near the ruins of the fort.

Hitherto the erections of the Light-house Board had been confined simply to two apartments for one light-keeper; and, from the infant state of the fund, the first light-houses were more of a temporary nature, to answer the immediate purpose of the shipping; as the whole of the coast of Scotland, excepting the Isle of May, was in darkness, or without the aid of light-houses, at the commencement of the institution of the north light-houses. When the works of Inchkeith, however, were undertaken, the funds being in a more prosperous condition, instead of two small apartments for a single light-keeper, the plan of the houses was now extended to the accommodation of a principal and an assistant light-keeper, who now keep a constant watch, by night, in the light-houses, in the same manner as is done on ship-board, when a vessel is at sea; and the whole establishment is now more like the appointment of a public board. The dwelling house at the light-house stations, instead of exposing, as formerly, a long slated roof on a house of one floor, is now built, as at Inchkeith, with two stories, or floors, and covered with a leaden roof. On the same substantial plan the light-houses are constructed; for instead of the roof of the light-room being framed with timber, and the windows glazed with crown-glass, that of Inchkeith is composed of copper, and the windows are glazed with polished plate glass, of much larger dimensions; and the whole premises are, in a great measure, rendered fire proof, the floors being all laid with pavement, or flag stones, from the quarries near Arbroath. The building operations at Inchkeith were greatly facilitated, and rendered much less expensive, from having the use of the stones of the old fortification and walls, which had been thrown down by an act of the Scottish Parliament. The stones of the old fort had been quarried, and taken from a bed of sand-stone on the island; and the remains of these old quarries are still observable, both upon the south-west and eastern sides of the island.

In the original design of Inchkeith light, it was meant to have been built upon the plan of a double or leading light, by the erection of a second light-house, upon the precipitous rock facing the westward; and, by keeping both lights in a line, ships were to have been enabled, under night, to pass the narrow channel, between the island of Inchcolm and the dangerous rocks called the Oxcares; but this part of the plan has never been put in execution.

When the present light-house was completed, it was what seamen call a stationary or fixed light, and contained 16 reflectors, made upon the parobolic curve, formed of copper, strongly coated or plated with silver, instead of the hollow or cavity of the reflector being lined with facets of mirror glass, as formerly. Inchkeith light remained as a stationary light till the year 1815, the period when the light of May was altered from an open coal fire to a stationary light, with oil and reflectors; and it became necessary to alter the character of Inchkeith light from a stationary to a revolving light, agreeably to its present appearance; and, with this alteration, seven reflectors, instead of the former number, are now found perfectly sufficient. The machinery for making the light revolve, consists of a movement or piece of strong clock-work, kept in motion by a weight, and curiously fitted with two governors upon the plan of the steam engine, instead of a fly wheel. The reflectors are ranged upon a horizontal frame, which is made to revolve, periodically, upon a perpendicular axis, exhibiting, to a distant observer, the alternate effect of light and darkness, in a very beautiful and simple manner. The reflectors are brought round in succession to the eye of the observer, and the angles, or interstices between them, produces the effect of darkness, by which this light is distinguished from the light of the Isle of May, and also from the numerous surrounding lights on the opposite shores.

It is further of importance to remark here, that the light of Inchkeith is elevated above the medium level of the sea about 235 feet; and such is the powerful effect of the reflecting apparatus, that it is distinctly seen, in a favourable state of the atmosphere, at the distance of four or five leagues, although it is impossible that more than a single reflector can be seen at a time.

The elevation or design of this light-house is considered to be in very good taste. It is a house of two stories with a platform roof, and parapet with embrasures; the light-house tower forming the staircase to the second floor and light-room. The light-keepers are very comfortably lodged, the principal having three apartments, and his assistant two. Besides the main house, a court of offices is formed in connection with the eastern wall of the old fort; and, besides other conveniences, there is an oil cellar sunk under ground, in which the oil is always kept in a fluid state, and at an equal temperature. There is also a place fitted up, without the gate, as a watch-house for pilots, where they have a guard bed and fire-place.

This establishment is in all respects very complete, and the situations of the light-keepers rendered pretty comfortable. The principal has a salary of 45*l*., and his assistants have 35*l*.; besides 10 acres of the island inclosed, and a garden, which they possess or hold in common, with a sufficient allowance of coal and oil for family use.

The following inscription is cut upon a stone, in a conspicuous part of the building: "For the benefit and security of commerce, and for the direction and comfort of mariners, this light-house was erected by order of the Commissioners of the Northern Light-houses. It was founded on the 18th of May, 1803, and lighted on the 1st of September, 1804. Thmas Smith, engineer."

Under our general article LIGHT-HOUSE, we shall have occasion to treat more fully of distinguishing light-houses. See Pitscottie's *Hist.*; Sibbald's *Fife*; Pinkerton's *History of the Stuarts*; Arnot's *History of Edinburgh*; Dr. Johnson's *Tour*, 1773. (s.)

INCIDENCE, ANGLE OF. See OPTICS.

INCLINATION. See PORISMS.

INCLINED PLANE. See MECHANICS.

INCLOSURES. See AGRICULTURE.

INCOMBUSTIBLE CLOTH, is the name of a species of cloth which resists the action of fire. It has been known for many centuries, that a mineral substance called abestos can resist the action of fire; and that some species admit of division into fine slender threads of a lanuginous appearance. These in general are very short and brittle, but with careful attention in the separation, they may be obtained several inches in length. The ancients, availing themselves of the peculiar property of asbestos, devised means of working it into cloth. Pliny and Dioscorides speak of asbestine cloth nearly in the same terms. Pliny, in one passage, remarks the incombustible nature of asbestos; and in another he speaks as if he had actually seen napkins made of it, which, being thrown into the fire during entertainments, were much better cleansed and came out whiter than if they had been washed with water. Dioscorides says, that "cloth is prepared from the asbestos of Cyprus, which, being thrown into the fire, burns, but is unconsumed, and comes more splendid from the flames." Besides the preceding observation, Pliny adds, that from this property the cloth was used to preserve the ashes of kings when their bodies were committed to the funeral pile. We find occasional allusions to asbestine cloth ever since the age of Pliny; and the ingenuity of mankind in our own æra has proved that it may still be made of the same materials. Accordingly, Isidorus, who lived in the 7th century, observes, that from asbestos, "something mechanical has been framed by human art." A chemist of the 9th century describes the process of making it, which proves to be very near the truth; Marco Polo, Simon Majolus, and a few others, testify its existence subsequent to the darker ages; after which, Kircher, Ray, Ciampini, and many more, directed their attention towards its substance and manufacture. The words of Pliny, concerning the use of incombustible cloth in preserving the remains of princes, are thought by some commentators not to apply to the Roman sovereigns, but to those of the east; and it is said that a Tartar prince sent a piece of it to Alexander, one of the popes. Marco Polo, who travelled into Tartary in the 13th century, speaks of a province called Chinchinthalas, in which a substance is found whereof incombustible cloth is made. He learned from "Curfican, a very intelligent Turk, that the process consists in drying it in the sun, and beating it in a mortar, after which it is washed and wove like wool. It is to be put during an hour into the fire, when it comes out whiter than snow; and no other washing is required, if dirty, than passing it through the flames." Cœlius Rhodiginus only makes an allusion to incombustible cloth, but Simon Majolus saw an incombustible cloak of asbestos exposed to the fire at Louvain; and Agricola observes, that at Verelung in Saxony there was another of the same substance. Kircher tells us, that in his museum he had a whole cabinet full of asbestine articles; that he had got a napkin of it from Cardinal Lugo, which after being thrown into the fire came out quite clean. He also had writing paper of the same substance, from which the letters were entirely obliterated on being committed to the flames, as if washed out, and the paper was withdrawn entire and clearer than before. Thus, he observes, correspondence could constantly be carried on by means of a single sheet. In addition to these instances may be mentioned the information of Mr. Ray, to whom the Prince Palatine shewed an incombustible purse at Heidelberg, which received no injury after being thoroughly ignited in a pan of charcoal. A long rope, likewise, which had been steeped in oil, and then put into the fire, proved incombustible. In the year 1702, a funeral urn was found containing a quantity of bones and ashes, wrapped in a piece of incombustible cloth no less than eight feet long, and five in breadth. Being presented to Pope Clement XI. he ordered it to be deposited in the Vatican, where it yet remains, and affords incontestible evidence of the truth of Pliny's narration. Some of the monkish writers also inform us, that a certain St. George being sentenced to be burnt alive, he was enveloped in asbestine cloth, that they might not ascribe his preservation from fire to a miracle.

Pliny is silent respecting the mode of fabricating asbestine cloth. The chemist of the 9th century directs the alternate soaking of asbestos in oil and water, in order to render it fit for spinning. Kircher, in the 17th century, affirms, that there were a few persons in his country acquainted with the mode both of spinning and weaving it, whereof some specimens might be seen in his museum; but such individuals were very rare, and did so only with the view of great emolument. He considered it a secret art; adding, that though it had been described by Boetius, Libavius, and Porta, they had been deceived by an erroneous account. Pivati, in his Encyclopædia, published in the year 1748, says, that a quantity of asbestos was formerly spun at Venice. All these remarks refer to an early date, and they inspired very little confidence. At length, Ciampini, an Italian, entered on a course of experiments towards the beginning of the 18th century. The method he describes consists in soaking the asbestos in warm water, after which it is opened and divided with the hands, to allow the extraneous particles to escape. This operation being frequently repeated, the flaxy parts are collected and laid in a sieve to dry, and then gently carded, some of the flaxen substance being allowed to hang over the sides. Next, by mixing the ends of thread with what hangs over of the asbestos, both may be drawn out and twisted together, and wound on a reel. Or, instead of carding the substance and then using thread, Ciampini affirms, that the asbestos may be drawn out by mixing it with common hemp. During the operation, the fore finger and thumb must be kept constantly wet with oil, both to protect the skin from the friction of the substance while drawing out in a thread, and to render the filaments more soft and flexible. The thread of asbestos, combined with real flax, having been thus obtained, it may, with great care, be wove into a coarse cloth; which, being put into the fire, the flaxen portion will be consumed, while the asbestine part remains entire. This cloth can be best preserved by keeping it well oiled; when committed to the flames, the oil burns off, and the cloth comes out white and purified. Whether or not the art was preserved in Europe, there is every reason to believe that it subsisted in the East. Independent of the Venetian traveller's narrative, we learn, that a piece of incombustible cloth was transmitted from China to Batavia, and from thence to England, in the year 1684, which is described as a *handkerchief* or *pattern*, but it seems to have been a small portion of very coarse cloth. It was subjected to various experiments, and the result was, its being withdrawn whiter and cleaner after having been rendered red hot in a fire.

A few years ago, the art of making incombustible cloth was completely revived by M. Perpenti, an Italian lady, who has improved on the process of all her predecessors. Having seen a distaff of asbestos, from the ruins of Herculaneum, in the cabinet of natural history belonging to the canon Cæsar Gattoni at Como, she was made acquainted by him with the different methods which the ancients are supposed to have adopted in making cloth. On inspection also, she remarked, that their asbestine cloth was fabricated of double threads, in order to be of greater strength. M. Perpenti began by beating the asbestos, and steeping it in oil and in water, whereby the threads became more pliant; but finding them too much relaxed for weaving by the oil, she abandoned this method. She restricted her operations to softening it in water, drying it in the sun, and then carding it like wool. A very close toothed steel comb was used in carding, as the filaments were thick and short; and in this way she succeeded in obtaining a weak and unequal thread, with which nevertheless she was able to make a pair of gloves. Much difference, however, is to be found in the nature of the asbestos itself. Ciampini had before remarked, that although the asbestos of Cyprus is reputed the best, it in fact proved the worst; and what was most suitable came from Corsica. M. Perpenti first used asbestos from the mountains of the valley of Malenco in the Valteline, which proved to be better than what was procured from the environs of Genoa. In the former, she observed, there were threads much longer than the piece of asbestos containing them; whence it became important to devise some method whereby they should be detached and unravelled. Here also M. Perpenti was successful, for by rubbing the asbestos, and disengaging the two ends of the threads, she thus obtained some of the greatest beauty, and suitable for the most delicate work. These were several feet long, and equally fine and strong as silk or linen thread. It was the more singular that such should be the case, as a piece of asbestos, to external appearance, exhibits only a mass of thick short threads, which has always been the chief obstacle to the fabrication of incombustible cloth. All the previous preparation, therefore, which is necessary, is confined to softening the asbestine substance in water, beating it to create greater flexibility, and employing the iron comb. The threads acquire greater consistence, by moistening the finger with a little oil or gum while they are spun.

Incombustible paper. Those who have occupied themselves with the subject of incombustible cloth, have also directed their attention to the fabrication of incombustible paper from asbestos. Kircher proposes a certain process for it, which we do not discover he adopted. Some was made of Welsh asbestos towards the close of the seventeenth century; and Ciampini thinks the shorter asbestine threads would answer this purpose. M. Perpenti found the asbestos of Genoa, which was less suitable for spinning, the best adapted for making paper, which she accomplished by washing and purifying it well. Some time ago, M. Sage exhibited before the French Institute, a leaf of incombustible paper, made twenty years before that period, by M. Levrier, of Lisle, the proprietor of a paper manufactory. It was not smooth like paper fabricated of flax, but had sufficient coherence, and if the ink employed was well gummed, would readily receive writing. When put among burning coals it was not consumed; it assumed a greyish colour from the glue, and the written characters appeared red. M. Sage regrets that M. Levrier had not received greater encouragement, as deeds on common paper might be preserved from the flames by inclosure in cases of asbestos; but Ciampini remarks, that it was no protection to a stick which he had enveloped in it. According to M. Perpenti's experiments, an indestructible ink may be obtained, by mixing a third of sulphate of iron with two-thirds oxide of manganese, the whole being well pulverised.

The Chinese and Siberians are said to have gone farther than any modern nation in converting incombustible substances to use. M. Sage describes a small furnace, constructed by the former, of a kind of card or paper, which, in his opinion, consisted entirely of asbestos. It was nine inches high, six in diameter, and provided with a grate, and two doors for the ashes. The colour was grey tending to red, but it whitened with heat. Both externally and internally it had a smooth polish resembling pasteboard, and its fracture was absolutely similar. M. Sage conceived that the asbestos, having been pounded, was mixed with a mucilage forming a paste, which being put into a mould, thereby acquired its shape and polish.

Besides incombustible cloth and paper, the ancients are supposed to have possessed the secret of making perpetual or inextinguishable lamps, apparently with the same materials. Several tombs have been opened, which the spectators declare contained burning lamps, though many centuries had elapsed from the sepulture of the deceased. Isidorus relates, that a candelabrum was reported to be in the temple of Venus, which neither wind nor rain could extinguish. We believe that directions have been given for constructing perpetual lamps; but the experiments of the moderns with asbestos do not appear to have been successful, for oil would not rise in the wick. It is most likely, however, that this is a mistake; for oil ought to rise in asbestine as well as in other wicks. Yet this would only be gaining an incombustible wick. The ancients however affirm, that asbestos once heated never cools, which has probably been the source of other opinions that it may constitute a perpetual lamp. See Pliny, *Hist. Natural.* lib. xix. cap. 4. xxxvi. cap. 31; Dioscorides, lib. v. cap. 158; Isidorus, *Originum*, lib. xvi cap. 4; Kircher, *Mundus Subterraneus*, vol. ii. var. loc.; Cœlius Rhodiginus, *Lect. Antiq.* lib. xviii. cap. 31.; M. Pauli Veneti *De Regionibus Orientalibus, ap. Grynæus Novus Orbis*, p. 355; Pancirollus, *De Rebus de Perditis; Philosophical Transactions*, vols. xiv. xv. xxii. xxvii. li. Bell's *Travels*, vol. i.

INCUBATION, is that instinctive process by which birds sit unremittingly upon their eggs, with the exception of short intervals employed in quest of food, until, by imparting their own vital warmth, the young acquires sufficient strength, and breaks the shell.

Persons not conversant with natural history have believed, that life does not exist in the egg until the commencement of incubation, or the application of artificial heat. The effect of either does no more, however, than unfold the latent germ. About 104 degrees of heat are required to hatch the eggs of our common domestic poultry, which, in hens, must be continued during 21 days. Sometimes the period is longer or shorter, ranging between 19 and 23. The period required by the eggs of other birds is extremely diversified; whence Count Morozzo has inferred, that the period of incubation is proportioned to the duration of the life of the bird; in the same way as he conceives the gestation of mankind and quadrupeds is proportioned to the length of their existence. The swan, which is supposed to live 200 years, sits 42 days; the goose, supposed to live 80, sits 30; while the goldfinch, whose life is restricted to 18 or 20 years, does not sit on its eggs above 14 days.

The experiments of most observers have been made on the eggs of the common hen; but Malpighi did not confine himself to these exclusively. On inspecting an egg at the larger end, where all the changes take place, several conspicuous parts appear, as the albumen, the yolk, the air vessel, and the membranes, besides some which are less obvious; but the highest magnifier is incapable of discovering the germ of the chicken. Nothing more than a confused whitish spot, generally called the *cicatricula*, is discernible. Malpighi, indeed, who has treated this subject in a masterly manner, seems to affirm, that the embryo is perceptible before incubation, but it has been sensible to no other observer. He likewise thought its evolution would be seen in six hours after incubation, and has given a magnified delineation of the appearances. Haller considers it unnecessary, at least in the climate of Switzerland, to make observations previous to seven hours; and he remarks, that Malpighi's egg of six hours was as far advanced as his of twenty-four. On the whole, it is to be concluded, that none of the more evident changes happen before the twelfth hour. At that time a slight enlargement of the cicatricula is found to have taken place. The embryo, still of the most irregular and indistinct figure, has undergone some expansion: it is surrounded by a line of a greenish or deep yellow colour. The rings or halones environing it, of which sometimes three and sometimes four are visible, seem better defined. No alteration is yet perceptible on the bulk or consistence of the fluids, though Haller says, that an egg, with seven hours incubation, contains a greater quantity of albumen than it will ever have afterwards. A cavity at the large end, called the *folliculus aeris*, is full of atmospheric air, which is gradually enlarged by incubation; and although twenty-one eggs, newly laid, afford only a cubic inch of air, the same quantity is yielded by two after twenty days.

Considerable alteration will be found to have taken place in twelve hours more, or after the interval of a day, from the commencement of incubation. The egg floats with the small end downwards, by the enlargement of the cavity, or escape of its own fluids, and the figure of the embryo is better defined. It seems about .18 of an inch in length, whereas in twelve hours it does not exceed .1. The circles or halones are more extended, and the interior one has acquired some resemblance to the figure of a heart, surrounded by a line of a greenish colour. Green specks are likewise perceptible in different parts of the area enclosed by it, which are the rudiments of blood vessels. Twelve hours later, the greenish line has gained more evidently the appearance of a vessel, and some of the specks are seen to contain blood. They are distinct blood vessels in two hours longer, and convey red blood in six more. In 48 hours, the fœtus betrays signs of motion. Its head resembles a hammer, and the tail is extremely slender. The vascular area has attained the figure of a heart, and pulsation is now evident, or perhaps some hours earlier. Still "it appeared like a cloud, and melted under the scalpel." At this period also the eyes become visible; and the contents of the yolk bag have grown somewhat more fluid. It was only at this time that Haller succeeded in measuring the length of the embryo, which proved .22 of an inch in one egg, and .30 in another. It must not be supposed, that there is the most distant resemblance between this shapeless body and a bird; on the contrary, no two objects can be more dissimilar. At the end of 70 hours, the rudiments of the wings, and sometimes those of the legs, may be traced; and at the close of the third day, or 72 hours, the changes are still more conspicuous, and the parts better defined. Before the fourth has come to a conclusion, the pulsations of the heart are so tremulously rapid, that the eye cannot follow them. But as the life of the embryo is enfeebled by exposure to the air, they become retarded, and are seen to follow each other in regular succession. The liver is perceptible before the fifth day, not of its ultimate hue and aspect indeed, but as a viscous cloud of a yellow colour; and the eye also appears black; the limbs seem to move against its termination. The heart gains its proper formation, and the viscera are unfolded. On the sixth day life is so vigorous, that it is not uncommon to find the chicken lying on its back, instead of on its left side as before. The natural figure is in a considerable degree acquired; and most of the organs exhibit a certain definite formation. The weight of the egg has now greatly diminished, the external colour darkens, and the substance of the shell becomes more brittle. Next day the white is smaller, and has sunk towards the small end of the egg, while the dimensions of the yolk are enlarged. From this period, the size of the animal advances with great rapidity. Its members are gradually unfolded, and its strength progressively increased. The muscular nature of the stomach is declared on the eleventh day. On the thirteenth the albumen is seen to have attained a greenish hue, and to have acquired greater consistence; the chicken has gained a more perfect form; its head is greatly curved, and the bill lies under the right wing: It is pointed, and is sometimes opened and closed. On the nineteenth, half the egg is occupied by air, and the chicken is heard to cry. In the next place, the shell becomes extremely fragile, and towards the close of the twentieth day is generally cracked, but not, as erroneously supposed, by the mother. After this the chicken is always heard, its beak projects, and, by the full period of incubation being completed, it is liberated from its confinement on the twenty-first. Now the albumen has totally disappeared, and the contents of the yolk bag occupy the stomach, which is observed to be greatly distended. See Harveii *Opera*. Malpighi *De Formatione Pulli in Ovo. Appendix de Ovo Incubato.* Maitrejean *Observations sur la Formation du Coeur dans le Poulet.* Haller *Sur la Formation du Coeur dans le Poulet. Journal de Physique*, vol. liv. p. 480. *Transactions of the Linnæan Society*, vol. x. Rees' *Cyclopædia*, *voce Incubation.* (*c*)

INDEPENDENTS, one of three leading denominations under which all Protestant Christians may be classed, in as far as regards their tenets on the subject of church government.* They are generally considered as having derived from the Brownists, but may be said more correctly to have been founded as a distinct religious community about the year 1610, by John Robinson, a man of acknowledged piety and learning, who officiated as pastor of a small congregation in Leyden, and who first published a declaration of their principles in 1619, under the title of *Apologia pro exulibus Anglis, qui Brownistæ vulgo appellantur.* After his death, a number of his hearers, having obtained from James I. a promise of full liberty of conscience in America, removed thither with their families in 1620, where they founded the colony of New Plymouth, and became the parents of the independent churches in that quarter of the globe. The first independent society in England was established in 1616, by a Mr. Jacob, who had adopted the sentiments of Robinson; but the severity of the penal laws against nonconformists in those times prevented the principles of this community from attracting much public notice, or making any considerable progress, till about the year 1640. From that period they increased rapidly both in number and reputation. Among the various causes which contributed to this success, must doubtless be admitted the distinguished learning of many of their teachers, and the general sanctity of their manners. They enjoyed also the peculiar protection and patronage of Cromwell, whose favour could not well fail to augment the number of their followers in those days, but whose predilection for their tenets, perhaps, contributed not a little to draw upon them afterwards much undeserved obloquy. Instead of accounting for this friendly disposition of the Protector, by the supposed congeniality of their principles with republicanism, (of which, in fact, he had certainly become the enemy and subvertor.) it may be ascribed, with just as much shew of reason, to the circumstance of his apprehending, from their limited union, less danger of any powerful counteraction to his despotic views, than from the more systematic forms of the Episcopalian and Presbyterian church policy. This growing influence and estimation of the independent name, to whatever cause it may have been owing, induced the greater part of the religious sectaries of that period to assume the same denomination, though neither always adhering to the principles nor possessing the respectability of the genuine independents. After the restoration of Charles II. their cause greatly declined; and in the year 1691, after the accession of William III. they entered into an association with the Presbyterian dissenters in England, by which they seem to have in some measure departed from the original principles of their sect, and to have conformed in many points to the sentiments of their new allies. Since this period the greater part of the different dissenting societies in England have, on their part, adopted the leading principles and practices of the independents on the subject of church government, even though maintaining very opposite tenets on doctrinal points. But still the independents, properly so called, form a distinct and flourishing society, and have well conducted academies, for the education of their young ministers, at Homerton, Hoxton, and Wymondley-house, near Hitchin.

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* These our readers can scarcely fail to recollect, are Episcopalians, Presbyterians, and Independents.

In Scotland, about the year 1728, Mr. John Glass, a minister of the established church, formed a separate community, which bears his name, and holds the fundamental views of the independents. About the end of the 18th century, Robert Haldane, Esq. collected in the same country several congregations, which conform rather more closely to the English independents; but, in consequence of his own changes of sentiment, and various other causes, the greater part of these societies were soon disunited and dispersed. A few of the more respectable teachers, who had concurred in the general views of Mr. Haldane, have continued to follow the plan of the English independents, and are attended by considerable congregations.

The independents evidently derive their name from their leading principle in church government, namely, that every Christian congregation ought to be governed by its own laws, without being subject to the jurisdiction of any other ecclesiastical authority. Robinson expressly uses the term in explaining his doctrines on the head of church government, in these words, "Cœtum quemlibet particularem, recte institutum et ordinatum, esse totam integram et perfectam ecclesiam, et suis partibus constantem, immediate et independenter, (quoad alias ecclesias), sub ipso Christo," &c.; and it is not improbable, that from this very passage the designation was originally derived. It was publicly assumed by the English independents in 1644, in a publication, entitled *Apologetical Narration of the Independents;* but, in process of time, when a number of turbulent and discordant sects, as already mentioned, had begun to arrange themselves under this extensive denomination, the proper independents became desirous to substitute in its place the name of Congregationalists, or congregational brethren.

From the Brownists, with whom they have often been improperly confounded, they differed considerably in many important respects. They were much less uncharitable towards other churches; and while they regarded their own form of ecclesiastical government as peculiarly resting on apostolic authority and example, yet they candidly acknowledged, that true religion might flourish in those communities, which were under the jurisdiction of bishops or presbyteries. They were more attentive in maintaining a regular ministry, and excluding promiscuous teaching in their societies. In regard to doctrine, it appears from "A declaration of the faith and order, owned and practised in the congregational churches in England," published in 1658, that in no point of any importance did they differ from the Presbyterian Calvinists. "Profitemur coram Deo et hominibus, adeo nobis convenire cum ecclesiis reformatis Belgicis in re religionis, ut omnibus et singulis earundem ecclesiarum fidei articulis, ut habentur in harmonia confessionum fidei, parati subscribere—Ecclesias reformatas pro veris et genuinis habemus, cum iisdem in sacris Dei communionem profitemur, et, quantum in nobis est colimus." In regard to political principles, they have been too generally and hastily denounced as the uniform enemies of all kingly government, and the most intemperate abettors of republicanism; but if estimated, not by the proceedings of a political faction, but by the writings of their learned men, and by their avowed forms of doctrine, there will nothing be found to justify these aspersions. On the contrary, it is expressly stated in a public memorial, which they drew up in the year 1647, that, as magistracy in general is the ordinance of God, "they do not disapprove of any form of civil government, but do freely acknowledge that a kingly government, bounded by just and wholesome laws, is both allowed by God, and also a good accommodation unto men."

In regard to church government, the nine articles, mutually adopted in 1691, between the independents and other dissenters in England, may be considered as the foundation of the present practice, and are in substance as follows. The I., relating to churches and church members, declares, that each particular church has a right to choose their own officers; and, being furnished with such as are duly qualified and ordained according to the gospel rule, hath authority from Christ for exercising government and enjoying all the exercises of worship within itself. The II., relating to the ministry, affirms, that ministers ought to be endowed with competent learning, sound judgment, and solid piety; and that none are to be ordained to the work of the ministry but such as are chosen and called thereunto by a particular church; that it is ordinarily requisite, that every such church consult and advise with the pastors of neighbouring congregations; and that, after such advice, the person thus consulted about being chosen by the brotherhood of that particular church, be duly ordained and set apart to his office over them. The III., relating to censures, prescribes, that offending and scandalous members be first admonished; and, if that should prove ineffectual, be excommunicated by the pastors, with the consent of the brethren. The IV., relating to the communion of churches, asserts, that the particular churches are all equal, and consequently independent; but that the pastors of those churches have frequent meetings together, that, by mutual advice, support, encouragement, and brotherly intercourse, they may strengthen the hearts and hands of each other in the ways of the Lord. The V., relating to deacons, acknowledges that the office of a deacon is of divine appointment, and that it belongs to their office to receive, lay out, and distribute the stock of the church to its proper uses, but waves the subject of ruling elders, as a point of mutual forbearance. The VI., relating to occasional meetings of ministers, admits, that in weighty and difficult matters, it is needful that the ministers of several churches meet together, in order to be consulted and advised with about such matters, and that particular churches ought to have a reverential regard to their judgment so given, and not depart therefrom without apparent grounds from the word of God. The VII., relating to the civil magistrate, prescribes obedience to, and prayer for God's protection and blessing upon their rulers. The VIII., relating to confessions of faith, considers it sufficient that a church acknowledge the Scriptures to be the word of God, the perfect and only rule of faith and practice, and own either the doctrinal part of the articles of the church of England, or the Westminster confession and catechisms drawn up by the Presbyterians, or the confession of the congregational brethren, to be agreeable to the said rule. The IX., relating to the duty and deportment of the brethren towards those that are not in communion with them, inculcates charity and moderation.

It is argued by the independent writers in support of their principles, that the word εκκλησια, usually translated church, is always used in Scripture to signify either a single congregation, or the place where a single congregation is assembled; that, wherever there were more congregations than one, there were more churches than one; that though the whole nation of Israel is called a church, yet, as having but one place of worship, first the tabernacle, and afterwards the temple, it formed no more than a single congregation; that the Catholic church of Christ is likewise a single congregation, having one place of worship, namely, heaven, where all the members assemble by faith and hold communion, and where they shall be all finally gathered together as one glorious assembly. They farther insist, that the principle of congregational churches is confirmed by the practice of the primitive church; that the disciples in Jerusalem, though certainly numerous before they were dispersed by persecution, are never mentioned as forming distinct assemblies, but as meeting in one place; that after their dispersion, we no longer read of them as one church, but as the churches of Judea, Samaria, Gallilee, Galatia, Macedonia, Asia; but that whenever the disciples of a particular city, who might ordinarily assemble in one place, are spoken of, they are uniformly called a church; as the church of Antioch, the church at Corinth, the church of Ephesus, &c. That, in all these churches or congregations, there were elders or presbyters and deacons, who all laboured in word and doctrine, but none who merely assisted in ruling or governing, they argue from Acts xiv. 23. xx. 17; and that these office-bearers did nothing of common concern to the church, without the consent of the multitude, they hold to be deducible from Mat. xviii. 15, &c. Acts vi. 1. xv. 22. xx. 28. 1 Cor. v. 3, 4, 5. Rev. ii. 2. In regard to the ordaining of elders or pastors in a particular church, they reason, that the ordinary and permanent officers of Christ's appointment do not succeed those that were extraordinary, such as prophets and apostles, in any thing peculiar to their work; that what these inspired teachers were to the disciples of their time, their writings are to us; and that no man can now be called to the ministry of the word otherwise than that word directs; that the character, qualifications, and duties of those, who should exercise the office of elders in the church, are completely delineated in the New Testament; and that, as far as concerns this description, it is not competent for any man or body of men to add or detract; that whoever possesses these qualifications or characters, and is chosen by the congregation, has all the call and mission that is requisite, and can receive no new powers whatever from the ordination of a bishop or a presbytery. See Mosheim's *Ecclesiastical History*, v.; Neale's *History of the Puritans;* Hoornbeek, *Summa Controversiarum Religionis;* Glass' *Works;* Ewing's *Attempt towards a Statement of the Doctrine of Scripture on some disputed Points respecting the Government, Worship, and Discipline of the Church of Christ*, a work which at once ably advocates its principles, and frankly impugns the abuses to which they are liable; and Brown's *Answer to Independency*, the most complete view of the arguments on the opposite side. See also PRESBYTERY, in which will be given also a view of EPISCOPACY, as contrasted with the other distinguishing systems of church government. (*q*)

INDIA.

IN this article we mean, in the first place, to give an abstract of the history of India from the earliest period till the year 1760, when the Mogul dynasty was in fact reduced to insignificance, and the Europeans, particularly the English, began to assume the greatest influence in Hindostan: in the second place, we shall give a sketch of the rise and progress of the European settlements in India; and this will lead us to a continuation of the history of Hindostan from the year 1760 to the present time: and, lastly, we shall give the statistics of India.

I. HISTORY. When the Greek and Roman writers mention India, in the most extensive acceptation of the term, they include a space almost as large as the whole of Europe, comprising an area of 40 degrees of latitude and longitude. They regarded it as bounded on the west by the Arachosian mountains, which divided it from Persia; on the east, by the Chinese part of the peninsula beyond the Ganges; on the north by the deserts of Tartary; and on the south, by the line. Within these boundaries lay the hills of Tibet; the valley of Cashmere; all the territories in which the ancients placed the Indo-Scythians, Nepaul, Bootan, Assam, Camroop, Siam, Ava, Aracan, and the adjacent kingdoms as far as the China of the Hindoos, and the Sin of the Arabian geographers; the entire western peninsula of Hindostan; and the island of Ceylon.

In the acceptation of the term Hindostan, as used by the Mahomedan writers, the territory in immediate subjection to the sovereigns of Delhi was understood. This was divided, in the year 1582, by the emperor Acber, into eleven soubahs or provinces, viz. Lahore, Multan, in which Sinde was included, Ajmeer, Delhi, Agra, Allahabad, Bahar, Oude, Bengal, Malwah, and Guzerat; Cabul, and the countries lying to the west of the Indies, formed a twelfth soubah; and when the Decan was conquered, three new soubahs were added, viz. Berar, Khandesh, and Aurungabad.

It is evident, that the limits assigned to Hindostan by the Greek and Roman writers are not only much too extensive, but they are also very vague and indefinite; and that those assigned by the Mahomedan writers, being derived from and varying with the extent of the conquests of their sovereigns, are on that account unsatisfactory. The limits assigned by the original Hindoos are, on the contrary, extremely well defined. According to them, Hindostan is bounded on the north by the Himaleh mountains, which commence near the Indus, in about the 35th degree of north latitude, and extend from Cashmere without interruption beyond the eastern extremity of Hindostan; this limit on the north includes the hilly districts of Nepaul, and the country belonging to the Deb Rajah of Bootan: on the west, the river Indus is the natural boundary; and on the south, the ocean: on the east, the Hindoos point out the eastern hills and forests of Tipperah and Chittagong as the boundaries of Hindostan; these will carry their country nearly as far as the 92d degree of east longitude. Hindostan is thus defined by natural limits, and its extent and boundaries are pointed out almost as accurately and clearly by another circumstance; for within the natural limits the primitive Brahminical religion and languages prevail, with the exception of Bootan; nor are they found beyond these limits, except in Assam and Cassay. It was called Bharat-veeresh, or Bharata, by its ancient inhabitants, from Bharat, one of the nine brothers, whose father, according to the Brahmins, ruled the whole earth, and to whom this portion of the globe was assigned. To these names they sometimes prefixed the epithets of Medhyama, or central, and Punyabhumi, or the land of virtues. The word Hindostan, by which the Persians designated all that part of the empire that lies between the Indus and the Ganges, and the latitudes of 21° and 30° N. is derived from the words *Hindoo*, black, and *stan*, place; and the word Decan, which they applied indiscriminately to the whole of the southern peninsula, is derived from the Persian word *decan*, south.

Hindostan, fixing to it the limits assigned by the Hindoos, is divided into four large districts. 1st. Northern Hindostan. This comprises Cashmere on the west, and Bootan on the east; on the south, it is bounded by the first ridge of mountains that rise from the plains of Delhi, Oude, Bahar, and Bengal; and on the north by the Himaleh ridge, which divides it from Tibet. 2d, Hindostan proper comprehends the eleven provinces formed by the Emperor Acber already mentioned. The Nerbuddah river divides it on the south from the Decan. 3d, Decan is bounded on the north by the Nerbuddah, and by a line drawn from its source to the mouth of the Hooghly. The Krishna and Malpurba are the boundaries on the south. This division comprehends the provinces of Aurungabad, Khandesh, Beder, Hyderabad, Nandere, the northern Circars, Berar, Gundwana, Orissa, and great part of Bejapoor. 4th, The south of India extends from the Krishna to the ocean, and comprises a small part of Bejapoor; the Balaghaut ceded districts; the three Carnatics, northern, central, and southern; Mysore, Canara, Malabar, Barramahal, Coimbetoor, Dindigul, Salem, Kistnagherry, Cochin, and Travancore.

In the present article, we shall confine ourselves, both in the history and statistics, to the second, third, and fourth divisions of Hindostan, referring our readers to the articlas Cashmere, Nepaul, and Tibet, for information respecting the first division; and to Bengal, Canara, Carnatic, Malabar, Mysore, and Travancore, for more particular information respecting the principal provinces in those parts of Hindostan of which we shall here treat.

The traces of the ancient chronology and history of India are very faint and imperfect, and are nearly quite lost in remote antiquity. It is supposed by those Europeans who have made the most elaborate and careful researches on these points, and who have investigated and compared, on the spot, the features, manners, languages and religions of the various tribes who inhabit this vast territory, that a few only of the aboriginal inhabitants are to be found scattered in the hilly countries; and it is certain, that the Brahmins have traditions that their ancestors came from the north, and, having conquered Hindostan, established there their customs, religion, and languages. According to them, Bharata comprehended ten kingdoms or states, each speaking a different language; five of these were called Gaurs, occupying the northern and eastern parts of India; and five were called Draviras, extending from Cape Comorin to Guzerat. The first state of the Gaurs comprehended all the Punjab, as far west as the Indus, and south as Guzerat: it was called Sareswata from its principal river. The dominions of the Canyacubjas, a warlike nation, comprehended part of the province of Delhi, Oude, Agra, Serinagur, and probably Allahabad and Cashmere. Tirhut extended from the Cusi to the Gundhuc, and from the Ganges to the mountains of Nepaul. Bengala extended over the province of Bengal, and probably part of Bahar. Utcala extended along the shores of the Bay of Bengal, from Balasore to Godavery, and inland as far as Sammalpoor. Dravira proper extended from Cape Comorin to between 12 and 13 degrees of north latitude. North of Dravira was the kingdom of Carnatica; it occupied part of Mysore, the Carnatic, and the shores of Coromandel: its name may be traced in the Carnatic on the east, and Canara on the west coast. Tailingana extended over the country between the Krishna and Godavery. The country of Muru or the Maharashtras, now called the Mahrattas, occupied the district to the south of the Nerbudda, and the maritime country of the Kocan or Khandeish. Gurjera, the modern Guzerat, seems not to have changed its ancient limits. At what period these ten great kingdoms of Bharata were formed, or when they were mingled and redivided, is not known; but many centuries before the Mahomedan conquest they had changed their names and relative importance. About two thousand years before the birth of Christ, Bharata comprised four rich and powerful kingdoms, together with many subordinate principalities. According to the Puranas, or ancient books of the Hindoos, which treat of the creation, and of the genealogy of their gods and heroes, these kingdoms acknowledged, as their common head, the sovereign of the most powerful of them, with whom they all united for mutual defence against foreign invasion, and under whom, in time of war, they acted. At all other times, and in every other respect, they were separate and independent states. The kingdom of the Prachii, or Prasii, people of the east, was the most opulent and powerful: it comprehended the modern provinces of Bengal, Bahar, and part of Oude. The kingdom of Bejanagur, which ranked next that of the Prachii, comprised the whole of the great Peninsula, from the Krishna to Cape Comorin. The third state extended from the Gulf of Cambay to the mouths of the Ganges, and from the latitude of 22° to 17° north. The provinces of Lahore, Multan, Delhi, and Ajmeer, constituted the last of these kingdoms. The sole management of the internal police of all these kingdoms belonged to the rajahs of the several provinces, into which they were divided; but these rajahs were tributary and responsible to their respective sovereigns.

The only events in the History of Hindostan, prior to the birth of Christ, of which we possess any direct and clear information, either from the Greek and Roman authors, or from the ancient books of the Hindoos, are, the great war of the Mahabharat, the invasion of India by Sesostris, and by the Persians in the reign of Darius Hystaspes; and the transactions of the reign of Chandra Gupta, the contemporary of Alexander the Great.

The æra of the war of the Mahabharat can be fixed with considerable precision and accuracy; the heroes of that war are expressly declared in the Hindoo books to have been contemporaries with Parasara, in whose time an observation of the place of the solstices was made, from which it appears that he lived 1391 years before Christ. This war was carried on by Krishna and his brother Bali Rama, against Jara Sandha, who reigned in Magadha, and was distinguished by its cruelty, and by the decisive and permanent political and religious changes which it produced. The brothers having surprised their adversary in his capital, Rajagriha, caused him to be split asunder. The ancient worship of Siva, or Maha Deo, was nearly annihilated, in order to introduce that of Vishnuor Hercules, Krishna; those who still adhered to the ancient religion were compelled to flee to the mountains, while the political as well as the religious followers of Krishna took possession of the plains. At the period of this invasion, there existed in the kingdom of Magadha, several warlike tribes, called, Xetries ; by these Krishna was not only strenuously resisted, but his newly established power was rendered insecure by their activity and turbulence. In order, therefore, to give security and stability to his conquests, the Xetries were actually exterminated in many of the provinces, and Sudras and other low castes elevated in their stead. After the murder of Jara Sandha, Bali Rama placed Sahadevati, the son of Jara, on the throne of his father ; but his authority was little more than nominal, as Bali retained for himself the greatest part of his conquests ; the extent of these may be inferred from the circumstances, that within his own territory he built or restored Palipotra on the Ganges, Mahaballipooram to the south of Madras, and Pali Pura in the Decan ; and that Gada, another brother of Krishna, was raised to the sovereignty of the country called after him Gadipoor, or Gazipoor, while many other provinces were bestowed by Krishna on the principal of his followers.

Though it has been found so extremely difficult to fix the era of Sesostris, and to free his history from events evidently either fabulous or highly exaggerated, that many authors have been disposed totally to deny its authenticity ; yet it appears to us that no reasonable doubts can be entertained that he invaded India. The circumstances of this invasion, the causes which gave rise to it, and the objects which he had in view, cannot be ascertained ; but we are expressly informed by Diodorus Siculus, that he crossed the Ganges, and advanced as far as the Eastern Ocean. His conquests, however, were not permanent, and indeed were so contrary to the genius and habits of the Egyptians, that, on the death of Sesostris, they were entirely relinquished.

The Persians under Darius Hystaspes obtained a firmer, though a less extensive empire in India, than the Egyptians. That monarch having subdued the countries which lie in a south east direction from the Caspian to the Oxus, turned his thoughts towards India, on which they bordered. In order to prepare himself for this new enterprise, he appointed Scylax to explore the Indus and the country lying on its banks, from the upper part of its navigable course to its mouth. The account which Darius received from Scylax of the populousness, fertility, and high cultivation of this territory, incited the Persian monarch to aim at its conquest. This he appears soon and easily to have accomplished ; but his conquests did not extend beyond the district watered by the Indus ; and of the circumstances attending them, we are entirely ignorant. It would seem, however, that he compelled some of the Indian princes to acknowledge his dominion, by the payment of an annual tribute ; for we learn from a Hindoo writer, that the ostensible cause of the celebrated invasion of India by Alexander the Great was, to levy this tribute, which some of its princes had refused to pay, and to compel them to acknowledge their dependence on the throne of Persia.

It would appear, that the extensive confederacy formed in Hindostan, by the mutual understanding and the union of the four great kingdoms already mentioned, against foreign invasion, did not last long. Before the conquest of the Persians, dissensions had risen among the different states, which, together with the wealth of the people, and their unwarlike character, invited the inroads not only of these conquerors, but also of the fierce and destructive barbarians of Tibet. By them the northern provinces were attacked and laid waste. It appears also, that foreign war, instead of producing domestic concord, extended and heightened their mutual animosities ; so that, at the period of the invasion of India by Alexander the Great, the nations of the peninsula were totally separated from the kingdom of the Prachii, though the western provinces of Hindostan were more closely connected with it than at any former period.

It is highly probable, that this union of the western provinces enabled them to make such a vigorous defence against the enterprise and high military skill of Alexander, and the much superior discipline of his troops ; that their defence excited his surprise and admiration, we are expressly informed by Arian, Plutarch, and other historians; but their efforts, though roused to religious enthusiasm by the eloquence of the Brahmins, were ineffectual. Alexander, after having subdued several small states on the banks of the Indus, passed the different rivers of the Punjab, attacked Porus, the sovereign of that district, who had collected a numerous army to oppose his march, and obtained a decisive victory, in spite of the gallant defence of that prince, who, together with some of his most distinguished generals, was taken prisoners. This battle was fought on the banks of the Hydaspes, which river it was necessary for Alexander to cross, in order that he might reach the Ganges, the great object of his ambition. To this point he now resolved to push ; but his troops had already done so much, and suffered so greatly, especially from excessive rains and incessant inundations, that their patience as well as their strength were exhausted, and they unanimously refused to advance farther. Alexander tried every effort, but in vain, to change their purpose ; they were inflexible, and the conqueror was obliged to give way to his troops, to abandon all his favourite schemes of farther conquest, and to issue orders for marching back to Persia. This memorable mutiny took place on the banks of the Hyphasis, the modern Beyah, one of the most celebrated rivers of the Punjab. Alexander left behind him some of his most experienced officers, with a small part of his army, for the purpose of keeping possession of the conquered territory on the banks of the Indus ; but his troops gave way to every kind of corruption and debauchery, to which they were stimulated by the policy of the Hindoos ; mutual animosities and recriminations took place ; and the death of Alexander, which happened about this time, hastened the downfal of his power in Hindostan. It was not, however, immediately annihilated. Pytho, the son of Agenor, seems to have succeeded to some part of Alexander's Indian conquests ; and Seleucus, who obtained Upper Asia on the death of his master, considering those countries of India, which had been subdued by Alexander, as belonging to that portion of the Macedonian empire of which he was now sovereign, marched into it, partly with a view of establishing his own authority there, and partly in order to curb Sandracottus.

Sandracottus, called by the Hindoo writers Chandra Gupta, was descended from the ancient lunar kings of Magadha ; but he was illegitimate, his mother having been the daughter of a barber. His father was Nanda, king of the Prachii, of whom the Hindoos relate so many wonderful stories. Sacatara, his prime minister, murdered him in his old age, but was in his turn put to death, with the whole of his family, except one son by Upadhanwa, the son of Nanda. The young man, however, who had been spared, watched for an opportunity of revenge, and having provoked Upadhanwa to offer an affront to a Brahmin, he took advantage of the confusion occasioned by the consequent excommunication of the king ; and associating himself with Chandra Gupta, entreated the assistance of the neighbouring monarchs to overturn the kingdom of the Prachii. Of these monarchs, the one who could afford the most ready and effectual assistance, from the contiguity of his territories and his power, was Parvateswara, lord of the mountains, king of Nepaul; to him one-half of the kingdom of the Prachii was promised. This monarch not only assisted Chandra Gupta with his own troops, but also procured the help of the Yavans or Greeks. Their efforts, aided by cruelty and treachery, were successful; Chandra Gupta was seated on the throne of Prachii, but he soon forgot his promise to Parvateswara. The new monarch put to death all the noble and legitimate children of his father. His reign, however, though commenced with these acts of cruelty, seems to have proceeded in a manner much more creditable to his character; for he was respected abroad, and beloved by his subjects. Towards the western princes he was more grateful for the assistance they afforded him in obtaining his throne, than he appears to have been to the sovereign of Nepaul. At least it seems probable, from the accounts both of the Greek and Hindoo writers, that the invasion of India by Seleucus, about A. C. 300, was occasioned by Chandra Gupta having offered his assistance to the western princes against the neighbouring dominions of the Macedonians. The particulars of this invasion are obscurely and differently related. According to some accounts, Chandra Gupta marched a formidable army to the banks of the Indus, and having restored the conquered provinces to their rightful masters, offered battle to Seleucus, which that prince declined. According to other accounts, particularly those of the Greek historians, the expedition of Seleucus was splendid and successful. It is probable, however, that no decisive success was gained by either party; and the terms of the treaty, by which hostilities were concluded, seem to confirm this conjecture. By this treaty, Seleucus gave his daughter in marriage to Chandra Gupta, who in return agreed to furnish Seleucus annually with fifty elephants. In order to keep up and confirm more completely a friendly intercourse between the two monarchs, Seleucus sent Megasthenes, one of his officers, a man of considerable acuteness and information, to reside at Baliputra, the capital of Prachii. Daimachus was afterwards sent as ambassador to Allitrochidas, the son and successor of Chandra Gupta. The time and manner in which the possessions of the Greeks in India were finally and completely wrested from them, are not known, but it is probable that they were obliged to abandon that country soon after the death of Seleucus. About 179 years after the invasion of this monarch, however, Antiochus the Great made a short inroad into India, and concluded a peace with Sophagasemus, *Shivaca Sena*, the grandson of Chandra Gupta, receiving from him a number of elephants and a sum of money.

From this period, the race of Bali Rami, called the Bali Putras, gradually declined on the throne of Magadha, till A. D. 191, when a new dynasty arose. The native country of this new dynasty was Gaur; but they took their appellation from the province of Andhara, between Nellore and the Godavery, of which they were at one time sovereigns. The interval between Chandra Gupta, and the establishment of the new dynasty, was filled up by twenty-four kings; ten of whom were of the family of Soma, ten of the Suraya Varshas. The most remarkable of these was Vicramaditya, whose reign furnishes the date of the common æra of India, beginning 56 years before that of Christ. The four last kings of the old dynasty were of the Canwa race; and it was during their reign that the Andharas gradually rose to power. In A. D. 151, Sipaca, one of the Andharas, murdered the last Canwa prince, and placed himself on the throne of Magadha.

It is not easy to determine the exact extent, or the precise boundaries, of the dominions of Sipaca. In some grants of lands by him, which still remain, he styles himself lord of Tri Calanga, or the three shores. Hence it may be inferred, if this be not an oriental exaggeration, that he reigned over the whole of India. Of the dynasty of the Andharas, there were three races. The first was of the genuine family; the second of a spurious branch; and the third consisted of the servants of the latter, who at first governed, and at length dethroned their masters. Of these different races, little remarkable or authentic is recorded. The last of the second race, Puloman, is represented as a warlike and pious prince. After a life of heroic exploits, he voluntarily destroyed himself in the holy stream of the Ganges, imitating in this respect the example of his grandfather, who closed in a similar manner a brilliant career of conquest. Respecting the precise æra of Puloman there can be no doubt, since the Chinese annals coincide with those of Hindostan, in fixing his death A. D. 648. After that event, the greater part of India seems to have been divided into a number of small monarchies, which arose out of the confusion consequent upon the intrigues and establishment of the third and last race of the Andharas. Maharajahs, or great chiefs, established themselves at Canoge, in Guzerat, at Marthala, or Tirhut, Sacita or Oude, Varenesa or Benares, and Tamralipta or Tamlook. The kingdom of Magadha had originally comprehended South Bahar only; but under the lunar race of kings, or Chandra Varshna, its boundaries were very much extended. During the sovereignty of the third race of the Andharas, it was reduced to its original limits of South Bahar. The foreign princes who principally contributed to diminish its extent were, the kings of Guar, or Bengal, who at length became such powerful and troublesome enemies, that the seat of the government of Magadha was removed from Palibothra to Patna, as being at a greater distance from the frontiers of Bengal. About this time, it appears from the Chinese annals, that the country to the westward, or that portion of Hindostan called the Punjab, was ravaged by a tribe of Huns, whose savage appearance, and manners, and warlike character, so completely terrified the native monarchs, that they defended their territories in a very feeble and inefficient manner.

We now arrive at a period of the history of Hindostan not only of great interest and importance, but which is also made known to us in a much more ample and distinct manner than the events which preceded it; we allude to the Mahomedan conquest of that country. The first attempt of the Mahomedans to conquer India was made during the reign of the Kalif Omar, A. D. 636, but it failed of success. In the reign of the Kalif Walid, the conquest of Sinde was accomplished. Before this time, the Calif Ali had sent a general, who effected some trifling conquests on the confines of this country. But, after long and bloody conflicts, he was forced to desist. As soon as the Kalif Walid had achieved this important conquest, the incursions of the Mahomedans into the fertile countries of Hindostan became more frequent and successful. They do not seem, however, to have attempted permanent conquest till nearly two centuries after they had obtained possession of Sinde, the first Mahomedan prince who made a serious impression on India having been the Sultan Mahmoud Sebectaghin, who reigned at Ghazna. The empire of Ghazna was founded by Abistaji, governor of Khorasan, who rebelled from the king of Bucharia. His successor, Sebectaghin, the father of Mahmoud, appears to have meditated the conquest of the western part of India. He actually carried his arms across the Indus, and ravaged the Punjab; but he made no establishments there; for at the period of his son Mahmoud's invasion, a prince of the Brahmin race possessed the whole country along the east side of the Indus as far as Cashmere, his allies being the kings of Delhi, Ajmeer, Canoge, and Callinger.

These Mahomedan princes, though really independent, were however nominally subject to the Kalif; and even Mahmoud, on his accession to the throne, received the robe of honour, and the investiture as sultan, from the Kalif Cader, in the year A. D. 998.

Before Mahmoud began his first expedition into India, he extended his empire northwards by reducing Bucharia, and he also obtained possession of Balk, or Balich. Three years after his accession, he entered Hindostan; but he remained only a short time, as in the year A. D. 1002, he invaded Segestan. In the year 1005, he again entered Hindostan, and seized on Habeth and Multan. But he was again induced to leave his newly acquired territory, in order to turn his arms against Ilek Khan, who, taking advantage of his absence, had besieged Balk. Such was the activity and success of Mahmoud, that in 1006 he had slain the invader of his kingdom, and driven his army across the Oxus. As soon as he had secured his territories, he returned to India, under the united influence of ambition and religion; for, true to the spirit and express commands of Mahomet, his object was no less to make converts than to extend his dominions. His conquests, however, for some time were not very extensive; for in the course of eight years he made no further progress than to Multan. The inhabitants of this district, who, according to Major Rennell, were the Malli and Catheri (that is, the Kuttry or Rajpoot tribe) of Alexander, inheriting the martial spirit of their ancestors, opposed for so long a period such formidable armies, headed by so furious an enthusiast. In 1008, all the Hindoo princes, from the west of the Ganges to the river Nerbuddah, were confederated against Mahmoud; but they were at length defeated; and the victor's first step towards the destruction of the native religion was, the demolition of the famous temple of Nagore Cote, in the mountains adjoining the Punjab country. His sixth expedition took place in the year 1011; in this also he was successful, and true to his religion, he again took advantage of his success to destroy Tannasar, a place of Hindoo worship, on the west of Delhi; the city of Delhi itself was taken at the same time. In the year 1018, he reduced Canoge, and destroyed the temples of Matura, near Agra. Flushed with his victories, he resolved to attempt the subjugation of the Rajpoots of Ajmeer, who had joined in the confederacy against him; but their country, full of mountains and fastnesses, presented such serious difficulties, that he was compelled to relinquish his attempt. About this period he seems to have reduced Benares and Patna. Hitherto his conquests and victories had been confined to the north of India; but about the year 1020, allured by the reputed treasures of the south, he directed his march to that quarter. His route was by Multan and Ajmeer, the citadel of which last he was compelled to leave in the possession of the enemy; and in crossing the desert between it and Multan, he nearly lost the whole of his army from the want of water. He penetrated, however, as far as Guzerat, which appears to have fallen an easy prey: Nehrwalla, the ancient capital of that kingdom, was reduced; and the famous Hindoo temple of Soumenat, adjoining the town of Puttan, on the sea coast, was destroyed. Mahmoud, however, suffered this new conquest to retain at least a nominal independence, appointing a descendant of the ancient rulers of Guzerat to be its sovereign.

After an active and successful reign of thirty-one years, this prince died in the year 1028: his kingdom, at the period of his death, consisted of the eastern, and by far the largest portion of Persia, as well as nominally of all the Indian provinces, from the western part of the Ganges to the peninsula of Guzerat, and from the Indus to the mountains of Ajmeer. The Punjab, however, which was in the immediate vicinity of the empire of Ghazna, was the only part that was subject to regular government, under the Mahomedans. Mahmoud appears to have been a prince distinguished for the elegance and magnificence of his court, as well as for his patronage of literature. By his express order, the materials of the Shah-nameh were collected; and under his eye, Ferdousi composed that poem which has immortalised his name.

The empire of Ghazna, which had been brought to rapid and unnatural maturity by the talents and successes of Mahmoud, contained within itself the seeds of its own decay and destruction: his successors were occupied, either with petty warfare at home, or in the defence of their distant provinces, with various success. Thirteen monarchs of the dynasty of Sebectaghin reigned at Ghazna. Khosru Shah was the last; he was deposed and imprisoned in A. D 1158, the western and largest part of his empire being seized on by the family of the Gaurides: the provinces contiguous to both shores of the Indus remained to the old dynasty till the year 1184, when the Gaurides also gained them. The new dynasty established permanently the Mahomedan belief on the throne of Delhi, which they fixed upon as their capital in India. The father of Hassanben Hassan owed his advancement to the throne of Gaur to the seventh sultan of the Sebectaghin dynasty; and Hassan, taking advantage of the distracted and enfeebled state of the empire of Ghazna during the reign of the twelfth sovereign of that dynasty, invaded it, and, after various success, accomplished his object, and, as has been already mentioned, deposed and imprisoned Khosru Shah. Previous to the final conquest of Ghazna, Hassan, on what pretence or with what object does not appear, invaded the dominions of the Selucidæ, when he was taken prisoner; but he ingratiated himself so completely with the reigning monarch, by his talents for poetry, that the conqueror sent him back laden with his gifts to his own capital. He died either in the same year in which he took Khosru Shah prisoner, or in the year immediately succeeding.

Hassan was succeeded by his son Mahomed Seifeddein; no event of moment occurred during his reign, but the joint reigns of Giathodien Abulffutteh and Shahabodien Abul Muzzuffur, which lasted 40 years, and the period of four years, during which the latter survived his brother, fixed the Mahomedan empire within India proper on the throne of Delhi. The history of the immediate cause of the revolution which overturned the ancient Hindoo monarchy of India, Patti, or Delhi, is among the most romantic that even the annals of the East present.

"Jya Chandra, emperor of India, whose capital was Canoge, was not in truth the legitimate sovereign of the country: that title belonged to the young hero Pithaura, king of Delhi, whose noble character and unhappy fate are the theme of both Mussulman and Hindoo writers; the two monarchs appear, however, to have lived for some years in good intelligence, till, upon occasion of a solemn sacrifice at the capital of Jya Chandra, where the functions of officiating priests were to be performed by sovereign princes, Pithaura, not choosing to perform an inferior part, while his rank as superior lord should have made him high priest, absented himself from the ceremony, and thus incurred the enmity and persecution of the monarch of Canoge. Shortly afterwards a more romantic adventure terminated, not only in the destruction of Pithaura, but in his own ruin. Jya Chandra had adopted as his daughter a beautiful and accomplished damsel, whom the king of Sinhala Dwipa, or Ceylon, had presented to him, during an excursion he had made to that island under pretence of a pilgrimage, but in reality to extract tribute from the kings of the southern provinces. This damsel he had promised in marriage to a neighbouring monarch; but she, being enamoured of the noble and valorous Pithaura, refused her consent. Pithaura being at that time at Delhi, and hearing of her affection, disguised himself, his brother, and attendants, as the servants of a bard whom he sent to the court of Jya Chandra; and having by this means obtained an interview with the fair prisoner,—for such she had been since her avowal of her affection for Pithaura,—he carried her off in safety to Delhi, during a species of tournament held by Jya Chandra, though not without a combat, which deprived him of some of his bravest warriors. The king of Canoge, in order to revenge himself more completely for this insult, implored the assistance of Shahabodien, who accordingly marched with a powerful army against Pithaura, who roused himself from the delights of his capital, and the indulgence of his love, to meet the Mussulmans in the plains of Thanessar, where he was defeated and slain, A. D. 1194. His capital immediately fell, and Shahabodien fixed in it the first and greatest of the Mahomedan monarchies in India; and very shortly afterwards overthrew Jya Chandra himself, and thus obtained the most extensive and richest provinces of Hindostan."

Shahabodien was succeeded by Mahomed Gori, who reigned seven years. He fell a victim to the indignation excited by his treachery in betraying the young prince Ali Shah into the hands of his rival on the throne of Khouaresm, Mohammed Shah, being murdered in his bed, A. D. 1212. He appears to have been an active and enterprising prince, and extended his territory considerably. He perpetrated in Benares the same cruel intolerance as Mahmoud Sebectaghin had done at Nagore Cote, and Soumenat. He also carried his arms to the south of the river Jumnah, and took the fortress of Gwalior. He likewise reduced the eastern part of Ajmeer.

The death of this emperor occasioned a new division of the Ghaznian kingdom. The Persian part became subject to Eldoze, and the Indian part to Cuttub, who founded the Patan or Afghan dynasty in Hindostan. The latter was a native of Afghanistan, and originally a slave. He had been purchased by the emperor, whose notice he soon attracted by his talents and fidelity. As soon as he ascended the throne, he changed the seat of government from Lahore to Delhi, which was nearer the centre of the new conquests. The object of his immediate ambition seems to have been the reduction and annexation to his dominions of Bahar and Bengal; but his premature death saved them for a short period. The emperor Altmush, who ascended the throne of Delhi, A. D. 1210, was more fortunate, as he completed the conquest of the greatest part of Hindostan. He appears to have been the first Mahomedan who reduced Bengal under his power; the government of which was from this period bestowed on one of the reigning emperor's sons. In A. D. 1215, he had nearly subdued all the kingdoms and principalities in Hindostan proper; his empire extending from the mountains of Tibet to that part of the Decan which lies in the latitude of 20° North, and from the Indus to the Ganges. He appears to have been a spirited as well as a judicious prince; and it is surprising, if we consider the principles and spirit of the Mahomedan religion, and the conduct of his predecessors, that there is no proof of his having persecuted the Brahmins, or destroyed the Hindoo temples. He appointed governors to the different provinces, and established strict and wholesome regulations for the guidance of their conduct. The natives of Bengal neither made much resistance to his conquests, nor endeavoured to throw off his yoke; but the robust and hardy mountaineers of Ajmeer and Malwah, as well as the inhabitants of Guzerat, still continued to oppose his authority, and seized with avidity and zeal every opportunity to assert their independence. Hence these provinces were almost constantly the scene of insurrections, which it sometimes required the whole power of the emperor to subdue. During his reign, the insurrections in the western part of his dominions also were very frequent and formidable.

The emperor Altmush was contemporary with the celebrated Gengis Khan. It was in the year 1221 that this conqueror reduced to subjection, and annihilated the dynasty of Charasm, which had sate for some time on the throne of Ghazna. Mohammed Shah at this period sate upon the throne, and he claimed also the dominion of some part of India; but, in consequence of having provoked the rage of Gengis Khan, he had not the leisure nor the means to secure his Indian territories. The lieutenant of Mohammed, in his province of Transoxania, had seized and put to death some Tartar merchants, who were travelling in a caravan from the camp of Gengis Khan. The Mogul monarch immediately sent to demand an apology, which was imprudently refused. The consequence was, that he immediately invaded Khorassan, which Mohammed had conquered in a single battle in the year 1199, and, in spite of the valour displayed by the eldest son of the emperor, the troops of Mohammed were obliged to give way. At first the flight of the emperor was towards India; but, being intercepted, he was compelled to flee towards the Caspian Sea, in an island of which he died, A. D. 1220. His son fought long and valiantly, but without success, against Gengis Khan. One of his most desperate exploits was the swimming across the Indus in sight of the conqueror and his army. Five years afterwards he returned to Persia, and was for a short time successful; but he was at length obliged to yield to the better fortune of his opponent. By the year 1231, Gengis Khan had over-run all Asia to the northward of the latitude of 30°; but the difficulties he experienced in repressing the turbulent spirit of his Tartar subjects very probably deterred him from attempting the conquest of Hindostan; though, in the year 1222, he had become the nominal sovereign of the empire of Delhi, and actually subdued all the country on the west side of the Indus, and portioned it out among his favourite generals.

In the short and feeble reigns between the death of Altmush and the elevation of the Emperor Balin, the Mogul chieftains made several predatory incursions into the Punjab; and Turmeshirin Khan is reported by Sherefeddin, the historian of Timur, to have carried his arms into the Dooab, and to have penetrated even to the confines of Delhi. Ferishta, however, does not mention the progress of this desultory conqueror, but only describes the inroads of the Moguls into the Punjab, which now frequently happened. In the year 1235, Feroze reigned at Delhi; he did not, however, long enjoy his dignity; his sister, who was a woman of great intrigue and activity, and of wonderful beauty, having gained over the chief of the nobles, drove her brother into exile, and took possession of his throne. She, however, in her turn, was exposed to intrigue, and being obliged to flee from her capital, she was killed in endeavouring to escape from her other brother, Baharam, who was then raised to the throne. His reign also was of very short duration; for in little more than two years his army rebelled, and placed a son of Feroze on the throne; but he being a man of very weak abilities, was almost immediately deposed in favour of his uncle Nassurodien Mahmoud, a man of great energy, enterprise, and prudence, as well as of considerable literary attainments. For some time before he became emperor he had been imprisoned, and during his imprisonment he supported himself by writing, saying, that those who would not gain their bread by their labour did not deserve to eat. Even after he was seated on the throne, he continued to supply his private wants by his own industry. He was eminently successful in all his wars, and astonished his subjects by the moderation and clemency with which he pursued his conquests. He died after a prosperous reign of twenty-one years, and, leaving no children, was succeeded by Balin, who was of the same family.

Balin had been originally a Turkish prisoner, who was sold as a slave to a person at Delhi; here making known and proving his relationship to the reigning family, he was admitted into it, and advanced to the highest rank and privileges, even before the death of Mahmoud. The character of Balin is represented as excellent in almost every point of view. It was one of his highest gratifications to make his palace an hospitable asylum for the oppressed and unfortunate; and at one period he entertained and supported twenty of the unfortunate sovereigns, whom the irruptions of the Moguls had driven from their dominions. He employed immense sums in encouraging trade and manufactures, and in patronising the fine arts; and invited men of talents and literature from the most distant parts of Asia to reside at his court. Every night a society of poets, philosophers, and divines, met at the house of his eldest son; and over this society the poet Khosru presided: The patronage of the fine arts was more expressly the care of his younger son. The emperor himself encouraged magnificence in architecture, equipage, and dress, but he discountenanced drinking and debauchery of every kind. As his claim to the throne was rather doubtful, there were frequent insurrections against him, and he is accused of having punished the authors of them in the most cruel manner, it having been remarked that he never pardoned a traitor.

In the year 1268, he appointed his eldest son viceroy at Lahore, where his court became famous for its elegance and learning. When Balin was 80 years of age, the Moguls made a violent incursion into Multan, which the emperor sent his son to repel; in this enterprize he was slain, and his father died soon afterwards. At the time of his death, his second son Kera, being absent in his viceroyalty of Bengal, Key Kobad, *his* son, was placed on the throne of Delhi; but after a reign of three years, he was murdered, A. D. 1289, and Feroze the Second, an Afghan chief, was raised to the sovereignty. Properly speaking, he was of the tribe of Chilligi; but as the terms Patan or Afghan are applied in a loose manner to all the tribes bordering on the common frontiers of India, Persia, and Balk, he is included in the Patan dynasty. Although he was 70 years of age when he ascended the throne, yet he almost immediately projected the extension of his dominions by conquest. To this he seems to have been excited by his nephew Allaodien, a man of the most restless and insatiable ambition. Alla was governor of the district of Gurrah, which bordered on the Decan; it may be proper, however, to premise, that at this period, by the Decan was meant the country lying generally to the south of the Nerbudda and Mahanuddy, or Cuttack rivers. This country nearly equalled in extent the dominions of Feroze; for they stretched from the shores of the Indus to the mouth of the Ganges, and from the northern mountains to Cuttack, Sirong, and Ajmeer, the greatest part of Malwah, and the Guzerat and Sind, being then independent. Alla having learned that the king of Deogire, the present Dowlatabad, one of the states of the Decan, was immensely rich, communicated this circumstance to the emperor, and represented the facility of obtaining his riches, and conquering his territories. This roused the covetousness of Feroze, and war was agreed upon. Alla, being appointed to conduct it, made an irruption into the Decan; his first expedition was attended with the capture of Deogire, and with it an incredible quantity of money and jewels. As soon as Alla gained possession of these, he increased his army, and marching back to Delhi, deposed and murdered the emperor in A. D. 1295.

Alla began his plan of conquests by the reduction of Guzerat; for, while it continued independent, it presented a formidable obstacle to the conquest of the Decan. Having succeeded in his designs against Guzerat, he next reduced Rantampore and Cheitore, two of the strongest fortresses of the Rajpoots in Ajmeer; this was the first time that the latter fortress had fallen under the power of the Mahomedans. In the year 1303, he conquered Warangole, the capital of Tellingana, another principality of the Decan, comprising nearly the whole of the present district of Golconda. But while Alla was pushing his conquests in the south, he was suddenly called upon to defend his own capital against the Moguls, who laid siege to it with a powerful army, and even plundered the suburbs; he arrived at Delhi just in time to save it from destruction; and after one of the most obstinate and bloody battles that is recorded in Indian history, he utterly defeated the Moguls, who with great difficulty effected their escape across the Indus. In the following year the remainder of Malwah was conquered; but the continual and sudden irruptions of the Moguls rendering the presence of the emperor necessary in the northern provinces, the conquest of the Decan was assigned to Cafoor, an able and enterprizing general. He proceeded to the Deogire country, by the route of Baglana, which he reduced in his march; and not only carried his arms into Deogire, and from thence into Tellingana, but into the Carnatic also in the year 1310. By the Carnatic is here meant the Peninsula in general, lying to the south of the Krishna river. How much farther he penetrated into the south of India is not accurately known, but he was instructed by Alla to reduce Maber, by which Major Rennel understands the southern part of the Peninsula. The conquered countries were divided into provinces, over each of which Cafoor appointed a Mahomedan governor. The quantity of treasure which he collected almost surpasses belief; it is said that silver was regarded by the soldiers as too cumbersome, and that they would not load themselves with any thing but gold: according to Ferishta, the treasure taken amounted to 100 millions sterling; the princes of the Decan had been employed in amassing it for a great number of years, so that it is probable their country had remained undisturbed all that time. In the year 1312, Cafoor again ravaged the northern part of the Decan, and exacted fresh tribute from Tellingana and the Carnatic; as, however, his expeditions were rather of a predatory nature, agreeably to the genius of his master Alla, the entire and permanent conquest of those countries was not accomplished till about three centuries afterwards.

In the year 1316, Alla died. An illness under which he laboured, was increased by a general insurrection, at the head of which was Cafoor. He not only directed his ambition to the usual objects, wealth and conquest, but, in the early part of his life, he had formed the plans of founding a new religion, and of leaving a viceroy in India, in order to rival Alexander the Great, after whom he called himself Secunder Sani, Alexander the Second. As he had raised himself to the throne by the murder of his uncle Feroze, he was constantly the prey of suspicion. In order to guard against conspiracies and rebellion more effectually, he levied an immense army, whose services he endeavoured to secure by gratuitous advances of pay; he confiscated the property of several men of rank and influence in the empire; he published an edict, forbidding all private meetings among his grandees, and prohibiting the use of wine, and all intoxicating liquors; he strictly forbade the nobles to marry without license from him; he exacted from his Mahomedan as well as his Hindoo subjects, half the yearly produce of their lands; and he set aside every part of the Mahomedan law which was at variance with his own views of policy. At the period of his death, all Hindostan proper was comprehended in the Patan empire; and though, as we have just seen, Alla was a cruel and despotic prince, yet the internal police was so admirably regulated, that strangers might travel throughout his whole empire in perfect security.

Cafoor did not long enjoy the fruits of his ingratitude and treason; for, after a few months, Cottub, the eldest son of Alla, was placed on the throne. Nothing remarkable occurred during his reign, nor till the period when Mahomed III. became emperor. This prince at first seems to have been successful in the Decan; for he carried his arms to Warangole, the capital of Tellingana, which, during the disturbances that preceded Mahomed, had shaken off the Mahomedan yoke; but afterwards his reign was marked with misfortune. The Moguls penetrated nearly to Delhi; and he was obliged to raise immense sums from his subjects to induce the invaders to retire; the consequence was, that the farmers were so severely taxed, that some burnt their houses and crops in despair, and many fled to the forests, where they maintained themselves by robbery. To remedy these evils, Mahomed very unwisely issued base money, which necessarily increased them. He also lost much territory by rebellions in Bengal, Guzerat, and the Punjab. Under these calamities, he projected an invasion of China, to which he appears to have been stimulated by the reports that had reached him of the immense riches of that country; but he was repulsed on the frontier; nearly the whole of his army perished, and he was soon called upon to quell rebellions in the southern part of his dominions: he also planned the absurd scheme of transferring the seat of government from Delhi to Dowlatabad, and attempted it twice, but without success. Dowlatabad soon remained his only possession in the Decan; for some of the Hindoo princes, headed by Belaldeo, king of the Carnatic, taking advantage of the distracted and weakened state of his empire, drove his armies out of that country. About the same time, Belaldeo founded the city of Bijinagur. Mahomed died, after a reign of 27 years, in A. D. 1351.

He was succeeded by his nephew, Feroze III.; the new sovereign was much more desirous of improving what remained of his empire, than of adding to it by conquest. But whenever war was necessary, he displayed great energy and skill; and during his reign, he was called upon more than once to quell insurrection, and repel invasion. He built fifty great sluices or canals, forty mosques, thirty schools, twenty caravansaries, a hundred palaces, five hospitals, an hundred tombs, ten baths, ten spires, one hundred and fifty wells, one hundred bridges, and gardens almost innumerable;—such is a list of the works of this monarch; and in almost every instance they were planned and executed with great judgment, and contributed most materially to improve and beautify his kingdom. He was also fond of literature; and so thoroughly convinced of the beneficial effects of education, that he spared no pains or expence to bestow on his children the best that his time and age could afford. In the year 1357, the Moguls made another irruption; indeed the empire was not secure for any length of time, either from the invasion of these barbarians, or from the attempts of the Hindoos to regain their native land. The old age of Feroze was rendered unhappy, by the death of several of his children, and by a rebellion against his son Mahomed, to whom he had resigned the empire: he died in 1388. The grandson of Feroze, who seems to have succeeded to the throne, reigned only but five months; rebellion and civil war raged, and prepared the kingdom for foreign conquest. The nobles having put him to death, placed his cousin on the throne; but he also was unfortunate; for his uncle, Mahomed, returning from the exile into which he had been driven, recovered the dominions of his father; civil war still raged, and the historian relates an unusual circumstance which arose out of this civil war,—two emperors in arms against each other, residing in the same capital. In the mean time, an independent kingdom was rising up in the Decan, which was founded by Houssan, who had been a general under Mahomed III.: before his time, Deogire had been the capital of this part of India, but Houssan fixed his residence at the ancient Koolbourga, which he named Ahssunabad.

In the year 1397, intelligence was received at Delhi, that Timur Bec was approaching; this famous conqueror, after having overrun Persia, Turkestan, and part of Russia, turned his ambitious views towards Hindostan. During this year, he had sent his grandson, Peer Mahomed, to reduce the Punjab and Multan; and in the month of October he crossed the Indus himself. When he first proposed to his princes the invasion of Hindostan, he was answered by a murmur of discontent and despair. "The rivers, and the mountains, and the deserts, and the soldiers clad in armour, and the elephants, destroyers of men." These things his princes thought it was impossible to overcome; but when they perceived he was determined on the invasion, they gave way to his superior judgment, or were terrified into submission by his dreadful character. He had been informed by his spies of the weakness and anarchy of Hindostan; the soubahs of the provinces had erected the standard of rebellion; and the monarch was despised and disobeyed, even in his capital. The Mogul army moved in three divisions; between the Shylum and the Indus they crossed one of the ridges of mountains, styled, by the Arabian geographers, the stony girdles of the earth. The mountaineers, after a brave resistance, were reduced or extirpated; but great numbers of men and horses perished in the snow; the emperor himself was obliged to be let down one of the precipices on a portable scaffold, the ropes to which were 150 cubits in length, and before he could reach the bottom, this dangerous operation was five times repeated. He crossed the Indus at the passage of Attock: from this place to Delhi, the direct and most frequented road measured only 600 miles; but Timur deviated to the south-east, for the purpose of joining his grandson, who had by this time succeeded in the conquest of the Punjab and Multan. Being in want of provisions, he gave up the large and populous town of Tulmubini to the plunder of his soldiers; and when its inhabitants murmured at this conduct, he directed them to be massacred. After crossing the Hyphasis, he entered the desert, reduced the fortress of Batner, and advanced with little or no resistance to the city of Delhi.

In the mean time, the contending parties in the capital united for their common defence. The siege, more especially of the castle, might have been a work of time, but

Timur, by the appearance of weakness and indecision, tempted his adversaries to descend into the plain, with 10,000 cuirassiers, 40,000 foot guards, and 120 elephants, whose tusks are said to have been armed with sharp and poisoned daggers. Timur, though impetuous, was not destitute of prudence. In order to protect his troops against these numerous and formidable opponents, he made use of some extraordinary precautions of fire, and a ditch of iron spikes, and a rampart of bucklers; but the troops of the Emperor of Delhi were totally unable to cope with the Moguls; for, as soon as the elephants were routed, they fled in every direction. The emperor and his prime minister, seeing no possibility after this defeat of defending their capital, escaped under cover of the night, and fled towards Guzerat, whither they were pursued by a strong detachment, which Timur sent after them. This detachment came up with them; an engagement took place, during which the emperor effected his further retreat, with the loss of two infant sons, and a considerable number of his retinue.

Timur, in the mean time, made his triumphant entry into the capital of Hindostan, where he received the submission of all the principal nobles. To them he promised pardon and protection, on condition that they would pay him immense sums of money. Orders were accordingly given to the magistrates to levy the contribution by a scale proportioned to the wealth and rank of the inhabitants. The Tartar officers who were employed to receive it, not satisfied with the regulated sums, violently broke into the houses; this occasioned resistance, in the course of which some of Timur's troops were put to death. Timur immediately issued orders for a general massacre. Delhi was sacked; its palaces and temples burned, and its streets filled with blood. Timur remained in Delhi only fifteen days, and appears then to have designed to return to the seat of his empire, when, having heard of a fortress on the Dooab which had resisted the arms of a former Mogul invader, he changed his purpose, marched into that district, and reduced the fortress. While here, information was given him respecting the famous cavern of Coupele, and the religious ceremonies which were practised at it by the Hindoos, in consequence of its resembling a cow's mouth, and the Ganges flowing through it. This information excited the persecuting spirit of this barbarian, and he determined to purify his soldiers in the blood of the idolatrous Hindoos. In this he succeeded. His return was along the skirts of the northern hills, by Mount Sewalic; in his route, he continued his massacres, though not without opposition, until he arrived on the frontiers of Cashmere.

His return was occasioned by disturbances in some of the provinces of his empire, stirred up by the famous Bajazet. On the banks of the Ganges he received intelligence regarding them, and in little more than five months he had crossed and recrossed the Indus. He may be said, however, rather to have overrun than to have reduced and conquered; for he did not disturb the order of succession in Hindostan, reserving to himself the possession of the Punjab only. During his life, which terminated in the year 1405, he was prayed for in the mosques of Hindostan, and the coin was struck in his name; but this might be more the effect of policy than the act of Timur. For, soon after he left Hindostan, his authority virtually ceased in Delhi;—that capital became the prey of the most dreadful and cruel dissensions; and while in this state, it was seized upon by a petty usurper. He, however, was soon driven from his throne, and Mahomed, who reigned at the period of the invasion of Timur, was replaced on it. But his authority was very confined; for the soubahs of the provinces, taking advantage of the Mogul invasion, and its immediate consequences, revolted from the supreme government of Delhi.

In 1413, Mahomed died, and with him ended the Patan dynasty. Several sovereigns, supported by different parts of the army, set themselves up in different provinces. At length the throne was occupied by Chizer, who styled himself a *Seid*, or descendant of the holy line of the prophet Mahomed. In order not to rouse the hostility of the Mogul princes, he did not assume the imperial titles, but represented himself as holding his authority under them. This, however, did not preserve his territories from invasion; for, during the space of nearly thirty years, the Moguls retained possession of the western states of Hindostan, from which they made frequent incursions into those which lay nearer Delhi. After a turbulent reign of seven years, Chizer died. He was succeeded by his son Mubarric Shah, of whom Ferishta says, " he reigned 13 years; he was esteemed a man of parts, just and benevolent; and though no great warrior, had he lived in a virtuous age, there is no doubt but he possessed talents which might have rendered him worthy of a throne." During the next 27 years, the throne was filled by his nephew and his son Alla.

The feeble and inauspicious dynasty of the Seids terminated A. D. 1450, by the abdication of Alla, and the subsequent elevation of Belloli, an Afghan of the commercial tribe of Loudi, by whom an inland trade was carried on between Persia and Hindostan. Belloli is represented as a humane and generous prince; but being destitute of talents and vigour, he was totally unqualified to preserve the empire under the circumstances of dissension and weakness in which it was placed. In 1488, it was dismembered. All Hindostan fell into separate governments, and the authority of the emperor did not extend beyond the province of Delhi and the contiguous districts. The whole of Bengal and Bahar was under the dominion of a Mahomedan usurper, who had taken the title of king. A potentate, styled King of the East, whose residence was at Jionpour, in the province of Allahabad, was the most formidable of these petty sovereigns. The provinces of the Decan, north of the Krishna, had long thrown off their allegiance, and were now formed into five Mahomedan states, equally independent of each other, and of the imperial government. Yet though the monarchs of Delhi had thus lost their influence and power, they still retained their diadem; and Secunder, the son of Belloli (who reigned thirty-eight years) an enterprising prince, would probably have regained some part of its dignity, had not a premature death put an end to his projects. He died at Agra in 1509, to which city he had transferred the seat of government.

He was succeeded by his son Ibrahim, a man of a very different character. He rendered himself ridiculous by his vanity, and detested by his cruelty. The horrors of civil war and assasination were spread over the country. At length the nobles, who were apprehensive that they were not of themselves equal to the task of getting rid of their tyrant, solicited the assistance of Sultan Baber, the Mogul prince of the house of Timur Bec. This sovereign reigned over a kingdom composed of most of the provinces situated between the Indus and Samarcand. Having been stript of the northern parts of his dominions by the Usbecs, he determined to try his fortune in Hindostan, and accordingly most readily accepted the invitation of the nobility of Agra. His residence was at Cabul, whence he undertook his first expedition across the Indus, in the year 1517. But it was not till six years afterwards that he took possession of Lahore, and the next year he marched to Delhi. Before he reached that city, Ibrahim met him with a large army, and a fierce battle ensued on the plain of Panniput. In this battle, 16,000 Patans, with Ibrahim himself, were killed. Thus an end was put to the dynasty of Loudi. Baber, in consequence of this victory, proceeded first to Delhi, and afterwards to Agra; both these cities opened their gates to him, and he was proclaimed Emperor of Hindostan, in the year 1525. It is said that he crossed the Indus the last time with only 10,000 chosen horse, the enemy's generals, by their revolts, furnishing him the rest of his army. The provinces which he gained were those of Multan, Lahore, Delhi, Agra, Ajmeer, and Oude: for, as we have already remarked, the empire of Delhi was no longer the same that flourished under Balin. The province of Bengal was completely separated. The rich countries of the Decan were the seat of another empire. Guzerat did not even nominally acknowledge the sovereigns of Delhi, and the mountain tribes of Patan were independent, or at least troublesome and restless subjects.

The reign of Baber, even in those districts which he gained, was by no means free from anxiety and disaster. He was frequently harassed by insurrections, and at one period his fortune seemed so desperate, that his nobles advised him to return to Cabul. To this, however, he would by no means agree; and by his moderation and firmness, united to a considerable degree of talents and activity of mind, he overcame all obstacles, and placed his kingdom in a state of comparative tranquillity. He died in the year 1530. His character may be thoroughly understood, both from the account given of him by Ferishta, and by the memoirs of his life, written by himself; and the historian does not appear to have drawn it in too flattering colours in the following terms: "He so often pardoned ingratitude and treason, that he seemed to make it a principle and rule of his life to return good for evil; he thus disarmed vice, and made the wicked the worshippers of his virtue. He was of the sect of the Haunafies, in whose tenets and doctrines he was perfectly versed; but he yielded more to the evidence of reason, than to the marvellous legends of superstitious antiquity. He was not, however, forgetful of that rational worship which is due to the Great Creator, nor a despiser of those laws and ceremonies which are founded on sound policy. He excelled in poetry and music, and he wrote his own commentaries in the Mogul language with such elegance and propriety, that they are universally admired." The historian adds, that he was fond of pleasure, though moderate in its enjoyment; and that he was equally celebrated for his clemency, courage, and justice. As an instance of the latter, he relates, that a caravan from China having been buried in the snow in crossing the mountains, he caused the merchandize to be collected, and sent notice to China of what had happened, in order that the owners might claim their property; and he restored it to them, refusing to be reimbursed even the expences he had incurred.

His eldest son, Houmaioun, who had been the companion of his victories, and the partaker of his fame, succeeded him; but the short reign of Baber had not allowed time enough to compose the distractions that prevailed, or to exterminate the seeds of rebellion. After having subjugated the valuable provinces of Guzaret and Malwa on the west, and those of Bengal and Bahar on the east, the viceroys of which, as it has been stated, had declared themselves independent of the supreme government, he found himself compelled to abstain from future conquest, and to turn his whole attention to his domestic concerns. The Patans were encouraged to disturb the tranquillity of his kingdom by his own brothers, to whom he had generously offered to give up one half of the empire. This they refused; and after twelve years of civil war, and encountering every species of distress and difficulty, Houmaioun was obliged to flee for refuge and protection, first towards the Indus, and the Rajpoot princes of Ajmeer, and afterwards to the court of Shah Tamash, king of Persia.

In the mean time Shere, an Afghan chief, ascended the throne of Delhi; and one of the brothers of the exiled emperor possessed the provinces to the west of the Indus. Shere was a man of extraordinary talents, and a brave and skilful warrior. He built caravansaries for every sect at every stage, from Bengal to the Indus, a distance of 3000 miles; and planted fruit trees along the road, for the accommodation of the passengers. He was the first who established horse-ports in India, for the purposes of government and commerce. In his reign such was the vigilance of the police, that travellers rested and slept with their goods in the highways with perfect security. These are proofs of the good qualities which he possessed, and exercised for the improvement and benefit of his country; but, on the other hand, he was cruel, vindictive, and treacherous. He was killed by the bursting of a shell at the seige of Cheitore, after a reign of five years, A. D. 1545.

His eldest son Adil succeeded him; but this prince was so totally unfit, and so little willing to govern, that, before he was crowned, he resigned his title to Selim his brother. So very unsettled was the state of Hindostan at this period, that no fewer than five sovereigns appeared on its throne in the course of nine years. In effect, there could not exist in the minds of the people any idea of regular and fixed government; for there had been scarcely twelve years in succession during two centuries, that did not furnish some example of successful rebellion. This induced a strong party in Hindostan to invite Houmaioun back. Secunder, the nephew of Shere, who had assumed the imperial title, and reigned at Agra, made great preparations to resist the invasion; but Houmaioun, having been assisted by the king of Persia, and by the troops of several Tartar and Mogul tribes, was too powerful for him. The battle of Serhind, which was fought in the year 1554, was decisive of the fate of Delhi, and destroyed for ever the Patan power. Houmaioun, however, did not long enjoy his crown; for, in consequence of an accident, he died the year subsequent to his victory. He was celebrated for the mildness and benevolence of his disposition, and not less for his great personal bravery.

He was succeeded by his son Acber, who had been born when he was an exile among the princes of Ajmeer. Acber was about fourteen years of age when his father died. The reign of this sovereign is the most prosperous and brilliant in the history of the Mahomedan empire of India. Even at the commencement of his reign, he conducted himself with a prudence and dignity rarely found united in so young a person, especially in the difficult circumstances in which he was placed. He had been left by his father under the special guidance of Byram Khan, who was appointed minister during his minority, and who was a man of great abilities, but of a boundless ambition and an imperious temper. Acber had the consummate address to render his minister's talents solely subservient to the necessities and advantage of the state; while at the same time, by asserting his own authority on every proper occasion, he restrained the passions of Byram, and placed limits to his ambition. The unsettled state in which the empire had been left, required all the talents and resolution, and occasionally all the harshness of the minister, and all the bravery and gentleness of the prince, to reduce to any kind of order the discordant materials of which it was composed.

The first act of Acber gave pleasing and satisfactory presage of the principles on which he intended to regulate his conduct. He issued orders prohibiting the exaction of the present money, on the accession of the new sovereign, from the farmers, forbidding the pressing of labouring men for the wars, and permitting all goods to pass from one part of his dominions to another toll free.

The first years of Acber's reign were employed in the reduction of the revolted provinces, from Ajmeer to Bengal. In this enterprize Byram was a principal actor. As soon as these provinces were restored to the empire, Acber endeavoured to preserve them, by a proper choice of governors; by wise regulations; by an unlimited toleration in religious matters; and by a proper attention to the habits and wishes of the people. The Hindoos still formed the great mass of his subjects; and the emperor had learnt from past events, that the passive religion and temper of these people would, if left to themselves, never disturb the established government.

Acber, soon after the reduction of these provinces, had a difficulty of a far different kind to struggle with; for his minister Byram, being offended at his master's endeavours to emancipate himself from his guidance, took up arms against him, under the pretence of a pilgrimage to Mecca. He was, however, soon overcome; and gratitude for the substantial benefits he had received from him, as well as the natural kindness of Acber's nature, prompted him to grant a full pardon to the rebel. The sovereign invited him with kindness to return to his service; and when Byram threw himself at the foot of the throne, he took him by the hand, raised him up, and throwing a robe of state over him, placed him in his former rank at the head of the nobles. "If," said Acber, "the lord Byram loves a military life, he shall have the government of Calpe and Chindore; if he prefers remaining at court, he shall be loaded with favours; and should religion prompt him to go on a pilgrimage to Mecca, he shall be escorted in a manner suitable to his dignity." Byram preferred the pilgrimage; and Acber gave him a suitable retinue, and 50,000 rupees to support him. On his journey to Mecca, he was unfortunately murdered, with his guard, by some of the Afghans of the tribe of Loudi.

In the year 1585, he resolved to attack the Decan; and soon afterwards carried the war into Berar, while another army was reducing Cashmere in another corner of the empire. The Decan appears at this time to have been divided into the states of Khandeish, Dowlatabad, Golconda, and Bejapoor. Berar and the Carnatic, each of which included several distinct governments, do not seem at this period to have been included in the Decan. Most, if not all the four states just enumerated, were governed by Mahomedan princes. In his attempts against the Decan, Acber was not completely successful; for at the period of his death in the year 1605, no farther progress was made in the reduction of it and the contiguous provinces, than the occupying the western part of Berar, Khandeish, Tellingana, a division of Golconda, and the northern part of Dowlatabad. The capital of this last province was taken in the year 1601, after a long and bloody siege, and an unsuccessful attempt to relieve it, by the confederate princes of the Decan.

In these wars Acber himself was not engaged. They were carried on by his sons, and the Patan and Hindoo chiefs on the frontiers. In the mean time, the emperor himself, with his minister, the learned Abul Fazel, was employed in regulating the internal management and economy of the kingdom. Inquiries were set on foot, by means of which the revenue, population, produce, religion, arts, and commerce of each individual district were ascertained, as well as its extent and relative position. Most of these important and useful particulars were by Abul Fazel collected into a book, called the Ayeen Acbaree, or Institutes of Acber. Hindostan proper was divided into eleven soubahs, some of which were in extent equal to large European kingdoms. The soubahs were again divided into circars, and these subdivided into purgunnahs. The names of the original soubahs, as well as of those which were added, have already been given; and the leading particulars relative to the extent, &c. of each soubah, will be noticed when we treat of the statistics of India. At present, we shall only offer a few remarks taken from Major Rennell, on the boundaries of those soubahs that bordered on the Decan, in order to have a more precise and accurate idea of the conquests of Acber.

"Guzerat extended southward to Damaun, where it touched on the district of Baglana, a division of Amednagur.

Malwah extended to the south of the Nerbudda river; and an angle of it touched on Baglana and Khandeish, on the south-west and south, and on Berar on the east. The Nerbudda formed the rest of the southern boundary of Malwah, and also of Allahabad. The government of Bengal extended to Cuttack, and along the river Mahanuddy; but the soubah of Orissa appears not to have been formed at that time.

Of the newly erected soubahs in the Decan, Khandeish, the smallest of them, occupied the space between Malwah on the north, Berar on the east, and Amednagur on the west and south.

Berar had Allahabad and Malwah on the north; Khandeish and Amednagur on the west; Tellingana and Golconda on the south; and Orissa on the east, as already stated, only the western parts of Berar were reduced by Acber.

Amednagur, the southmost of Acber's soubahs, had Khandeish and Malwah on the north; the Gaut or Balagaut mountains on the west; Visiapour and Tellingana on the south; and Berar on the east. The limits of this soubah are not defined in the Ayeen Acbaree; and as Acber had wars in the Decan during almost his whole reign, it may be supposed that its limits were perpetually fluctuating.

Tellingana, which in the Ayeen Acbaree is called a circar of Berar, was possessed only in part by Acber. Tellingana, of which Warangole was the capital, comprehended the tract lying between the Krishna and Godavery rivers, and east of Visiapour, (answering to the modern province of Golconda,) and was probably in more early times an extensive kingdom."

After Acber had ascertained, by the enquiries he instituted, the condition and the wants of the different provinces of his vast empire, he applied himself most diligently and wisely to their improvement. Schools were established, in which both the Indian and Arabic languages and sciences were taught. Translations of works both of instruction and taste were made at his express desire, and under the direction and superintendance of Abul Fazel. Under his mild and equitable government, agriculture flourished, commerce revived, the arts prospered, and his subjects enjoyed the fruits of their increased industry, free from those apprehensions of insecurity to which they had been so long exposed. Acber participated in the prosperity of his people. His regular annual revenue amounted to nearly 30,000,000*l.* sterling; and from sources less regular and permanent, he frequently derived in the course of the year about twenty millions more. His armies were not less remarkable for their numerical strength, than their excellent equipment and discipline. They consisted of about 300,000 horse, and an equal number of foot. They were composed principally of detached tribes under independent chiefs; and, from this circumstance, it required all the vigilance and vigour to prevent rebellions and insurrections from being much more frequent and dangerous than they actually were. Acber died after a reign of 51 years, in the year A D. 1605. Prince Danial, his eldest son, died just before him.

Immediately on his decease, a powerful party of the nobility intrigued for the purpose of placing Khosru, the son of Selim, Acber's only surviving son, on the throne; but their designs were frustrated, and Selim succeeded. The new monarch assumed the appellation of Jehanghire, or conqueror of the world. Scarcely was he seated on the throne, when his nephew Khosru engaged in open rebellion; to this step he seems to have been led rather by the advice and intrigues of the nobility, than by his own wishes or judgment. The rebellion, however, was soon quelled, and Khosru thrown into prison. As soon as Jehanghire had restored internal tranquillity to his kingdom, he turned his thoughts to the conquest of the Decan. He seems, however, from some cause, not very apparent, not to have pursued this object with perseverance or zeal. War was also made on the Rajpoots, and the Rana, or chief prince, compelled to sue for peace, on terms most favourable to the emperor.

Jehanghire was a man of talents, and would have proved himself such by his conduct, had not his councils been rendered vacillating and weak, and his government been constrained, by the influence of his mistress Noor Jean. She was the daughter of Aiaas, a Tartar, and was born in the wilderness, to which the poverty of her father had obliged him to flee. Aiaas afterwards came to the court of Jehanghire, and being a man of considerable abilities, and of probity, he was soon noticed and patronized; his daughter was educated with the greatest attention and care, and she soon became one of the most accomplished women in Asia. As she was also greatly distinguished for her beauty and her wit, she was not long in attracting the particular notice, and exciting the warm affections, of the young prince Selim. He requested his father Acber to demand her in marriage for him; but as she was betrothed to Shere Afkhun, one of the most accomplished and bravest nobles in India, Acber refused to interfere. Selim, therefore, was obliged to wait till he ascended the throne, when, his passion still being as ardent as before, he resolved, by whatever means, to gratify it. Noor Jean was by this time married; but this circumstance possessed no weight in the mind of the new sovereign. He caused her husband to be assassinated, and the widow to be conducted to the royal Zenana. She soon proved that she did not bear implacable resentment against the murderer of her husband, and that ambition was more powerful in her breast than affection. She became the wife of Jehanghire, and shortly afterwards her influence over him was almost without limits. Her father and brothers were raised to the first offices in the empire, and her relations, to the most remote degree, came from Tartary to the Mogul court, where she heaped upon them wealth, rank, and power.

In one respect, however, her influence, and the situation to which she was raised, was beneficial not only to the emperor, but also to the kingdom at large. Her father was appointed prime minister; and as his talents were not weakened nor abused by his elevation, and his probity remained unimpaired, he did great service to the state. Under the name of Actemad ul Dowlah, he exercised the office of prime minister in such a manner till his death, that his name is to this day revered by the people of Hindostan. The principles upon which he administered the government were similar to those upon which Acber had conducted himself; he regarded the industry of the people, not only as the only source of wealth and prosperity, but also as the surest defence against foreign foes, and the best preservative of internal quiet. Forests were cut down, and towns and villages were built; manufactures flourished under his auspices; but it was to the improvement of agriculture that he specially directed his attention and his measures. Those provinces, which during war had been desolated, were repeopled and cultivated. Religious persecution was unknown; the Hindoo and the Mahomedan were equally the objects of his care, and placed equally under the protection of the laws. It was in this reign that Sir Thomas Roe was sent as the first English ambassador to the Emperor of Hindostan. He presented a coach to Jehanghire from James I.; and, in spite of the opposition of the Prince Royal, obtained the object of his mission, which was leave to establish a factory at Surat. In the second division of this article, the European establishments will be particularly considered; we shall, therefore, only remark in this place, that the Portuguese had by this time acquired considerable settlements in Bengal and Guzerat; but only those at Guzerat, where they also possessed some extent of territory, attracted the notice of the court; and it is curious to observe in what terms the author of the Ayeen Acbaree mentions them. Speaking of the lands of Guzerat, he says, "By the *neglect* of the king's governors, several of these districts are in the hands of Europeans." Ferishta also, mentioning the site of an ancient Hindoo temple near Diis, says, that it was situated in the districts that were subject to the "idolaters of Europe."

The rebellions of his son, Shah Jehan, embittered the latter part of his reign; and these rebellions were sometimes fostered and strengthened by the nobles, whose martial habits rendered a life of peace irksome to them, and sometimes excited by the intrigues of the empress.

Jehanghire died in 1628: at the time of his death he was on a journey to Cashmere, in the cool and beautiful vallies of which he was accustomed to reside during the sultry months of summer. "This Monarch had the character of being a Deist, because he protected the followers of Brahma and Zoroaster, and even tolerated Christians as well as Mahomedans: he was most rigorous in administering justice, punishing even those he loved, without regard to greatness of situation or office. He was completely free from avarice; and his disposition was forgiving. In private his temper was capricious, so much so, indeed, as to bear occasionally the character of insanity, with which malady his unfortunate son Khosru was certainly afflicted. He was naturally indolent, and indulged much in wine and opium; but he was fond of literature, and has left a well written life of himself. So well known, and so well beloved was he, that he frequently left his palace in a simple habit, and mixed with the evening parties of every rank: his person was too well known to be disguised; but he never had reason to repent of his familiarity with his people."

On the death of Jehanghire, the nobility resumed their intrigues, in the hopes of preventing the succession of his son Shah Jehan; but as there were several parties among them, each with a different view, though all hostile to Shah Jehan, their schemes were defeated by their own want of concord. It is probable, however, that they might not have been defeated so soon or so easily, had not the emperor received the valuable assistance of the talents of Asiph Jah: this person was the son of Aiaas, and consequently a brother of Noor Jean; but he was still more closely connected with the emperor, by the latter having married his daughter. By means of this man, Shah Jehan was seated peaceably and firmly on the throne; and he no less rewarded his services, than secured the tranquillity and prosperity of his own kingdom, by raising him to the rank of vizier. As soon as the intrigues of the nobility were quelled, Shah Jehan caused the male descendants of Baber to be put to death; and, in order to make the people forget this cruelty, he held a festival, which surpassed in magnificence every thing of the kind that had ever been celebrated in the East.

During the first years of his reign, he was prosperous and happy: his kingdom flourished; his conquests were extensive; and in his domestic concerns there was concord and affection. His father-in-law continued vizier till his death, which happened in his 72d year—and though his measures were sometimes despotic, yet they were generally wise and prudent, and productive of beneficial results. The empress was a woman of an amiable and gentle disposition, and of great virtue as well as beauty; she conducted herself with so much prudence and propriety, and with such strict and regular regard to her husband's wishes and views, that she obtained unlimited influence over him: during her life, he had no other wife, and when she died, he raised to her memory a beautiful tomb, of the finest marble, inlaid with precious stones, which cost *L*.750,000.

The Mogul dominions were considerably enlarged during the reign of Shah Jehan; the conquest of the Decan was pursued with great vigour, and the plunders and devastations perpetrated there, occasioned most of its princes to make submission, and acknowledge the emperor as their sovereign. The whole of Bengal was entirely subdued; and the states of Tibet and Assam were kept in awe; Candahar was recovered from the Persians; Cashmere was governed by a vice-roy from Delhi; and Guzerat was reduced to obedience. Golconda was in part actually taken possession of; but Bejapoor and the Carnatic, together with the region of the Gauts, remained in the power of their ancient possessors. In the wars, during which these conquests were achieved, Shah Jehan was principally indebted for his success to his general Mohabet, his son Khan Ziman, and on their death, to the military talents of his own sons. There were four of them, Dara, Sujah, Aurengzebe, and Morad. The characters and talents of all these were distinctly marked, and though in some respects they resembled one another, yet in many material points there were great and striking differences. Dara was undoubtedly most richly gifted by nature of all the sons, both in the qualities of his mind, and in the virtues of his heart. Like all the princes of the house of Baber, he was well versed in the learning of Persia and Arabia; and he caused himself to be instructed in the ancient learning of Hindostan by some Hindoo Pundits, whom he liberally paid for that purpose; he was even anxious to acquire some insight into the literature and the customs of Europe; and in order to gratify his desire in this respect, he paid great attention to, protected, and encouraged the Jesuits, who had a college at Agra. In his temper he was frank, far beyond what the manners and habits of the east require or sanction; and his generosity was unbounded, and not always under the guidance of a discriminating prudence. In his person he was remarkably handsome; and his address was elegant and insinuating. Possessed of these qualifications, he was deservedly a favourite with almost all classes and descriptions of his father's subjects. Sujah, the second son, was distinguished for his prudence, which directed or restrained the openness of his temper, and the generosity of his disposition, much more than Dara was inclined or could be induced to do: but his prudence, though a guard against the excess of these qualities, was but a feeble barrier, when the attainment of pleasure was Sujah's object; in this respect he was weak and unrestrained. Both these sons were distinguished, and nearly in an equal degree, for their talents and success as warriors; but the third son, Aurengzebe, was superior to either of his brothers, in the politics, the skill, and the bravery, which a state of warfare demands. As he was inferior to his brothers in the advantages of person and address, he endeavoured, and but too successfully, to compensate for these deficiencies, by dissimulation and intrigue. Wrapt up within himself, though apparently open and artless, he threw his adversaries off their guard, and succeeded at one and the same time, in concealing his own sentiments and plans, and in developing those of others; when it was necessary to gain over his opponents, or to make use of them as instruments in his own hands, he displayed wonderful powers of address, and exquisite knowledge of the weak parts of the human character. It is evident that such a disposition and habits as Aurengzebe possessed, aided by no mean talents, and the happy and not common art of having these talents always at command exactly when they were wanted, were capable of producing much good, or much evil, according as they were directed. Unfortunately, ambition, of no low standard, was the ruling passion of his heart; and this ambition, which aimed at as high power as lay within his reach, he was resolved to gratify, without the smallest compunction of conscience, regarding the measures which it might call upon him to execute. But he well knew, that as he was not the oldest son, it would be indispensably necessary to keep his ambition concealed from every eye; he therefore affected the habits of a Faquir, and used religion as a mask to cover his designs. The distinguishing features in the disposition of the fourth son were, violence and impatience; but they were not the violence and impatience of a bad heart, or of an unfeeling temper; they were rather constitutional than the result of thoughtlessness or vice, and they were accompanied, as is often the case, where they are of this venial description, by a great share of openness and sincerity; in courage he surpassed all his brothers. Of the daughters of Shah Jehan, two only require particular notice; the eldest, Jehanara, resembled Dara in almost every respect; and these two were, of all the emperor's children, the most remarkable for filial piety, and for mutual affection. Roshenara resembled her brother Aurengzebe in disposition; and this similarity induced her always to support his interest and plans as far as lay in her power.

Shah Jehan, who had a clear insight into the characters of his sons, was very apprehensive that on his death disputes might arise among them: partial to Dara, not more, perhaps, because he was the eldest, than on account of his excellent qualities, he made him the associate of his throne, and commanded respect to be paid to the signet of Dara, equal to that which was paid to his own. In order, however, that this might not rouse the jealousy of his brothers, he at the same time made Sujah governor of Bengal, Aurengzebe governor of the southern provinces, and Morad governor of Guzerat. But this very measure, in one respect, defeated the object which the emperor had in contemplation; for Dara being necessarily near his father, while his brothers were at a distance, they were disposed to regard their appointments as given them, not so much to place them on a footing with Dara, as to remove them from the seat of government, and consequently to deprive them of the chance of contesting the throne with him, in the event of their father's death.

As long as Shah Jehan continued in health and vigour, the authority of Dara was not questioned by his brothers; but in the year A. D. 1657, the emperor having been seized with a stroke of the palsy, was obliged to give up the entire government to his eldest son. As soon as the other brothers heard of their father's illness, they immediately anticipated a fatal issue, and apprehending the destruction of their power as soon as Dara should ascend the throne, they each, without communicating with the other two, resolved to march with the utmost expedition to Delhi. The intelligence of the approach of Sujah first reached the seat of government; and as Dara did not deem it prudent to leave Delhi himself, he dispatched his son to oppose Sujah. The hostile armies met near Benares; a battle was fought, which terminated in the defeat of the invader, who retraced his steps into Bengal for the purpose of raising new forces. But the danger with which Dara was surrounded was very little lessened by this defeat: Sujah, from the position of his government, had been obliged to commence hostilities without aid from his brothers; but they had it in their power to unite their armies; and this they actually did; Aurengzebe, on his march from the Decan, being joined at Brampoor by Morad, with his troops from Guzerat. While Aurengzebe possessed the government of the Decan, his ambition had not been asleep, nor had it been unaided by those talents and habits, which were so well calculated to attain its gratification in the most unsuspicious and certain manner. Meer Jumla, a man of low origin, but of an enterprising turn, had raised himself to great power, and acquired immense wealth at the court of the princes of Golconda; but, in consequence of some affront which he received, he fled to Aurengzebe, bringing along with him all his treasures. To make this man his friend, Aurengzebe was incited, not less by the consideration of his riches and forces, than of his abilities; accordingly he received him in the most kind and flattering manner, and soon gained such an ascendancy over him, that he found no difficulty in persuading him to join in the attempt to deprive Dara of the throne of Delhi.

As the united forces of Aurengzebe, Morad, and Meer Jumla, were very numerous, Dara resolved to oppose their progress by every means in his power; accordingly an army, under a general whom he could depend upon, was stationed on the banks of the Nerbudda, to contest the passage of that river; but the attempt was in vain; the army of Dara was defeated, and Dara then deemed it necessary to advance against his enemies. The brothers met near Agra; a battle was fought; victory seemed doubtful for a considerable time, and turned in favour of the invaders only in consequence of an apparently trifling circumstance. Dara was obliged to dismount from his elephant from different accidents; and the soldiers no longer seeing him at his station, were panic struck, and fled. Aurengzebe and Morad thus gained a decided victory.

The next objects which Aurengzebe had in view was the capture of his father and his brother Dara; to accomplish the latter, he marched without loss of time after the battle to Agra; and that city presenting the prospect of a resistance, which he had not leisure or means to overcome, he had recourse to stratagem, and thus gained possession of it. His father consequently fell into his power, and he imprisoned him, his daughter Jehanara, and the infant daughter of Dara, in the fortress. In the mean time Dara had fled to Delhi, and against that city Aurengzebe now directed his march. Hitherto he had succeeded in persuading his brother Morad, that it was for his sake alone he was anxious to deprive their father and brother of the throne; and that the only reward he sought for himself was a hermitage, in which he might spend the remainder of his life, at a distance from the cares and vanities of the world. But his real projects now became apparent, and Morad regarded him with suspicion and alarm. As Morad was the favourite of the troops, and besides had a great number of personal friends, Aurengzebe resolved to remove him; and this he did, not in his accustomed dark and crafty manner, but openly; for having invited him to a sumptuous entertainment, he caused him to be seized and murdered. It does not appear that this most violent measure created any disturbance, for after its perpetration Aurengzebe immediately marched to Delhi. He did not, however, assume the sovereignty, without the mockery of appearing to have it forced upon him, by the urgent representations and entreaties of his friends: as soon as he became emperor, he took the appellation of Alumghire, or conqueror of the world.

As soon as Sujah heard of the death of one of his brothers, the defeat of the other, and the successful enterprize of Aurengzebe, he collected a large army, and commenced his march towards Delhi; as he was now the only obstacle which stood between Aurengzebe and the entire and secure possession of the throne, the latter immediately made preparations to oppose him; and as soon as he had completed such measures as were necessary to keep Delhi quiet during his absence, he left that capital with a powerful army. The two brothers met at Kedgera, about thirty miles from Allahabad; the battle which ensued was obstinate and bloody, but it terminated in the defeat of Sujah Yet, notwithstanding this defeat, Sujah was still a formidable opponent; and his farther resistance was rendered peculiarly harassing to Aurengzebe, as well as dangerous, by the following circumstance. Mahomed, the son of the emperor, was attached to one of the daughters of Sujah; he was placed under the care of Meer Jumla, to whom was entrusted the pursuit of Sujah; as soon as the two armies approached each other, Mahomed took an opportunity to leave the camp of Meer Jumla, and to join his uncle. This circumstance rendered it the more necessary to bring Sujah to an engagement as speedily as possible; accordingly Meer Jumla attacked him at Tanda, a town in the province of Bengal, adjacent to the ruins of the ancient city of Gour, and again defeated him. Aurengzebe, as soon as he heard of the defection of his son, wrote him a letter, the object of which was, in a most artful manner, to rouse his suspicions of his uncle and father-in-law. This letter had the desired effect; and Sujah perceiving that Mahomed was no longer happy with him, sent him off, along with his wife, and jewels to a large amount. With respect to himself, having no longer any chance of opposing Aurengzebe, or even of standing his ground in the plain country, he fled, after the battle of Tanda, to the Mountains of Tipperah. Among these, and in the adjacent countries, he wandered almost forgotten for many years, till at length he was destroyed, together with the greater part of his family, by the Rajah of Arracan. Mahomed, as soon as he returned to his father, was thrown into prison, where he remained till his death. With respect to Dara, he was, if possible, still more unfortunate than either of his brothers: After wandering about in the deserts, he seems to have taken up his residence at the court of Jihon, a petty prince in the province of Bichar, west of the Indus. At first he was hospitably received; but afterwards, probably in consequence of the interference of Aurengzebe, he was seized and sent to Delhi. There he was obliged to mount on an elephant, and after being exposed to the inhabitants as a captive, he was murdered by the orders of his brother.

Aurengzebe was now seated, without a rival, on the throne of his father; the empire which he governed was extensive and powerful; at the death of Shah Jehan, it stretched from Cabul to the Nerbudda; westward of this river to the Indus; and to the eastward, it comprehended Bengal and Orissa. To the south of the Nerbudda, the Moguls had reduced the countries dependent on Brampore, Aurungabod, Ahmednagur, and Beder; and these had been connected into one government. This territory was bounded on the east by Berar, westward by the hills towards Concan, and by the dominions of Golconda and Bejapore to the south.

As Aurengzebe had governed in the Decan during his father's lifetime, it is not surprising that his ambition directed its views of conquest principally to that part of India; but it was not till the year 1678 that he could, in person, and with all his force, invade this district. In the mean time, a power was rising up in the Decan to resist the onset, and, after various vicissitudes, to retaliate on his successors the injuries of his sword. This was the state of the Mahrattas.

In the ancient fables of the Hindoos, the term Maharashtra is applied to a geographical division of the Decan, comprehending principally its north-west quarter. It is supposed, that the original country of the Mahrattas included Khandesh, Boglana, and part of Berar, extending in a north-west direction as far as Guzerat and the Nerbudda. They possessed the narrow but strong country that borders on the Concan, and stretches parallel with the sea from near Surat to Canara. The original Mahratta state comprehended a country of great natural strength, interspersed with mountains, defiles, and fortresses, and admirably calculated for defensive warfare. It does not appear, however, that the original Mahrattas were of the military cast; for the names of their principal tribes signified farmer, shepherd, and cowherd. It appears extraordinary, that a nation so numerous as the Mahrattas should have been almost unnoticed in Indian history till the reign of Aurengzebe. Nursingh, one of their princes, is, indeed, mentioned in A. D. 1391, by Ferishta; but it is probable that, prior to the time of Aurengzebe, their country, like the other parts of the Decan, was divided into little principalities, many of which depended upon the neighbouring Mahomedan chieftains, but were never completely brought under subjection.

In the middle of the 17th century, Sevajee suddenly arose; one of those men who, by a fortunate conjunction of rare talents and rare opportunities, raise nations from obscurity to the highest pitch of fame. His father had been minister to the king of Bejapore, and, having obtained possession of the wealth which he had collected, he raised a band of adventurers, and by means of them he seized some strong fortresses in the mountains, near the sea coast. The security of these retreats, and the connections he had in the army of Bejapore, brought numerous bodies of troops to his service; while his abilities, and the desire of opposing a Mahomedan power, induced many of the rajahs to devote themselves to his cause. Under these circumstances, the king of Bejapore judged it necessary to send a strong army against him; but he first seduced, and afterwards murdered the general, and the army, deprived of their leader, broke up and dispersed.

At this period Aurengzebe was in the Decan. He had reduced Golcondah; but being obliged to return to Delhi, he was apprehensive that his conquest would be wrested from him by the king of Bejapore. He therefore endeavoured to gain the Mahratta chief as his ally; and, by congratulating him on his success, and putting him in possession of some forts adjoining to the kingdom of Bejapore, he succeeded in his scheme. Sevajee, enterprising and crafty, extendeded his dominions, till, by his plunder of Surat in the year 1664, he roused the suspicions and the anxieties of Aurengzebe. Besides the abundance of its commerce, this city was in high renown, as being the part through which the Moguls made their pilgrimage to Mecca, of which, in the archives of the empire, it was called the port. Aurengzebe felt the disgrace as well as the detriment of the insult. The whole army of the Decan, therefore, was ordered to invade the Mahratta territory; but Aurengzebe did not trust entirely to force, he also employed stratagem; and finding that Sevajee made a most obstinate resistance, he used all his arts to persuade him to make peace; and not only succeeded in this, but also prevailed upon him to come to Delhi. When he arrived at this city, he discovered that he had been deceived, and, burning with revenge, he contrived to escape, and place himself again at the head of his armies. Aurengzebe was now convinced that he had stirred up against himself a most rancorous and formidable foe, who would not only defeat his schemes of conquest in the Decan, but most probably wrest from him the territories he had already acquired there. To reduce him by the sword was out of the question; he again attempted stratagem, but without success. Under these circumstances, Aurengzebe resolved to employ that knowledge of human nature which he so eminently possessed; he knew that the Mahratta chief was actuated by the most unbounded ambition, and this passion he hoped to manage in such a manner as to bring about his destruction.

In the year 1667, Aurengzebe appointed his son Mahomed Mauzum to the government of the Decan; and the prince marched from Delhi with a numerous and chosen army. As soon as he reached the Mahratta country, he caused his troops to spread along the foot of the hills, to the north and south of Jenneah-gur, in such a careless manner, that the bands of Sevajee made excursions through them, even to the gates of Bejapore. Aurengzebe, informed of this, wrote in a threatening and displeased tone to his son; who, in his turn, openly expressed displeasure at his father. At last there seemed to be no doubt that the son had revolted. In the mean time, the Mahratta chief had, through his spies, fully informed himself of the state of things in the Mogul camp; he was not, therefore, surprised when Mahomed applied to him for assistance against his father; but Sevajee's suspicions were raised; he dreaded a collusion between the father and son; and this he endeavoured to ascertain by his spies, both in the camp of Mahomed and at Delhi. He could, however, learn or conjecture nothing; still he resolved to continue suspicious and guarded, till at last Mahomed was convinced that it was impossible to overreach Sevajee. From this plan, though unsuccessful, Aurengzebe however reaped one advantage; for it had fixed such general distrust on his son, as was likely to prevent him from gaining any support in any future intention of real rebellion.

About this period, the intrigues of the Persians had incited several of the Patan tribes of Cabul to rebel against Aurengzebe; but being deprived of the assistance they expected by the death of the sophy of Persia, they were left to the mercy of Aurengzebe, who punished them with vindictive severity. It was in the Decan, however, that the emperor's schemes were carried on to the greatest extent, and with the most zeal; and there they were still opposed in the most formidable manner by the Mahratta chieftain. Sevajee was at this time in possession of all the ridge that stretches from Rajahpoor to Damaun; besides which, he had several detached fortresses of great strength to the eastward. With the exception of Chaul, he was in possession of the sea coast from the river of Rajahpoor to the river Pener, which flows into the harbour of Bombay. As it was evident that he meant to attack either Surat or Aurungabod, Aurengzebe's generals fixed their station at Jenneah-gur, which was the most proper point to watch his movements in either direction. Sevajee, however, eluded their vigilance, and at the end of the year 1669 he suddenly attacked and reduced Surat. This insult increased the indignation of the emperor; but as he could not spare more troops from near his own person, he was obliged to dispatch them into the Decan even from the province of Bahar. He also resolved to make a descent on the shores of the Concan, and thus compel Sevajee to attend solely to the defence of his own dominions. Against the fleet which was to be employed in the transport of these troops, the Mahratta chief sent one of his generals, in the hopes of being able to destroy it in the harbour; but this expedition proved unsuccessful. The plans of Aurengzebe, however, did not restrain Sevajee; by his prudence and enterprise, he gradually enlarged his territories, and more firmly established his power.

In the mean time, the rebellion of the Patans of Cabul had become the most solicitous concern of the empire. One entire army, commanded by the Mogul's governor of Peshawer, which had crossed the Indus, was destroyed by them. Encouraged by this success, they became more daring, and formed a plan which might have proved fatal to the power of Aurengzebe. It has already been mentioned, that the emperor's brother Sujah took refuge with the rajah of Arracan, by whom he was murdered. It happened that a Patan soldier, who had served in the army of Sujah, bore such a resemblance to him in countenance and figure that they might easily have been mistaken for each other. This man had also acquired the manners and deportment, as well as some minute particulars of the life of Sujah, in a surprising degree. This adventurer the Patans produced as the lawful king of Hindostan, and all the tribes were summoned to march with him to Delhi. As they could bring 150,000 men into the field, and were brave and active, and retained an hereditary aversion to the Mogul authority, this intelligence alarmed Aurengzebe, and schemes of distant conquest were laid aside for the protection of his throne. As he was not a man either disposed or obliged to be dilatory in his movements, he immediately displayed the standard of the empire, marched from Delhi in April 1674, and crossed the Indus at the end of the year. The particulars of this expedition are not clearly or fully detailed; but it appears that the rebellion was soon quelled, and the Patans, though not completely subdued, were compelled to retire to their mountains, and the emperor returned to his capital in July 1676.

Towards the Decan, and the designs of Sevajee, he again directed his anxious attention. The Mahratta chief was still carrying on his conquests, and had even penetrated into the Carnatic. While Aurengzebe was engaged in warfare with the Patans, he was obliged to pass unnoticed, and unrepressed, the schemes of Sevajee: and he probably thought, that he would waste his force unprofitably at such a distance, against so strong a country. But he was mistaken in this idea; for Savajee was not only able to maintain his conquests, he also, by the prudent and economical mode in which he conducted his wars, drew from that conquest the means of other invasions. Visiapore now became as much exposed to his attacks from the Carnatic on one side, as from the Concan on the other; and the rich countries to the south of the Coleroon lay at his mercy.

Aurengzebe intended to have put himself at the head of his armies in the Decan, having found that his generals were not equal to the Mahratta chieftain either in talents or skill; but his persecution of the Hindoos had stirred up the Rajpoot tribes in Ajmeer, and he deemed it necessary, in the first place, to reduce them. Accordingly, he advanced towards their country in the year 1678. On the approach of his army, they abandoned the plain, and secured their herds, and their women and children, in the vallies within the mountains. Aurengzebe, insensible of the dangers he was about to encounter, and ignorant both of the nature of the country, and of the resources and army of the rajahs, pushed on in the most imprudent manner, till at length the division, which he himself commanded, was unexpectedly stopped by insuperable defences and precipices in front; while the rajahs, in the course of one night, closed the passes in his rear, by felling the overhanging trees, and from their stations above prevented all endeavours of his troops to remove the obstacle. The favourite wife of the emperor, who had accompanied him in this war, was inclosed in another defile of the mountains, where she was taken prisoner. The emperor himself, unable to escape and unwilling to surrender, was exposed to all the horrors of famine; but most unexpectedly and unaccountably, after being thus confined for two days, the rajahs withdrew from their stations, and permitted him to escape. The empress, also, was sent back; and the only recompense which the rajahs asked in return for this moderation was, that the emperor would refrain from destroying the sacred animals of the Hindoo religion; but he ascribed their forbearance to fear of future vengeance, and continued the war. Being, however, a second time exposed to imminent danger, he resolved to leave the conduct of the campaign to his sons Azim and Acber, while he himself retired to Ajmeer, with his body guard of 4000 men. His sons continued the war each in a different part of the country; but neither, at the end of the year, had been able to force the passes of the mountains.

We must now return to the Decan. Sevajee, in consequence of a confederacy of princes against him, had been compelled to retreat; but his spirits were not broken, nor his plans frustrated. He soon resumed offensive measures, and was again successful in a most important enterprise. A convoy of money for the use and support of the Mogul army was coming to Aurungabad, of which he received early intelligence. He resolved to intercept it; and accordingly, with a detachment of his best cavalry, he set out, and fell upon the convoy, before his approach was known, within a few miles of Brampore. He seized and carried off the whole; but the excessive fatigues which he had undergone in this rapid march produced an inflammation of the breast. His illness was concealed as long as possible; but it proved fatal on the 5th of April, 1680. At the period of his death, the Mahratta states comprised, on the western side of India, all the coast, with the back country, from the river Mirzeon to Versal, excepting the small territory of Goa; to the south, Bombay, Salsette, and the Portuguese possessions between Bassein and Damaun; to the north, along the other side of the ridge, they comprehended all the district as far as the mountains continued to the westward. The length of the whole might be estimated at 400 miles, and the breadth at 120. At the distance of 300 miles from this territory he was in possession, towards the eastern sea, of half the Carnatic. The whole had been acquired by his own abilities and enterprise; and he left, at his decease, a permanent sovereignty, established on communion of manners, customs, language, and religion.

Aurengzebe could not restrain the emotions of his joy on hearing of Sevajee's death, nor the justice due to his character, which he had denied him during his life. "He was," he said, "a great captain; and the only one who had the magnanimity to raise a new kingdom, whilst he himself had been endeavouring to destroy the ancient sovereignties of India;" he added, that his armies had been employed against him for 19 years, and nevertheless his state had been always increasing. He was accustomed to apply to Sevajee the appellation of the Mountain Rat.

Aurengzebe still remained at Azmir, directing the war against the Rajpoots, carried on by two different armies, under the command of his sons. In the year 1681, the army of Azim took the city of Chittore by surprise, where all the favourite objects of Hindoo worship were destroyed. The rajahs, however, were not dispirited, and Aurengzebe deemed it prudent to recal his armies from the Decan. The whole force of the empire, which could with prudence be collected to one spot, was now employed against the two Rajpoots, under the command of the three sons of the emperor, and his own inspection. Of these sons, the youngest, Acber, was turbulent, arrogant, and mischievous. The army he commanded lay nearest the city of Ajmeer, where Aurengzebe was; and Acber was easily bribed, by the promise of the support of the rajahs, to attempt the seizure of his father, and the placing himself upon the throne. The scheme, however, was betrayed to Aurengzebe, and Acber judged it prudent to escape and take refuge near Guzerat. Mauzum, the eldest son, was ordered by Aurengzebe to follow Acber, and not to quit the pursuit till he had taken him: the fugitive, however, effected his escape; and on the 1st of June, 1681, arrived at Pawleegur, a fort at the foot of the Ghauts, not far from Bombay.

Sambagee, who had succeeded Sevajee as chief of the Mahrattas, was at this time at Panda; and shortly afterwards he paid his personal homage to Acber, declaring, that he intended to accompany him with 30,000 horse to Brampore, and there proclaim him emperor of the Moguls.

Aurengzebe, when he learnt that his son had effected his escape into the south of India, fully impressed with the necessity of prompt and vigorous measures, sent forward the two armies commanded by his sons, and soon afterwards marched from Ajmeer with a third army, which he himself commanded. Before he set out, however, he concluded a peace with the Rajpoots; they agreed to surrender the district of Meirdah, which had been taken from Chittore by Shah Jehan; and the emperor, on his part, did not insist on the capitation tax—the constant source of uneasiness and turbulence with the Rajpoots.

By the middle of November, 1681, the three armies had arrived at their intended stations. Azim's at Ahmednagur, Mauzum's at Aurungabad, and Aurengzebe himself at Brampore. His plan was to attack the mountains with his land forces, while his fleets should act against the fleet and coasts of the Mahratta chief. This war is full of petty details, rather than of interesting and important transactions. Sambagee continued for a long time either to defeat the open measures, or to frustrate the secret designs of Aurengzebe, till at length, in 1689, he was betrayed into his hands, and murdered in the most barbarous manner by his orders. Prior to this event, Aurengzebe had commenced hostilities against the kings of Bejapore and Golconda, and he soon reduced these two countries completely under his power; but, notwithstanding these successes, and the death of the Mahratta chief, the mountainous parts of Baglana were unsubdued, and he experienced great difficulty in prosecuting his conquests on the west.

His absence for so long a time in the Decan encouraged the tribes in the north of his empire, particularly the Rajpoots, Patans, and Jats, to take up arms: this was the first time that the Jats appeared otherwise than as banditti. These insurgents, however, were soon and easily quelled; and the emperor appears to have passed the remainder of his reign unmarked by any event of moment. He died in the year 1707, in the 90th year of his age, after a reign of 52 years. Under him, the Mogul empire reached the utmost limits to which it ever attained; it comprehended the country from the 10th to the 35th degree of latitude, and nearly as many degrees of longitude.

Notwithstanding the ambitious projects in which Aurengzebe was engaged during a large portion even of his very long reign, he was by no means inattentive to the improvement of his empire, or the comforts of his people. He uniformly, and without solicitation, remitted the taxes in those districts which suffered from a scarcity, inundation, or the ravages of war. And during his repeated journies through every part of his immense empire, he carefully noted the farms which were cultivated in the most careful and productive manner; and, as a reward to the farmers, he either remitted or lightened their taxes. He built colleges in all the principal cities of Hindostan, and schools in the inferior towns. He likewise established several public libraries, and gave rewards to learned men Hospitals, caravanseries, and bridges, were built, and where it was impracticable to build bridges, ferries were established. The administration of justice was impartial; and, though severe and cruel in many of his measures of foreign or general policy, he was by no means so in the internal administration of his empire. So averse was he, either from feeling, principle, or policy, to punish crimes with death, that capital punishments were nearly disused during his reign.

His person was by no means remarkable; nor was his countenance handsome; but his features were marked with strong expressions of intelligence, and they were by no means disagreeable. His manners were prepossessing and simple, his voice was harmonious, and he was a good orator, and an elegant writer. He was well acquainted with the languages of Arabia and Persia, and he wrote the Mogul tongue, as well as the various dialects of India, with ease and elegance.

His wealth was immense. His revenue exceeded 32,000,000*l.* sterling, in a country where the products of the earth are about four times as cheap as in England. Even after many years of weak government, and both public and private disturbances, Nadir Shah, when he invaded India, carried back with him from the royal treasury of Delhi above 80,000,000*l.* sterling, in gold and jewels; most if not all of which must have been collected by Aurengzebe. Yet, notwithstanding the immense wealth which he left behind him, the magnificence of his court was unrivalled, even in the annals of the East. His own dress was simple, except on days of festivals, when he wore cloth of gold and jewels. In the manners and habits of his private life he was free from parade and ostentation; but he encouraged magnificence in his nobles, and required it in the governors of his provinces.

He rose every morning at day-break; and after going into the bath, he spent half an hour at his devotions, and the same time in reading. He then dressed. At seven o'clock he went to the chamber of justice, where he expected to meet his judges. Here he heard appeals from such of his subjects as thought themselves aggrieved, and overlooked the last decisions of the courts of law. At this time every person was not only permitted, but encouraged, to approach him. To those who were poor and necessitous he gave money, having always a large sum lying on a bench beside him for that express purpose. If a well-grounded complaint was made against any of his nobles, though they might be men of great influence and consideration, or even his personal friends, they were deprived of their estates, and thus degraded, were obliged to appear daily at the hall of audience, till they were restored to their rank and property, by offering full redress and compensation to the injured party; but if they continued contumacious, they were banished. At nine o'clock, the emperor breakfasted with his family; after this he appeared at a balcony facing the great square of his palace. The elephants were now brought out, richly caparisoned, as well as his state horses, to be reviewed before him;—feats of horsemanship and combats of wild beasts took place. At eleven o'clock he went to the hall of audience, and mounted a throne covered with jewels; before him all his nobles, in two ranks, were arranged, on rich carpets, when the ambassadors, viceroys, generals, and visitors, were introduced. Each person, on being presented, made an offering; and, if he was in high favour, the king received it from his own hand. The ceremonies of introduction consisted in bowing three times, at three different intervals, on approaching the throne, and the same on retiring. When a new dignity was conferred on any noble, a dress of state, two elephants, two horses, a camp bed, a sword, warlike instruments and ensigns, his patent, and a sum of money, were given him by the emperor. The hall of audience was a most magnificent and splendid apartment; its roof was of silver; the rails which divided it from the courts were of gold, and the other rails of silver. It opened into a large square, where Aurengzebe reviewed his troops. A second square was occupied by the lower order of nobility; a third by artizans, who came to exhibit their manufactures, and who received rewards according to their merits; and a fourth was filled by huntsmen, who presented wild animals and game. The emperor spent two hours in this hall, after which he retired to his bathing chamber with his officers of state, and regulated the common affairs of the kingdom. He spent an hour at table, and in the hot season slept half an hour after dinner. At four o'clock he appeared in the balcony over the great gate of the palace, when a mob usually collected round him with petitions and complaints. From this he retired to prayers, and thence to the bathing-room again, where the vizier and other ministers assembled. The council frequently sat late, but the usual hour for the emperor's retiring was nine o'clock.

Such was the mode in which Aurengzebe spent the day while he was at Delhi, as described by Bernier. Even when he was on a journey, the court of justice was held in the camp, at the same hours as in the city. But as it might have been inconvenient, or beyond the means of many, to follow the king for the sake of obtaining justice, to these was granted a sum adequate to defray their travelling expences.

That most curious traveller, Bernier, who followed the camp of Aurengzebe from Delhi to Cashmere, describes, with great accuracy, the immense moving city. The guard of cavalry consisted of 35,000 men, that of infantry of 10,000. It was computed that the camp contained 150,000 horses, mules, and elephants; 50,000 camels; 50,000 oxen; and between 300,000 and 400,000 persons. Almost all Delhi followed the court, whose magnificence supported its industry.

Such is the picture of the manners and magnificence of the Mogul empire at the period of Aurengzebe's reign, when it had attained its utmost extent and splendour, and before the peculiarities of its manners were broken in upon by the intermixture of those of foreign nations.

Aurengzebe seemed sensible, before his death, that his empire, which had been extended so much by himself, by means not the most justifiable, and which was composed in a great degree of parts so discordant and distant, would, in all probability, not long remain quiet and undivided; and this apprehension was increased by his observation and experience of the character of his sons. It has been thought that, under this apprehension, he made a partition of it before his death; but this statement or conjecture is not accurate; for in two letters, which are extant, written by him to two of his sons, a few days before his death, he does not even allude to any intention of dividing the empire. In these letters, however, he expresses, in doubtful terms, his apprehensions of civil wars. He left behind him four sons; Mauzum, afterwards emperor under the title of Bahauder Shah; Azim, and Kaum Buksh, who severally contested the empire with their elder brother; and Acber, who, thirty years before, had been engaged in rebellion, and fled into Persia. Scarcely was Aurengzebe dead, when a civil war broke out between the partizans of Mauzum and Azim. The former approached from Cabul, and the latter from the Decan, and disputed the possession of the empire. Their respective armies consisted of about 300,000 men. Near Agra a battle was fought, in which Azim was slain, and his brother was confirmed in his kingdom; for Kaum Buksh was not more successful in his attempts than Azim. He reigned nearly five years. He seems to have been a prince of considerable talents, and who paid great attention to business; but his efforts to keep the empire up to that high pitch of greatness, and to that firm state of consolidation and strength, to which Aurengzebe had raised it, were utterly fruitless. In fact, the long absence of his father in the Decan had given rise to many disorders, and sown the seeds of much discontent and sedition near the seat of empire. Bahauder Shah very wisely quitted the scene of his father's mistaken ambition, as soon as he had succeeded in crushing the rebellion of his brother Kaum Buksh, which had been raised in that district. The Rajpoot princes of Ajmeer, who had taken advantage of Aurengzebe's absence in the Decan, next called for his attention. They had formed a strong confederacy, against which he was about to act, when an evil of a more pressing nature drew the emperor's thoughts and measures to another quarter. A short time before Aurengzebe's death, the Seiks, a particular sect of religionists, who had established themselves along the foot of the eastern mountains, during the reign of Shah Jehan, were governed by Gooro Govind. This chief new-modelled their whole government, and converted them into a band of ferocious soldiers. The Seiks revere him as the founder of their greatness and independence. During the confusion which took place in Hindostan, on the death of Aurengzebe, they increased in strength, and laid waste the country under the command of a bairaggi, or religious mendicant. These the emperor marched against in person, and succeeded in defeating. Their leader was taken prisoner, and executed. After this the emperor took up his residence at Lahore, for the purpose of keeping the Seiks in check. Here he died, after a short illness, in the year 1712.

A war for the succession commenced immediately among his four sons. The second took possession of the imperial treasures; but he was opposed by his three brothers, who agreed to divide the empire among them. A battle was fought, in which the second son was killed. But on this success, only the youngest son was ready to carry into execution the agreement to divide the empire; and as the other two brothers refused to coincide with him, another war commenced, which ended in the death of the youngest. Only the oldest and third brothers now remained; and as the oldest was supported by an Omrah in high trust, a man of great talents and intrigue, he at last succeeded in gaining possession of the throne, after a third battle, in which his brother was slain.

The low and disgusting vices of Jehaunder, who was now emperor, together with the pride of the Omrah, who had raised him to the throne, soon proved his destruction. The two brothers Seids Abdoola Khan, and Ali Khan, originally soldiers of fortune, had raised themselves to governments in the eastern provinces, during the troubled times that succeeded the death of Aurengzebe. These two chiefs resolved to place Ferokshere, grandson of Bahauder Shah, and of course great grandson of Aurengzebe, on the Mogul throne; and having raised a large army, they attacked and defeated Jehaunder near Agra, in the year 1712. The emperor was killed in this battle, and for some time the capital was deluged with the blood of his nobles. In order to secure the throne to Ferokshere, all who might aspire to it were branded with hot irons, and afterwards imprisoned. In the following year the Seiks again appeared in arms; and in 1716, they had become so formidable, that the emperor marched against them at the head of his grand army. But the particulars, or precise issue of the campaign, are not known.

The two chieftains who had raised the emperor to the throne, thinking themselves slighted on account of his favourites, imprisoned him after a reign of six years, in 1717, and placed one of the royal family, whom they released from confinement, in his stead; him they deposed and murdered, and also his brother. Thus in the space of eleven years from the death of Aurengzebe, five princes of his line who had mounted the throne, and six others who had been competitors for it, had been disposed of. The Seids had the disposal of the seat of government, and nominally of the empire at large; but an incurable anarchy had been introduced into all the provinces, the governors of which were strongly disposed not only to coincide with the Seids in their want of allegiance to the head of the empire, but even to dispute the power of the Seids themselves.

In the year 1720, Mahomed Shah, grandson of Bahauder Shah, who since the accession of Jehaunder Shah had been in confinement, was placed on the throne by the Seids. His first enterprise was against the Seids themselves. Warned by the fate of his predecessors, he was convinced, that till they were reduced to the rank of subjects, he could not be emperor. As soon, therefore, as he had cautiously and gradually strengthened his own influence and power, he began to reduce theirs. But they had been too long the virtual rulers of the empire to submit quietly; and having numerous friends and partizans, they openly rebelled against their sovereign. A battle ensued, in which they were defeated, and their defeat was followed by the emperor's acquiring his full and legitimate power.

But, in consequence of the agitated and disturbed state of the empire, the distant parts of it, especially those which had been added to it recently, loosed their allegiance and dependance; particularly the Decan, of which Nizam ul Moolk was viceroy. This man having been affronted by the Seids while they were in power, resolved to avenge himself upon the emperor. He accordingly remained almost constantly at the seat of his government; and his measures while there created great suspicion and alarm. In order, if possible, either to tempt him from his plans, or to get him into his power, the emperor invited him to court, and offered him the situation of vizier. But he was too enlightened and cautious, or too ambitious, to accept of this offer. As, however, he was sensible that by himself he stood little chance of succeeding in his designs of rendering the Decan independent, he cast his thoughts round for assistance; and on many accounts the Mahrattas seemed to him best calculated to answer his object.

The power and territories of the Mahrattas had been gradually increasing. Enterprising and active, commanded by princes who in a high degree possessed these characteristics of the nation, and surrounded by weak and divided states, it is not to be wondered that they succeeded in gradually extending their dominions, and in striking awe into their neighbours. Early in the reign of Mahomed Shah, they had imperiously demanded and received tribute from him, under the condition that they would lay waste or seize the provinces of Malwah and Ajmeer; and this tribute amounted to one-fourth of the net revenue which he derived from these provinces. As might have been expected, however, they were not long satisfied with this tribute, for they invaded and conquered the greatest part of Malwah. A short time afterwards they seized upon the other part, as well as upon the province of Ajmeer. The Mahrattas, therefore, were by no means unwilling to listen to the proposal of the Nizam; but their object was not so much to assist them as to benefit themselves; and they hoped, during the disputes and wars between him and the emperor, that they should be able still further to extend their territories.

In the year 1738, the Nizam, having arranged all his plans, and believing himself sufficiently powerful to carry them into execution, came to court attended by a large body of armed followers. He had already, by his intrigues and bribes, procured a large party there; but on his arrival he found that the opposite party was too strong for him. At the head of it was the commander in chief of the army of the empire. The Nizam had now gone too far to retreat; and as the Mahrattas, though acting with him in the middle provinces, could be of no use where support was chiefly wanted, he directed his thoughts to another quarter.

At this period Nadir Shah, the usurper of the Persian throne, had invaded the province of Candahar, and was besieging the fortress of Candahar itself. This province, which had long formed part of the Mogul empire, at this time was held by an Afghan chief. The siege lasted 18 months. After it was finished, Nadir prepared to invade Cabul. The Nizam, informed of these things, resolved to invite Nadir to invade Hindostan. By some it is said, that it was in consequence of this invitation alone, that Nadir entered Hindostan; but according to others, while he was in Cabul, the imprudence of Mahomed affronted the Persian ambassador, and this afforded an immediate pretext for the invasion of his master. However this may be, in the year 1739 Nadir Shah entered into Hindostan.

A kind of infatuation seems to have prevailed in the Mogul councils. The army was not half assembled; and Mahomed had marched only a day's journey from Delhi into the plains of Carnawl, when Nadir, who had by this time reduced Lahore, defeated him, with the loss of Douran, the commander in chief of the army, and his best and bravest minister. It appears that before this fatal battle, Nadir was so little confident of success, that he offered to evacuate the empire for 50 lacks of rupees. But the intrigues of the Nizam and his party induced the emperor not only to refuse this sum, but after the battle to throw himself on the clemency of Nadir. The first consequence of the battle was the reduction of Delhi. At first the strictest discipline prevailed among the Persians; no one was molested; and the emperor, after having been kept a state prisoner with his family for a few days, was permitted to return quietly to his palace. But though this strictness of discipline was maintained, and this moderation shown with regard to the emperor, the conqueror was intent on plunder, and the scene was soon changed. A quarrel having arisen in the bazar of Delhi, one of those engaged suddenly called out that Nadir Shah was dead, and that now was the time to free Delhi from the Persians. A massacre instantly commenced; and during the whole night, the city was a scene of confusion and murder. The inhabitants, however, had soon ample and dreadful reason to repent of their precipitancy; for at day-light Nadir gave orders for a general massacre, without distinction of age or sex. The carnage lasted from sun-rise till mid-day, when the emperor and his nobles appeared before Nadir Shah, and, for the sake of Mahomed, he was induced to pronounce the words "I forgive." Instantly the carnage stopped, but its effects continued; for many Hindoos as well as Moguls, in order to save their women from pollution, had set fire to their houses, and burned their families and effects. These fires spread, and the city soon presented a most dreadful scene of ruins. The dead bodies occasioned a pestilential disorder among the comparatively few inhabitants that survived; and, as always is the case during the prevalence of any dreadful calamity of this nature, every species of crime and immorality was indulged in. In order to extort confessions of treasures, private murders were committed; the ties of friendship and blood were forgotten. The evil, however, was not yet at its height: famine was added to pestilence, murder, and plunder; and hundreds of persons, desperate, and hopeless of escaping from such accumulated distress, and unable to bear the sight of those whom they had loved and respected either falling under it, or, what was worse in their estimation, giving themselves up to the commission of every crime, put an end to their own lives.

At length, after having had possession of Delhi for about six weeks, Nadir left it; but he left it almost a desert; for it is said, that 100,000 of its inhabitants had been massacred by his troops, or destroyed by fire, pestilence, or famine. A treaty had been concluded, by which he confirmed Mahomed on the throne of all the provinces east of the Indus, reserving those to the west for himself. He also married his son to a grand-daughter of Aurengzebe. He carried with him three millions and a half sterling in money from the royal treasury; one million and a half in plate; fifteen millions in jewels; the celebrated peacock throne valued at a million; other thrones of inferior value; and the canopy for the royal elephant, estimated at eleven millions; besides 500 elephants, a number of horses, and the imperial camp equipage. A fine to the amount of five millions was exacted from the nobles and other inhabitants; so that, if to these sums be added the plunder of the soldiers, the estimate that 62 millions were carried away, will not be deemed beyond the truth.

No empire, after such devastation committed in its capital, could soon have recovered its strength; but with respect to the Mogul empire, its restoration was absolutely impossible. It was loosened from its foundation; and there were those on every side of it, who were prepared to hasten its downfall. The departure of Nadir left the Nizam in possession of the whole remaining power of the empire; but he preferred an independent kingdom in the Decan to the government of a feeble and declining state. About this time, Bengal became independent of Delhi, under Aliverdy Cawn, (see BENGAL); and not long afterwards, a vast army of Mahrattas, both from Poonah and Berar, for they were now divided into two states, invaded it, under the pretence that their object was to recover it for the emperor. The Mogul empire now became a prey to all the neighbouring states that were sufficiently contiguous and powerful to attack it. The Rohillas erected an independent state on the east of the Ganges, within 80 miles of Delhi.

They were originally an Afghan or Patan race, who emigrated from the province of Cabul about the beginning of the 18th century. They then consisted of several independent tribes, who acted in concert when necessary, and were remarkable for the hatred which subsisted between them and the Mahrattas. About the year 1720, the Afghan chiefs Bisharat and Daood, accompanied by a great number of their countrymen, came into Hindostan in quest of military service. Here they established themselves. Daood was succeeded as their principal leader by Ali Mahomed, under whom, taking advantage of the distracted state of Hindostan, they acquired the territory which has been mentioned, to which they gave the name of Rohilcund.

In the years 1740 and 1741, the Mahrattas invaded the Carnatic; and the intelligence of these invasions hastened the departure of the Nizam from Delhi to the Decan; for the Carnatic was included in his government, and he was anxious to recover it. Before however he left Delhi, he delegated his power at court to his eldest son. On his arrival in the Carnatic, he succeeded in settling it for the present; but this part of the Mogul empire was now not only really but nominally rendered independent.

In the year 1747, Nadir Shah died; and in the confusion which followed, Abdalla Ahmed Shah, a soldier of fortune, who had been raised to high rank by Nadir, seized on the eastern part of Persia, and on the contiguous provinces of India, which had been ceded by Mahomed to Nadir. These he formed into a kingdom, and united it to Cabul, of which he had also made himself the chief. The provinces thus wrested from the Mogul empire, nearly comprised the ancient empire of Ghazni. In the year of this invasion of India by Abdallah, Mahomed Shad died, after a reign of 29 years. Though by no means qualified either in talents or habits for the turbulent times in which he lived, he seems to have been a humane and respectable prince.

He was succeeded by his son Ahmed Shah. Before his accession, he had manifested many proofs of spirit and bravery; but scarcely was he seated on the throne, when he disappointed his subjects, by giving himself up entirely to dissipation and pleasure. His reign, which lasted about six years, was a scene of confusion, owing to the turbulence of the nobles, and the incursions of the neighbouring powers. Before he died, the entire division of the remainder of the empire took place, nothing remaining to the house of Timur except a small territory round Delhi, together with the city itself; and this was constantly exposed to depredations, massacres, and famines, by the contests of invaders. The last imperial army was defeated by the Rohillas in the year 1749; and the result of this defeat was, the complete establishment of the independency of the Rohillas in the eastern psrt of the province of Delhi.

The Gauts, a Hindoo tribe, established themselves, and founded a state in the province of Agra. This tribe attracted notice in Hindostan for the first time about the year 1700. At this period, having migrated from the banks of the Indus into the lower part of the province of Moultan, they were permitted to settle in several parts of the Dooab of the Ganges and Jumnah. They were then agricultural, but they soon afterwards became a warlike tribe; and their subsequent progress was uncommonly rapid. During Aurengzebe's last march towards the Decan, one of their leaders pillaged the imperial baggage, and, with part of the spoil, erected the fort of Bhurtpoor. Afterwards they erected other forts, from which they made incursions into the neighbouring territories; and during the civil wars carried on by the successors of Aurengzebe, they found means to secure themselves a large portion of country, and accumulated great wealth.

It may be proper to point out particularly the fate of those provinces, which once constituted the Mogul empire, at this period. The Decan was usurped by its viceroy the Nizam; and Bengal by its viceroy Aliverdy.

Oude, which at an early period of the Mahomedan invasion had been subdued by the invaders, and had remained under different vicissitudes attached to the throne of Delhi, was seized upon by Seifdar Jung, the nephew of Saadet, who had been appointed soubhadar of this province during the reign of Mahomed Shah. Allahabad was seized by Mahomed Kooli. Malwah, which had been invaded and overrun by the Mahrattas in the year 1707, was finally separated from the Mogul government about the year 1732, and was divided between the Poonah Mahrattas, and several native princes and Zemindars; the Mahrattas also possessed the greatest part of Guzerat, Berar, and Orissa, besides their ancient territories in the Decan. Ajmeer had never become a regular organised possession of the Mogul empire, like Agra and Delhi; but remained in a kind of half independent state, paying a tribute, and furnishing the imperial armies with a certain number of mercenaries. After Aurengzebe's death in 1707, it continued for some time under a nominal subjection to the Delhi throne; but about the year 1748 it assumed total independence, and reverted to its ancient masters the Rajpoot princes. The Seiks also took advantage of the weakness of the Mogul empire, and in 1746 made themselves masters of a considerable part of the Dooab of Ravey and Jallinder. In fact, to use the words of Major Rennell, "The whole country of Hindostan proper was in commotion from one extreme to another, each party fearing the machinations or attacks of the other; so that all regular government was at an end, and villany was practised in every form. Perhaps in the annals of the world it has seldom happened, that the bonds of government were so suddenly dissolved over a portion of country, containing at least 60 millions of inhabitants."

In 1748, the Nizam died. His eldest son still remained at Delhi; and his second son Nazirjung, taking advantage of his brother's absence, ascended the throne. At this period, the French and English first appeared in a military character, as auxiliaries of the princes of Hindostan, in consequence of the wars respecting the sovereignty of the Decan, and for the nabobship of Arcot. In the first, the French only interfered; in the latter, both nations. These wars lasted till the year 1754, and terminated, after much blood had been spilled both in battle and by assassination, in fixing Mahomed Ali in the government of Arcot; and Salibidjung, one of the sons of the Nizam, in the government of the Decan. Although the power of the Mogul emperor had long ceased to be of political consequence, yet his name and person were of use, as retaining a considerable degree of veneration among the mass of the people, not only in Hindostan proper, but also in the Decan; so that application was made to him to sanction and confirm all grants of lands, even in those districts in which he retained no sovereignty, in order to reconcile the transaction to popular opinion. Even to this day, the coin throughout the whole district, known by the name of the Mogul empire, is struck in the name of the nominal emperor.

In the year 1753, the emperor Ahmed was deprived of his eye-sight, and deposed by Gazi, the son of that Gazi who had been his vizier. A little before his death, the Mahrattas had been called in to assist in reducing the Gauts, who, being in possession of Agra, were troublesome to the emperor; and the Mahrattas of Berar established themselves in Orissa, by cession from the Nabob of Bengal, who was also compelled for a short time to pay them a tribute for Bengal and Bahar: on this tribute they long afterwards rested their claims in these provinces. On the death of Ahmed, Alumghire, his cousin, was placed on the throne by Gazi: the new emperor soon found that he was a slave in the hands of this person; and in order to get rid of him, he invited Abdalla, commonly called the Durannee Shah, who was at this time in possession of Lahore, to Delhi. He gladly accepted this invitation, and laid that city under heavy contributions, not even sparing the sepulchres of the dead. From Delhi he proceeded against Agra, but the Gauts repulsing him, he returned towards Candahar in 1758. The situation of the emperor was now most deplorable; he could not possibly retain the small remnant of an authority which was left to him, without foreign assistance; and yet if he invited foreigners, they only defended him against internal commotion and intrigue, for the purpose of plundering him, and laying waste his territories. Thus he was alternately treated by the Mahrattas and Abdallah, according as he called in the one or the other to his assistance. A little before he was murdered by his vizier, Abdallah again visited Hindostan, when Delhi was plundered and almost depopulated. At this period his son Shah Allum was engaged in a fruitless attempt to reduce the Bengal provinces. As soon as he ascended the throne, he followed the example of his father, and successively threw himself for assistance on the Mahrattas, Nedjeb Dowlah, a Rohillah chief, who commanded the Mogul army in the time of his father, and Sujah Dowlah, another powerful chieftain: by these, however, he was either not assisted, or assisted only to be still more plundered and insulted; at length, he was received under the protection of Mahomed Kooti of Allahabad. This chief, in conjunction with Bulwant Singh, who had increased the Zemindary of Benares, which he had received from his father, to the size of a province, supplied him with an army: with this he entered the Bengal provinces, where he was joined by some Zemindars of Bahar, so that his force altogether amounted to about 60,000 men. But his troops were so ill disciplined and provided, that in the year 1761 he deemed it prudent to surrender himself to the British, who were then acting as allies of the Nabob of Bengal. They however were not disposed to connect their fortunes with his; and he was again obliged to put himself under the protection of Sujah Dowlah.

Abdallah, in the mean time, was by no means secure in his possessions; for the Mahrattas, who, in the midst of these confusions, had been daily gathering strength, and being engaged in every scene of politics and warfare from Guzerat to Bengal, and from Lahore to the Carnatic, resolved to attempt the expulsion of Abdallah from Hindostan. Thus the principal powers in it were arranged in two parties, the Hindoos and Mahomedans, for the Gauts joined the Mahrattas, while Sujah Dowlah, with the Rohillas, and other Mahomedan chiefs, joined Abdallah. The battle, which was to determine whether the Hindoo government should be restored or not throughout Hindostan, was fought on the 7th of January 1761, on the plains of Paniput, already famous for having been the scene of a battle between the Sultan Baber and the Patan emperor Ibrahim, in 1525.

The combined Mahomedam army was commanded by Abdallah, and that of the Mahrattas by Sedasiva. The former consisted altogether of 42,000 horse, and 38,000 foot, besides camels, and between 70 and 80 pieces of cannon; these were the regular troops, but the irregulars were more numerous. The Doorrannies of Caubul, who were the strength of the army, amounted to 29,000; they were all men of great bodily vigour, and their horses, which were of the Turkish breed, were very hardy. The regular troops of the Mahratta army consisted of 55,000 horse, and 15,000 foot, with 200 pieces of cannon, and camel pieces and rockets without number. Besides the regular troops, there were 15,000 pindaries or plunderers, and the followers of the camp were nearly four times as numerous as the regular troops.

The strength of these armies was too nearly equal, and the issue of the battle too momentous, not to excite in the generals of both parties great anxiety, and to render them cautious and reserved about commencing the engagement. Accordingly, they continued in sight of each other from the 26th of October 1760, to the 7th of January 1761. During this long interval many bloody skirmishes took place, which generally terminated in favour of the Doorrannies. At last the Mahratta army, being greatly straitened for provisions, their chieftain resolved to quit his entrenchments and give battle. The action continued from morning till nearly noon, without any decisive success on either side; but about this time the Mahratta chieftain's son, a youth about 17, being mortally wounded, the fate of the battle was decided; for after this event, the Mahrattas fled in all directions. The victors pursued, and gave no quarter in the heat of the pursuit.

In the Mahratta camp, it is said that there were of all descriptions, men, women, and children, about 500,000, of whom the greatest part were either killed, or taken prisoners; and of those who escaped from the field of battle, many were destroyed by the Zemindars. About 40,000 were made prisoners; such as were taken by the Doorrannies were mostly murdered afterwards by them; for this carnage in cool blood, they alleged as an excuse, that when they left their own country, they were requested by their mothers, sisters, and wives, to kill some of the unbelievers on their account, in order that they might also possess a merit in the sight of the prophet. The commander in chief of the Mahrattas is supposed to have been killed, either in the battle or in the pursuit. This was the most important struggle that had taken place since the contests between Aurengzebe's sons in the year 1707.

After this very decisive battle, Abdallah with justice regarded himself as the uncontrolled master of Delhi; but as his policy was to rule there in the name of the lawful emperor, he invited Shah Allum to return thither, promising to seat him on the throne of his ancestors. This invitation, however, was not accepted; and Abdallah, in order to secure to himself the attachment of the people as far as he could, set up Shah Allum's son, under the protection of Nidjib Dowlah, exacting at the same time an annual tribute. It is highly probable that he meant afterwards to have changed the dynasty, and to have established himself on the Mogul throne; but his presence was required in Lahore, where the Seiks threatened to overpower his garrisons. Scarcely had Abdallah left Delhi, before the small portion of territory which remained to the Mogul emperor, consisting merely of the northern part of the province of Delhi, was invaded both by the Gauts and the Mahrattas; but Nidjib Dowlah, under whose guardianship Abdallah had left Shah Allum's son, either baffled them or bought them off.

We have been induced to carry the history of Hindostan rather beyond the limits which we fixed to the first division of this article, in order that we might embrace as many of the events of that history as possible, which did not mainly or directly depend upon the principal or auxiliary operations of the Europeans; but from the period to which we have brought it down, the Europeans acted such an important part in Hindostan, that it will be proper to consider them, and especially the British, as the pivot on which its future history turns. This, therefore, leads us to the second division of this article, in order that we may trace the rise and progress of that power, which, proceeding from the western extremity of Europe, established such a vast empire in Hindostan.

PART II.

RISE AND PROGRESS OF THE EUROPEAN ESTABLISHMENTS IN INDIA.

As the Europeans were induced to form their establishments in India, in order to be nearer the source, and have a more ready and complete command of those luxuries which, for many centuries before the formation of these establishments, had become in such high and general request in the western world, it may be proper to introduce this part of our subject by a rapid glance of the commerce of the ancients with India, and of the means and route by which these luxuries were introduced into Europe before the discovery of the Cape of Good Hope.

Of all the nations of antiquity, the Phenicians were the most enterprising and extensive in their commerce. Having obtained possession of Eziongeber, and other parts at the head of the Arabian Gulf, they were enabled to keep up a regular intercourse with India and the east coast of Africa. At first they were obliged to convey their merchandize from the ports of Idumea to Tyre; but having acquired Rhinocorera, the present El Arisch, the nearest port of the Mediterranean to the Arabian Gulf, they brought the produce and manufactures of India to this port, and thence conveyed them by sea to Tyre. This was one of the most ancient routes of communication between the western parts of Asia and India. Another route, which seems also to have existed from the earliest times, was by the Persian Gulf through Mesopotamia, the coast of Syria and Palestine. Besides these two routes, two others were pursued by the ancients, by the Caspian and Black Seas. The first route, according to Strabo, was as follows: The productions of India having been collected at Pattala, the present Tatta, near the mouth of the Indus, were carried up this river as far as it was navigable; and thence they were conveyed by caravans to the Oxus, Gihon, where they were again sent by water, and descended this river as far as the point where it most nearly approaches the Ochus, Tedjen. To this latter river they were conveyed by caravans. The Ochus brought them to the Caspian Sea, across which they were embarked to the mouth of the Cyrus, Kur: up this river they were carried to its nearest approach to the Phasis, Rioni, where caravans were again employed to convey them to Sarapana, Schoroban, a town on this river. The communication between this place and the Black Sea, by the Phasis, was easy and short. In some instances, it appears that the merchandise of India was carried down the Oxus till it arrived at Lake Aral, into which that river falls; and, being transported across this lake, was sent in caravans to the Caspian. The Wolga was next ascended, to the point where it approaches nearest to the Tanais or Don; to which latter, crossing by land, the merchandise was carried down it to the sea of Azoph. The fourth route, according to Strabo, was across the Caucasus, from the Caspian to the Black Sea.

Such were the routes by which the merchandise of India arrived in Europe, prior to the time of Alexander's invasion of that country; but he determined, as soon as he became master of Egypt, to found a city which should not only eclipse Tyre, but carry on a more direct and easy intercourse with India than had been formerly done. The Romans had not been very long established in Egypt, before, having acquired a knowledge of the monsoons, they perceived that, by taking advantage of them, a more direct communication with India might take place. Their merchants, accordingly, ascended the Nile from Juliapolis, about two miles from Alexandria, to Coptos. Hence they transported their goods in caravans to Berenice. Here they arrived in the middle of summer; and immediately embarking, reached the coast of Osellis, Gælla, on the east coast of Arabia Felix: thence they coasted to Musiris, Merjee, on the west of India. It is probable that some of their navigators even doubled Trapobane, Ceylon, and ascended the Ganges to Palibrotha, at that time the most commercial city in India. They returned from India with the north-east monsoon, performing the shorter voyage within the year.

The great mass of the commerce between India and Europe was carried on in the same route of the Red Sea, till the seventh century, when the conquest of Egypt by the Saracens transferred it by the Black Sea to Constantinople. As soon, however, as the Mamelukes became masters of Egypt, they permitted the Venetians to follow the ancient route; and when De Gama displayed the Portuguese flag in the Indian seas, Alexandria was the sole entrepot of Indian commerce.

Having thus traced the various routes of communication that existed before the discovery of the Cape of Good Hope, we shall subjoin an enumeration of the principal articles which the ancients brought from India.

1. *Spices and aromatics.* These were in great demand, not only as articles of high and expensive luxury, but also for religious purposes; of course, the ancients required a regular and immense supply of them: but there is reason to believe that they were brought principally, if not entirely, from Arabia; though it is probable that the Arabians obtained them from the western parts of India; as at present the extensive demands of various provinces of Asia for these articles, especially for frankincense, are supplied by the Arabians from India.

2. *Precious stones and pearls.* Of these India furnished the chief part to the luxury and extravagance of the Roman emperors; and its productions of this kind were allowed to be most abundant, diversified and valuable.

3. *Silk.* As the ancients had no direct communication with China, all the silk which they obtained was purchased in India, whither it was brought in ships of the country.

Arrian, in his Periplus of the Erythrean Sea, has given us some minute and curious particulars respecting the homeward and outward cargoes of the ships employed, in his time, in the Indian trade; they imported into Patala, on the Indus, woollen cloth of a slight fabric, linen in chequer work, some precious stones, and some aromatics unknown in India, coral, storax, glass vessels of different kinds, some wrought silver, money, and wine. In return for these, they obtained spices of various kinds, sapphires and other gems, silk stuffs, and silk thread, cotton cloths, and black pepper. Patala, however, was not the only or the principal port, which the ancients frequented in India; the chief emporium of trade was Baragyza, which seems to have been situated on the river Nerbuddah. The articles of exportation and importation here were very various and numerous; besides those already mentioned, there were imported brass, tin, lead, girdles or sashes, mertilot, white glass, arsenic, black lead, gold and silver coin. Among the exports there were the onyx and other gems, ivory, myrrh, various kinds of cotton goods, both plain and ornamented, and long pepper. The exports from Musiris, which lay nearer the eastern parts of India, were still more rare and valuable. Arrian specifies particularly pearls in great abundance, and of extraordinary beauty, a variety of silk stuffs, rich perfumes, tortoise shell, different kinds of transparent gems, especially diamonds, and pepper in large quantities, and of the best quality.

As the demand for these, and other articles the produce or manufacture of India, increased along with the increasing civilization and wealth of Europe, the commerce of India was always an object of great importance with all those states of Europe which applied themselves to trade. Hence the rivalship of Venice and Genoa respecting it; and hence the attempts which were made to reach the East Indies by sea. At length the Cape of Good Hope was discovered and doubled; and the Portuguese opened this easy communication with India.

After a tedious course of voyages, continued for nearly half a century, Vasco de Gama, an active and enterprising Portuguese admiral, doubled the Cape of Good Hope, and coasting along the eastern shore of the continent of Africa, sailed from thence across the Indian Ocean, and landed at Calicut on the coast of Malabar, on the 22d of May 1498. At the period of the arrival of the Portugese in India, the west coast of Hindostan was divided between two great sovereigns, the kings of Cambay, and the Zamorin, each of whom had under him numerous petty princes; at the same period the maritime region on the gulf of Bengal was divided into three sovereignties; 1st, That of Aracan, or Rokhang, from the Ganges to Cape Negrais; 2d, Pegu or Bagoo, from the Cape to Martaban; and 3d, Siam, from the latter to Tanasserim, near which the Malay peninsula commences. The dominions of the Zamorin included the whole coast from Bombay to Cape Comorin; Calicut was the capital, and one of the most commercial cities in India. De Gama, having received information of the riches of this city, immediately proceeded thither, and was on the point of concluding a commercial treaty with the Zamorin, when his object was defeated by the jealousy of some Mahomedan merchants; soon after this he returned to Lisbon. Cabral was next sent out by the Portuguese court to Calicut; but the Moors were as little favourable to him as they had been to De Gama, so that he judged it prudent to proceed to Cochin and Cananore. As the kings of these places were under the yoke of the Zamorin, which they were desirous of throwing off, they received him very favourably, and entered into alliance with him. The Portuguese thus in a short time acquired so great an influence, as to give law to the whole coast, fixing their own prices on the productions of the country, and building forts in the principal towns.

In 1508, Albuquerque arrived in India, and took the chief command of the Portuguese: hitherto they had not acquired a good port; and as this was an object of the first consequence, he attacked Goa, and took it with little difficulty; he was, however, unable to retain it; for the natives besieged it so closely, that he was in a short time in want of provisions, and compelled to abandon it and retire to his ships. He did not, notwithstanding, give up his object; but returning in a few months, he took it by surprise, and fortified it in such a manner, as to render it quite impregnable by the forces of the natives. It now became the metropolis of the settlements of the Portuguese in India, from which they spread their conquests and their commerce over the Eastern seas.

As the Venetians had been deprived of the most abundant and certain source of their riches by the discovery of the Cape of Good Hope, and the subsequent commerce by sea between Portugal and India, they stirred up the Sultan of Egypt to unite with them in the attempt to drive the Portuguese out of India. This he was easily induced to do, as he also had felt the consequences of the Portuguese voyages to India, in the reduced receipt of the transit duties, which he had been accustomed to levy on all Indian merchandise passing through his dominions. Accordingly an Egyptian fleet, equipped principally with materials supplied by the Venetians, made its way into the Indian sea, and being joined by the fleet of the king of Cambay, attacked the Portuguese, at first with some success, the latter, however, having received reinforcements from Portugal, soon regained their superiority.

About the same time, the Portuguese having gained the command of the Red Sea, and the Persian Gulf, the commerce between India and Europe by these routes entirely ceased. Thus secure from competition on the western shores of India, they next turned their thoughts to conquests on the East. Neglecting the coast of Coromandel, which possessed no ports, they passed on towards the regions beyond the Ganges, and the Malay peninsula, of the riches of which they had heard wonderful accounts from the merchants of Surat. Their conquests here, however, and in the Spice islands, do not fall within our notice. In the middle of the 16th century, they had become masters of the east coast of Africa; of the coasts of Arabia and Persia; of the two peninsulas of India; of the Moluccas; and of the trade to China and Japan: they seized every vessel that sailed on the Indian seas without their permission, ravaged the coasts, insulted the native princes, destroyed the temples of their religion, and established the inquisition at Goa. But in the midst of these abuses of their power, their settlements were divided and torn by factions; the tribute paid by one hundred and fifty princes of India, as well as the revenue derived from other sources, was squandered by individuals; so that the forts and the ships were in a very ruinous condition. In this state of things, the Portuguese empire in India must soon have fallen, had not Juan de Castro arrived as viceroy. But great as his talents and virtues were, and indefatigable and wise as he was in his endeavours to restore his countrymen to their former character, the task was beyond his powers; and the native princes, at last roused by the indignities and oppression under which they had so long suffered, and encouraged by the effeminacy and supineness of their oppressors, united in a league to exterminate them. In this object they would have succeeded, had not reinforcements arrived from Portugal at this critical moment, by the assistance of which, the attack made by the native princes on the Portuguese establishments in 1567 was repulsed. On the union of Portugal to Spain, which took place soon afterwards, in 1580, the former country lost nearly all her power and her establishments in India, in the manner which we shall presently describe. At this time they possessed the following places: Diu, Damacun, Choul, Bassein, Salsette, Bombay, and Goa; they had factories at, and influenced the governments of Dabul, Onore, Barcelore, Mangalore, Cananore, Calicut, Cranganore, Cochin, and Quilon; they had also factories in the Bay of Bengal, at Masulipatam, Negapatam, and St Thomè, with commercial stations in the province of Bengal. All these possessions and establishments were independent of what they had in Malacca, the Eastern Archipelago, &c. At present the settlement of Goa, which still nominally remains to them, is almost wholly abandoned by the mother country, and its inhabitants scarcely speak their national language intelligibly. Their poverty is such, that women of the best families earn their subsistence by making lace or artificial flowers, and working muslin. The remaining Portuguese possessions are Damaun, a sea port in the province of Aurungabad, 100 miles north from Bombay, Dhelli in the island of Timour, and Macao in China.

The first commercial transactions of the Dutch, after they had cast off the Spanish yoke, were with the Portuguese. From Lisbon they procured the productions of India, to sell them again to the nations of the north of Europe. This trade, however, was put an end to by Philip II. when he became master of Portugal; and the Dutch then endeavoured to discover a passage by the north seas to China and India. This enterprize was unsuccessful; but, while engaged in it, Houtman, a native of Holland, confined in the prisons of Lisbon for debt, proposed to the merchants of Rotterdam, to reveal to them the knowledge he possessed of Indian navigation and commerce, provided they liberated him from prison. His proposal was accepted; and an association was formed, which sent out four ships to India under Houtman, in the year 1594. On their first arrival in the Indian Seas, the Dutch and Portuguese had only occasional skirmishes; but a sanguinary war soon followed, which in the end totally destroyed the Portuguese power. The native princes, in these contests, generally took the part of the Portuguese, either from fear of the Dutch, or from other motives. The Portuguese also had another advantage, in their superior knowledge of the Indian seas. But the Dutch, on the other hand, were much braver, and more active—stimulated by stronger motives, and yet in the vigour of their republican enthusiasm. Besides, they received continual reinforcements from Holland; whereas, after the conquest of Portugal by Spain, the connection betwixt the Portuguese settlements and the mother country was very much loosened, and the intercourse abridged. Spain, jealous of the prosperity of her newly acquired subjects, left the Indian settlements entirely to their own force. In the three years, 1620 to 1622, that Hernan de Albuquerque was viceroy, he never once received any letter of instruction or information from the court of Spain. The colonies, therefore, must have been supported entirely from their own resources, which involved them in a destructive war with the Dutch. Success was notwithstanding long doubtful; but the Dutch at last gained the ascendancy. The Portuguese at first lost Malacca and Ceylon; and in the year 1660, they were driven from Macassar, Cochin, Cananore, and other settlements on the coast of Malabar. In 1663, the Dutch obtained permission from the native princes to establish factories at Negapatam, Sadras, Pulicat, and Bimlipatam, on the east coast of the peninsula. From this period, the affairs of the Dutch are so interwoven with those of the English in India, that we shall defer their future history till we come to treat of the establishments of the latter.

For several years after the Portuguese, Dutch, and English had penetrated to India, the French contented themselves with procuring its productions from the Portuguese and Dutch. In the year 1601, indeed, a Company had been formed in Brittany, which sent two ships to India; but they returned with cargoes barely sufficient to defray the expences of the equipment and voyage; consequently the company was dissolved. In 1633, another Company was formed; but as their enterprizes were confined to the island of Madagascar, they do not fall within our plan. The attempt to colonize this island not succeeding, the French sent some ships direct to India, and established factories with the consent of the native princes. Their chief rendezvous at first was at Surat; but the Dutch and English uniting against them, soon obliged them to abandon it. They next attempted to seize on Trincomalee; but in this also they were unsuccessful.

In 1672, a French force, commanded by M. de la Haye, landed at St Thomè, a sea-port contiguous to Madras, formerly possessed by the Portuguese, but then belonging to the king of Golconda, and carried it by assault. War, however, breaking out the same year between Holland on the one side, and France allied with England on the other, a powerful Dutch armament, assisted by the armies of the king of Golconda, invested St Thomè by sea and land. After a skilful and obstinate defence, the town was reduced in September 1674; but the king of Golconda insisted on retaining the conquest. This occurrence is principally remarkable, as noting not only the first appearance of the French on the coast of Coromandel, but the origin of their power in that quarter; for, from the wreck of their establishment at St Thomè was formed their celebrated settlement of Pondicherry, where a small district was ceded them by the native prince. At the beginning of the 18th century, their establishments consisted of Pondicherry, with small and insignificant factories at Masulipatam and Rajapore. Soon after this period, the history of the French and English nations in India are so blended, that they must be considered together.

In the year 1716, the Europeans established in India found themselves unexpectedly encountered by a new and powerful rival; for there appeared off the coast of Malabar two forty gun ships, under imperial colours, which had been fitted out at Ostend. In the year 1720, the Ostend East India Company, by whom these ships had been fitted out, received a regular charter from the emperor; and in 1723 they had established factories at Coverlong, between Madras and Sadras, and at Bankibazar on the Hooghly. The Dutch, French, and English, immediately took the alarm; and in 1727 a treaty was signed at Paris, in which the emperor promised to suspend the company for seven years. Before the expiration of that term, he pledged himself, by the treaty of Seville, to the dissolution of it altogether; and this accordingly took place.

The Danes received the first idea of forming establishments in India from a Dutchman, who, discontented with his own government, offered his services to Christian IV. to form a settlement at Ceylon. This man, however, dying on his passage, and the Danes having been unfavourably received at Ceylon, they proceeded from thence to the coast of Coromandel, where the king of Tanjore allowed them to form a settlement at Tranquebar. The little that remains to be told of this Danish settlement will be found under our account of the British proceedings in India.

Queen Elizabeth was the first English Sovereign who thought of obtaining for her subjects a share in the trade to India. In the year 1583, she granted letters to two adventurers for the princes of India, and in 1596, other letters. All these adventurers proceeded to the court of the Great Mogul, by land, where they were well received. The attempts to discover a passage by the North Sea to China having failed, the English resolved to go round the Cape of Good Hope. Accordingly the Queen, on the last day of the year 1600, granted letters patent to a society of merchants in London to trade to the East Indies. The object of the company was principally pepper and other spices; and therefore their voyages were to Achen, Java, and the Spice islands. In the year 1612, four ships were sent out by King James, for the purpose of conciliating the Mogul emperor, some of whose vessels had been annoyed by the English in the Red Sea. The commander of this fleet succeeded in his mission; and, at the same time, he obtained from the court of Delhi the liberty of establishing a factory at Surat; and this city was some time afterwards regarded as the principal English station in the west of India. The Portuguese, alarmed at the success of the English, attacked their fleet near Surat, but they were repulsed. This voyage, therefore, may in some respect be regarded as the origin of the power of the British in the East; the two foundations of which were, the grant of the Mogul sovereign, and their own naval ability and resources. The presidency of Surat controlled all the factories in what may be called western India, or the tract extending from the parallel of Cape Comorin westwards to the Persian and Arabian Gulfs. Soon afterwards they obtained an establishment on the coast of Coromandel, at Masulipatam. To this they were prompted, because the cloths of Coromandel were in high request in the Spice Islands, and consequently constituted the best medium of exchange for pepper and other spices. In the year 1615, Sir Thomas Roe was sent by King James as the first British ambassador to the Mogul, from whom he obtained considerable privileges for the East India Company. About the same time, the Zamorin of Calicut granted them similar privileges; so that a long range of settlements was formed, immediately subject to the presidency of Surat, among which were, in the Mogul territory, Broach, Brodera, Ahmedabad, and Ajmeer; and in the Zamorin country, Craganore, and Calicut.

The disputes and wars with the Dutch followed soon afterwards; and these were not only fatal to the British settlements in Amboyna, but also prejudicial to those settlements on the Coromandel coast. In consequence of disputes with the Dutch and with the king of Golconda, in whose dominions Masulipatam was situated, in the year 1629 they left this place, and fixed themselves at Armegum; but soon afterwards they again took possession of Masulipatam. About 1640, the Dutch began systematically to harass the European commerce on the coast of Malabar. In consequence of this, the English fixed on Madraspatam, which they obtained from the chief of the district. They immediately built a fort, with the name of Fort St George; and in 1653, this station was raised by the company to the rank of a presidency.

Nearly about the same time, the commercial transactions of the British commenced on the Ganges. In 1634, they obtained from the court of Delhi the privilege of a free resort to the port of Pipley, in the province of Bengal. This privilege was much extended in 1645, chiefly through the professional skill and success of a surgeon of one of the Company's ships, who had thus, at the Mogul court, conciliated the favour of the monarch. Factories were accordingly established in Bengal, the principal of them at Hooghly; but this, as well as the others, was subject to the presidency of Madras, or Fort St George. The factories of the British at this time were, Madras with its dependencies Masulipatam, Madapollam, Pettipolu, and Hooghly; and the factories subordinate to Hooghly were, Cossimbazar, Balasore, Patna, and Malda.

But the Mogul government, as well as the other Indian princes, though they granted to the British the privileges of commerce, yet denied them the exercise of civil jurisdiction, or the use of military strength. The factory of Surat was strongly built; but it was not allowed to be either fortified or garrisoned. This factory was exposed to still farther inconvenience and danger; for it was exactly placed on the debateable ground between the Mogul and the Mahrattas, and, as we have already seen, was more than once plundered by Sevajee the Mahratta chief. It is probable, therefore, that the British would have been obliged to have given up Surat, had not they gained an unexpected relief. In the year 1668, King Charles II.

ceded to the Company the island of Bombay, which he had received as a part of the marriage portion of Catherine, the Infanta of Portugal. This was a strong place, and it was within 200 miles by sea from Surat, to which it was made subordinate. The British now commanded greater respect, both from the Mogul and the Mahratta officers; but in the years 1665 and 1672, their settlements, particularly on the Malabar coast, suffered much from the hostilities of the Dutch.

The settlement of Madras was also exposed to great difficulties and danger. About the year 1656, the territory on which it stood, and which belonged to the king of Bisnagur, was conquered by Meer Jumla, the general of the king of Golconda, who afterwards distinguished himself, as we have already noticed, as the ablest officer in the service of Aurengzebe. This event, however, in the end, proved fortunate to Madras; for in the years 1674 and 1676, the king of Golconda permitted the Madras government to build ships in any part of his dominions, and forbade his officers to molest the British commerce.

The settlements of Bengal also flourished; but in the mean time, the war between the emperor and the Mahrattas weighed heavily on the factories of Surat and Bombay. Sir John Child was at this period, what would now be stiled governor general of the British settlements in India, while his brother Sir Jonah was leading member of the Court of Committees; their policy was, first the enlargement of the authority of the Company over such British subjects as were within the limits of their charter; and secondly, retaliation by force of arms on the Indian princes who had oppressed their settlements, and the attainment of political strength and dominion in the East. Hence it is evident that they laid the foundation of that system of aggrandizement, on which the British have ever since acted in India. In Bengal the design was to gain possession of the city and territory of Chittagong; but hostilities were prematurely commenced, and the attempt failed. On the side of Surat considerable advantage was at first gained by the capture of a number of Moorish vessels, richly freighted. But these enterprizes, which had been undertaken while Aurengzebe and the Mahrattas were nearly equally poised in strength and success, in the hopes that the latter would co-operate with the British, were brought to a premature conclusion by the overwhelming victories of Aurengzebe. Sir John Child therefore applied to the Mogul for peace, which was granted in February 1690.

Almost immediately after the conclusion of the Mogul war, a new settlement of importance was acquired on the coast of Coromandel; that of Tignipatam, which was at first ceded by the Rajah of Gingee, and afterwards, when his territory was conquered by Aurengzebe, the grant was confirmed by that monarch. The British fortified the station, and it has since been known by the name of Fort St David.

About the same time, a more important acquisition was made in Bengal. During the late hostilities in that province, the agent and council had retired to a town a few miles lower down the river, called Chuttanuttee, immediately contiguous to which is that of Calcutta; as soon as peace was made with the court of Delhi, the agency was transferred to this latter place. At first, however, they could not gain permission to fortify it; but some of the rajahs having rebelled against the Mogul monarch, the British, under pretence of being afraid that Calcutta would be attacked, obtained leave to raise walls round it. In 1698, Prince Azim, one of the grandsons of Aurengzebe, who commanded the Mogul army in Bengal, was bribed by the British to confer on them a grant of the three connected villages of Chuttanuttee, Gorindpore, and Calcutta, together with the justiciary power over the inhabitants. Shortly afterwards, the fortifications of the new possessions being completed, received, in compliment to the king of England, the name of Fort William; and about the same period the agency of Bengal was elevated to the rank of a presidency. For some years the position, and relative constitution of the British presidencies, had fluctuated very much; but Bombay at last superseded Surat completely; and from the date of the building of Fort William, the established presidencies were those of Madras, Bombay, and Bengal.

Soon after the death of Aurengzebe, the settlement of Bengal was much exposed to the depredations and extortions of Jaffier, who had become nabob of that province. Weary, at length, of the insults and the injuries which they sustained, the Presidency of Calcutta, in the year 1713, sent an embassy of complaint, accompanied by presents, to the court of Delhi. It would, however, have failed altogether, but for the concurrence of two propitious circumstances. The one was, a cure effected on the emperor by Mr Hamilton, the surgeon of the embassy. This gentleman being offered any reward he chose, besought the grant of the Company's requests, which were instantly complied with; and the emperor, besides other valuable presents, gave him models of all his surgical instruments in pure gold. The other circumstance was, the retirement of the English from Surat, from which place the emperor had been long anxious to induce or force them to depart. Of the privileges granted to the Company, those relating to Bengal were the most important; and, indeed, they were long considered as constituting the great charter of the English in India. They were, that, in Bengal, all persons indebted to the Company should be delivered up; that English goods might be conveyed duty free through the Bengal provinces; and that the English should be at liberty to purchase the lordships of thirty-seven towns contiguous to Calcutta. This last privilege, however, was never in fact granted, and even some of the others were rendered ineffectual; as, however, the privilege of exemption from duty, and a free passage for their goods was actually given, the English soon became the principal carriers from the ports of the Ganges, and the shipping possessed by private Europeans in Calcutta, in ten years after the embassy, amounted to 10,000 tons.

From this time till the breaking out, in the year 1745, of the war between France and England, the English settlements in India present nothing deserving of particular notice or record. At the breaking out of this war, the English possessed the following settlements:—Bombay; Dabul, about 40 leagues farther to the south, in the province of Concan; Carwar, in the province of North Canara; Tellicherry, on the sea coast of the Malabar province; Anjengo, their most southerly settlement on the western coast of the peninsula, on the sea coast of Travancore; Fort St David; Madras; Visigapatam and Balasore, on the Coromandel coast; and Calcutta. The principal French settlements were Pondicherry and Chandernagore; the latter about 20 miles above Calcutta, the former on the sea coast of the Carnatic.

In the year 1746, Madras was besieged by a French armament, and compelled to capitulate; but it was restored to the English by the peace of Aix la Chapelle. About the same time, the nabob of the Carnatic, within whose jurisdiction both Madras and Pondicherry were situated, and who successively took part with the combatants on both sides, sustained a total defeat from a very inferior number of French. The event is memorable, chiefly, as being the first which decidedly proved the superiority of the European troops over those of Hindostan.

The territory of the Carnatic was one of the subordinate principalities immediately governed by nabobs, but subject to the soubhadar of the Decan, who was still regarded as a feudal prince under the Mogul emperor. Nizam ul Mulk, already frequently mentioned, who was soubhadar of the Decan, died in the year 1748, and the province was disputed between his son Nazir, and his grandson Murzafa. At the same time the nabob of the Carnatic, Anwaraadeen, who had been regularly established in that office by the Nizam, was opposed by Chunda Saheb; the latter and Murzafa made common cause, and to their alliance acceded M. Dupleix, the governor of Pondicherry, a man of great talents, intrigue, and ambition. The combined troops of the French and the two princes overthrew those of Anwaraadeen, on the frontiers of his own country, in a pitched battle, in which he himself was killed, and his eldest son taken prisoner, while his second, Mahomed Ali, escaped, and implored the assistance of the English. For some time the English hesitated, till at length they were induced by several reasons—the strongest, probably, a desire to curb and oppose the French—to espouse the alliance of Nazir and Mahomed Ali, who had made common cause.

Such was the origin of the war for the succession of the Carnatic, or the Carnatic war, as it is called, between the English and the French. In its progress, this war preserved essentially the character under which it had commenced, that is, in reality, a contest between the English and French for superiority of power and extension of dominions in Hindostan. The violent deaths of Nazir Jung and his nephew introduced new competitors for the soubhadarship of the Decan; but the English throughout the contest persevered in their object, of securing the nabobship of the Carnatic to Mohamed Ali. It was during this war that Mr Clive, afterwards Lord Clive, first appeared as a military character, and by his talents the English gained considerable success. In 1751, he defeated his opponents in the plains of Arani; and this victory was followed by the reduction of the forts of Timery, Conganzam, and Arani. These successes, however, were only against the Indian troops of Chunda Saheb; but, in the beginning of the year 1752, he attacked, and, after an obstinate battle, he defeated, near Arcot, an army consisting of 1500 sepoys, 1700 horse, with 150 French, and eight pieces of cannon. Soon after this, Chunda Saheb having been surrounded and cut off from his supplies by an English force, fled, but was taken and beheaded by his rival. After his flight, his army was defeated and routed by Major Lawrence, who had succeeded Mr Clive in the command of the army. The French immediately proclaimed Rajah Saheb, his son, nabob of the Carnatic. Thus the forces of the English and French were engaged in regular hostilities against each other in India, at a time when no war existed between them in Europe. As soon, however, as intelligence of these events reached the courts of Versailles and St James's, orders were sent out to put an end to the war; and a treaty was entered into, by which the French and English were to possess an equal dominion, military force, and commerce, on the east coast of the peninsula.

The breaking out of the seven years war in 1756, prevented the execution of this treaty, and rendered the French and English principals in the contest; the former captured the subordinate factories of their rivals, and at length even laid siege, though unsuccessfully, to Madras. The constancy, however, of the English, aided by the arrival of reinforcements from Europe, succeeded in turning the fortune of the war; the French were repeatedly defeated; Pondicherry was taken; and Mahomed Ali established in his principality. Salabut Jung, the third son of the Nizam, who had been raised to the musnud of his father by the assistance of the French, at length sought and obtained an accommodation with the English, in return for which they received from him a grant of the possessions which their victories over the French had given them, viz. the Circar of Masulipatam and its districts, and the Circar of Nizampatam. At the same time, they received from Mahomed Ali a part of the territory about Madras, and the advantage of a powerful influence in the Carnatic.

Before, however, the war in this part of India, of which our limits have obliged us to give this rapid and brief sketch, was thus happily terminated, the English were obliged to detach a force to the succour of their interests in Bengal. The causes and circumstances of their misfortunes there it may be proper to trace with all possible brevity.

In the year 1741, Alivedi, as we have already seen, usurped the nabobship of Bengal. He died in 1756, leaving for his successor Surajah Dowlah. This prince was strongly prepossessed against the English. Understanding that the governor of Calcutta was building a wall and digging a moat round that city, he took offence, and at last marched at the head of his army to attack it, with its dependent settlements. The town was gallantly, though not very skilfully, defended for three days, but then was obliged to surrender. Surajah Dowlah had promised the prisoners their lives, but on the same night in which he entered the place he ordered the massacre, (for it deserves no other appellation,) which has rendered proverbial the black hole of Calcutta. The Europeans, to the number of 146 persons, were, in the most sultry season even of the Bengal year, confined for twelve hours within a cube of 18 feet, having no outlets except two small windows, strongly barred. All perished except twenty-three; and some of these afterwards experienced from the nabob fresh cruelties. As soon as intelligence of these events reached the English on the coast, they detached to Bengal 900 Europeans, and 1500 sepoys, under the command of Colonel Clive. In a few days after their arrival before Calcutta, the city was retaken, and the nabob being attacked in his camp, acquiesced in a pacification highly honourable and advantageous to the English. On him little reliance could be placed, especially as by the breaking out of the war between the English and French, he might naturally expect the assistance of the latter, who had, at their settlement of Chandenagore, contiguous to Calcutta, a force of 300 Europeans, and 300 sepoys. Under these circumstances, Colonel Clive resolved to attack the French settlement, which he accordingly did, with success. Still, however, the nabob was justly suspected; and as it was soon afterwards proved that he was in correspondence with the French, the English listened to the overtures of the discontented grandees at his court, and at length resolved to support Meer Jaffier in his pretensions to the nabobship. This arrangement led immediately to the famous battle of Plassey, by the issue of which Meer Jaffier gained the nabobship, and his English allies a large treasure, a portion of territory adjoining to Calcutta, and a considerable influence with the new nabob. The British forces engaged in this battle were commanded by Colonel Clive, and consisted of 900 Europeans, 100 topasses, and 2000 sepoys, with eight six pounders, and two howitzers. The nabob's army was estimated at 50,000 foot, and 50 pieces of cannon, besides about 40 Frenchmen. According to one account, the fortune of the day was decided by Meer Jaffier, who commanded part of the nabob's army, remaining neuter during the engagement; but by other accounts, it would appear, that even if his forces had taken an active part, the issue would have been equally favourable to the British.

By the treaty between the English and the new nabob, the latter agreed to pay a large sum into the treasury of Calcutta; and the English guaranteed his dominions. Jaffier, however, after he had acquired his power, seems to have been unwilling to pay the stipulated sum; and on being pressed by Colonel Clive to fulfil his engagement, he meditated the reduction of the British influence. This, and the non-payment of the money, were sufficient pretexts for stripping him of his newly acquired dominions; and to this object the British directed their plans, so as to accomplish it with the least appearance of injustice.

Before, however, we narrate these plans, it will be proper to attend to the affairs of India in another quarter. In the year 1759, the son and heir apparent of the Mogul appeared in a hostile position on the frontier of the provinces; and he afterwards invaded Bahar with a view of possessing himself of the soubhadarship of Meer Jaffier. As the English were bound to support him, Clive, who was now governor of Bengal, joined his army to that of the nabob's, and the allies drove the enemy beyond the Carumnasa. In the same year, and soon after the close of this campaign, the Dutch projected the overthrow of the English establishments and influence in Bengal. An expedition for that purpose was fitted out at Batavia, which in the month of August entered the river of Bengal, with the profession of proceeding to the Dutch settlement at Chinsurah. As Clive was apprehensive that the nabob might take advantage of this circumstance, he resolved to call upon that prince to insist on the departure of the Dutch, as they were within his territories. This, however, he did not do; and the Dutch landed their whole force near Calcutta. In this emergency, Clive was at a loss in what manner to act; for the English and Dutch were at peace. As, however, some decisive steps were necessary, he ordered Colonel Ford to intercept the march of the Dutch; this was accordingly done with most complete success.

In February 1760, Colonel Clive left Bengal for England; and about the same time the dominions of the nabob were again menaced with invasion from the interior. A Mahratta army entered the district of Burdwan, and Shah Allum re-appeared on the frontier of Berar. Against the former, the nabob in person led an army, partly composed of British troops, but the campaign in this quarter proved unsuccessful. The Mogul was opposed by a British army, commanded by a British officer, but the operations of the latter were much impeded by the obstinacy of the nabob's son, who commanded an auxiliary force, so that the Mogul, though defeated near Patna, escaped into the south-western districts of Bengal, where he effected a junction with the Mahratta general who had invaded Burdwan. He was soon, however, compelled to retreat into Berar. This campaign, which presented nothing else remarkable, was closed in July, by the setting in of the rains, and the death of the young nabob, who was struck dead with lightning in his tent.

By this time, the plans of the British against Meer Jaffier were complete; accusations of various kinds, besides the non-payment of the money, were brought against him; and in September 1760, a treaty was privately made at Calcutta between the British and Meer Cosseim, son-in-law and general of the nabob. By this treaty it was stipulated, that Cosseim, under the title of dewan or deputy to the nabob, should obtain the real possession of the nabobship, and that he should grant to the English, for the pay of the army, the districts of Burdwan, Midnapore, and Chittagong. It is also said that he promised the projectors of this revolution two millions of rupees; this, however, was expressly denied in the examination before the Select Committee of the House of Commons. Meer Jaffier was soon afterwards brought to Calcutta, and thus deprived even of the name and appearance of power.

Meer Cosseim had not been long possessed of the nabobship, when he entered into projects unfavourable to the English; levying high duties on their merchandize contrary to treaty; and at last massacring the English deputies who were sent to him to adjust matters. The English, therefore, in order to punish him, resolved to restore Meer Jaffier to the dignity from which he had been degraded. As a condition of his re-instatement, he consented to cede to them the districts already granted them by Cosseim, of Burdwan, Midnapore, and Chittagong, and also to grant to them those commercial privileges which Cosseim had withheld. On the 7th of June 1763, he was proclaimed soubhadar of the three provinces; and the British government also declared war against Cosseim. On the 19th of July, one of Cosseim's generals was totally defeated by a British force, half way between Calcutta and Moorshedabad, and on the 24th the latter place was taken. Advancing rapidly after these successes, on the 2d of August they encountered, on the plain of Goriah, the whole of the hostile force at that time in the lower part of Bengal. It was composed of about 15,000 black cavalry, and 10,000 regularly disciplined sepoys, with 17 pieces of cannon, managed by 170 Europeans. After an obstinate contest of four hours, the enemy were completely routed. Cosseim was himself in the province of Bahar, and thither the British pursued him. In the beginning of October they gained possession of Monghir, and in November of Patna, Cosseim still fleeing from danger, having escaped into the dominions of the nabob of Oude, carrying with him treasure and jewels to the value of two millions sterling.

The same year which witnessed the expulsion of Cosseim from the three provinces also produced, in Europe, a pacification between France and England. By the treaty of peace, France, whose recent acquisitions, as well as her ancient possessions in India, had been wrested from her, was restored to the factories of which she had been mistress in the year 1749, but she renounced any pretensions to the territories which she had recently acquired on the coast of Coromandel and Orissa, and engaged neither to erect fortifications, nor maintain troops in the soubah of Bengal. Mahomed Ali was acknowledged lawful sovereign of the Carnatic. The English sacrificed but a small part of the territory which they had gained; they retained unimpaired their authority at the courts of the Carnatic and Bengal; they retained, in addition to their old settlements, the newly acquired possessions of the Circar of Masulipatam, and its dependent districts, which they had conquered from the French; also the castle of Surat, the Jaghire, or territory round Madras, the Calcutta zemindary, and the districts of Burdwan, Midnapore, and Chittagong.

In the pursuit of Cosseim, the British army had reached the interminous frontier of the territories of Bengal and Oude: the fugitive prince had taken refuge in the court of Sujah Dowlah, otherwise called the Nabob Vizier, which, at the same time, harboured a more illustrious exile, the young Mogul. The British camp now became the scene of complicated negociations; an alliance was proposed to Sujah Dowlah, which he rejected. While these negociations were going on, discontents prevailed in the British army. Encouraged by this, Sujah Dowlah, who had already collected an army on the frontiers of Oude, determined on hostility; and he was joined by the Rajah of Benares. In March 1764, Major Carnac took the command of the British forces, and having restored discipline and subordination, repulsed the vizier in an obstinate engagement near Patna. The war was now carried into the province of Oude, and Major Carnac was succeeded by Major Monro. On the 24th of October was fought the celebrated battle of Buxar, on the river Carumnasa, about 100 miles above the city of Patna. The British army consisted of 856 Europeans, and 6215 sepoys; the combined troops of Sujah Dowlah and Cosseim consisted of 40,000 men. After an arduous contest of three hours, the army of the vizier retired in disorder, leaving on the field 133 pieces of cannon, and blowing up some of their powder magazines; 2000 troops were slain on the field of battle. The loss of Major Monro's army was trifling, being only 87 Europeans and 712 sepoys. The flight of the allies was so rapid, that they did not stop at Buxar, but hastened to a small river beyond it. Over this was a bridge of boats, which, however, they had not all crossed, when Sujah Dowlah directed the bridge to be destroyed. By this act of generalship he sacrificed, indeed, the rear division of his army, which, to the number of nearly 2000 men, were drowned; but he saved his main body from certain destruction, and at the same time preserved from capture the immense treasures of Cosseim as well as his own. A native historian describes the camp of the two chiefs in the following terms: "A bridge of boats being thrown over the Ganges, the allied armies began their march in numbers not to be reckoned; but, from the ignorance of the generals and want of discipline, murdering and plundering each other. It was not an army, but rather a moving nation." On the following day the Mogul, who had taken no part in the battle, sought and obtained the protection of the British, offering them terms highly favourable to their views and plans of aggrandizement and extent of territory.

Sujah Dowlah was now obliged to struggle for his existence. He offered to negociate; but as he refused to deliver up Cosseim, his offer was rejected. At last, having dismissed his ally, who took refuge in upper India, he voluntarily repaired to the British camp, and surrendered himself to the general. Terms were made with him, by which the entire territory of Oude, except the districts of Corah and Allahabad, were restored to him; the excepted districts were allotted to the Emperor, the fort of Allahabad being assigned for his residence. In return for these cessions, and for an annual stipend for his support, the Emperor, besides a confirmation of the territorial acquisitions which the British had made, either on the soubhadary of Bengal, or on the coast, conferred on them two important favours: he invested them with the Dewaunee of the three provinces of Bengal, Bahar, and Orissa; the second grant was that of the five northern circars. Over these districts, indeed, he had only a nominal claim, derived from their former conquest, in the latter days of the Mogul government. At this time they belonged to the soubhadar of the Decan. In 1754, he had granted them to the French, then his allies, and on their being defeated by the English, the circars reverted to him. After the general peace of 1763, the French again endeavoured to gain a footing in them; and this induced Lord Clive, who arrived in India for the second time, in 1765, to obtain from the Mogul the proprietary grant of this territory. In the year 1766, four of the circars were given up by the soubhadar; the fifth, held by a brother of the Nizam, was granted in reversion to the British. In return for these cessions, the British promised the soubhadar the assistance of their troops, whenever he might need it, to settle the affairs of his government. About the end of the year 1766, having united himself with a Mahratta chief against Hyder Ali, sovereign of the Mysore, he applied for these troops, which were granted him, even before his object or that of the Mahrattas was known. As soon as the British troops had joined, the united army entered the territory of Mysore.

It was on this occasion that Hyder Ali first displayed those talents which afterwards rendered himself so very formidable. He bought off the Mahrattas by large bribes. Next he entered into negociations with the Nizam with such effect, that in August 1767, the armies of the Nizam and Hyder actually united at Bangalore, from which place they made irregular incursions into the Carnatic. Had Hyder adhered to his own plan of the campaign, which was to elude a general action, and to harass the British by his superiority in cavalry, the latter must have suffered dreadfully; but on being accused of dilatoriness by the Nizam, he consented to change his plans. The result was fatal to his interests and views; for by a succession of obstinate engagements and bloody defeats, the allied army was driven out of the Carnatic. The Nizam deserted Hyder in his misfortunes, made peace with the Madras government, and retired to his own dominions. This defection, though it weakened Hyder, gave him greater liberty of action, which he improved to the utmost; and partly by the nature of the country which was the scene of warfare, and partly by the mode in which he conducted the campaign, he baffled the British for a considerable length of time. The intelligence of his being able to oppose an enemy hitherto invincible by the Indian princes, so raised his reputation, that adventurers flocked to him from all parts, and his cavalry were soon increased to upwards of 90,000. At last he was induced to give up his plan of defensive and dilatory warfare, in order to protect a fort besieged by the British. The consequence was an obstinate engagement, in which, notwithstanding his vast superiority, he was defeated. He still persevered, however; and in January 1769, having recovered his own provinces, marched into the Carnatic, which he ravaged with fire and sword. At this period the British were commanded by General Smith, who, by a dextrous movement, cut off the enemy from his own country. From the difficulties, however, which seemed to be entangling him, Hyder was extricated by his own spirit of enterprize; for having, by a variety of movements, contrived and executed with great skill and adroitness, drawn the British forces to a considerable distance from Madras, he directed his course to that city with a body of 6000 cavalry; and after marching about 120 miles in three days, presented himself on Mount St Thomè. The presidency was so much alarmed at his unexpected appearance, that they entered into a negociation with him; and on the 3d of April, an offensive and defensive treaty was concluded, on the simple condition, that the forts and places taken on both sides should be restored.

Soon after this treaty Hyder was involved in a war with the Mahrattas, on which occasion he sought, but in vain, that assistance from the British, which, by treaty, they were bound to give him. In this war he was at first very unsuccessful, having been totally defeated, in the year 1771, within a few miles of his own capital. He himself escaped with great difficulty, with a small remnant of his army, into Seringapatam, where he defied the attacks of his numerous enemies, who possessed neither the skill nor the ordinary requisites for a siege. Hyder waited, in patience, until the enemy, by desolating the country, were compelled to leave it.

In 1773, the Mahrattas crossed the Ganges to invade the Rohilla country; a brigade of the British army marched to the western frontier of that country, and drove the enemy beyond the river. For this protection, the Rohilla chiefs had stipulated to pay Sujah Dowlah, as whose allies the British acted, 40 lacks of rupees; but when the service was performed, the payment was evaded. This breach of treaty led to the invasion and conquest of the Rohilla country in 1774. A considerable tract of land in the Dooab was also conquered from the Ghauts. Thus the boundary of the province of Oude was advanced westward within 20 miles of Agra; north-westward to the upper part of the navigable course of the Ganges; and south-westward to the Jumnah river. In the following year, on the death of Sujan Dowlah, the province of Benares was ceded to the British.

In the year 1778, a war broke out between the British and the western Mahrattas. This occasioned the march of a brigade from Bengal across the continent to the side of Bombay and Surat. By some mismanagement, it was obliged to capitulate with the Mahratta general on the 9th of January, 1779. One of the terms was, that a body of troops, which were advancing on the other side, should be obliged to return to Bengal; but this condition was not complied with, and the expedition proceeded. There were not more than 7000 men, all native troops, commanded by European officers; and yet they marched from the banks of the Jumnah to the western sea in despite of the Mahrattas, whose empire they traversed almost the whole way. This war was attended by the conquest, by the English, of the finest parts of the Guzerat and the Concan, including the important fortresses of Bassein and Ahmedabad; in short, of the whole country from Ahmedabad to the river Pennar, and inland to the foot of the Ghauts; and on the side of Oude, the province of Gohud and other districts, together with the celebrated fortress of Gwalior, were reduced, and the war was carried into the heart of Malwah. But, in consequence of the war which broke out in the year 1780 with Hyder Ali, peace was made with the Mahrattas, after detaching Scindiah, the principal member of that state, from the confederacy. All the acquisitions made during the war were given up, except Salsette and the small islands situated within the gulf formed by Bombay, Salsette, and the continent.

Hyder Ali, indignant at the refusal of the British to assist him against the Mahrattas, made peace with them, and prepared for the invasion of the Carnatic. On the 24th of July, 1780, Hyder Ali's cavalry were only nine miles distant from Madras; and it was ascertained, that his whole force consisted of 100,000 men, among whom was a large body of European troops, under French officers, and commanded by Colonel Lally. In this emergency, Sir Hector Munro ordered the British army to assemble at Conjeveram, and directed Colonel Baillie, who commanded a detachment at Gumeropanda, to join him at that place; but this detachment was cut to pieces by Tippoo Saib, Hyder's son. This obliged the Carnatic army to retreat, till Sir Eyre Coote arrived from Bengal with a brigade of 7000 men, and assumed the command. Sir Eyre immediately restored the spirits of the army, and in a very short space of time defeated Hyder in five several battles. In some instances, however, the British were not so successful; for Tippoo entirely defeated a detachment of about 2000 infantry, and 300 cavalry, under Colonel Braithwaite. In the end of the year 1782 Hyder died; and one of the first objects of Tippoo, who succeeded him, was to recover Canara, which had been conquered by a detachment under General Matthews. It had been supposed by the presidency of Bengal, that an attack of Tippoo's provinces on the west of India would, by giving an easy and immediate entry into the most valuable part of his dominions, draw him off from the Carnatic, which he still occupied, notwithstanding the defeats which his father had sustained. Accordingly, General Matthews was sent into Canara, a province which Hyder Ali had conquered in 1763, and he succeeded in reducing the whole of it. The scheme succeeded in drawing Tippoo from the Carnatic into Canara; but at the dreadful expense of the loss of General Matthews and his army, which was obliged to capitulate, on condition of being allowed to go to Bombay. This condition, however, was not fulfilled; and General Matthews, and 20 of his officers, were poisoned, and most of his troops were massacred. At last, Tippoo finding that the Mahrattas, his inveterate enemies, were at peace with the English, and at liberty to attack him, and being deserted by the French in consequence of the peace of 1783, condescended to treat in March 1784. By this treaty, matters were restored nearly to the condition in which they had been before the commencement of hostilities.

Having given this brief sketch of the wars in which the British were engaged with the Mahrattas, and with Hyder Ali and his son, it will be proper to advert to a general confederacy which seems to have been entered into against the British, of the plan of which these wars formed a part. The Nizam of the Decan having taken disgust at the conduct of the Madras government towards him in 1779, determined on revenge. Under the influence of this feeling, he resolved to engage all the principal powers of Hindostan Proper and the Decan against the British. The Poonah Mahrattas were already engaged, and Hyder was preparing. There remained the Nizam himself, and the Berar Mahrattas. Each party was to pursue a particular scheme of attack, suited to his local position and means. Hyder was to attack the Carnatic; the Nizam the Circars; the Poonah Mahrattas were to keep the Guzerat army employed; and the Berar Mahrattas were to invade and lay waste the provinces of Bengal and Bahar. But this confederacy, like most others among nations of different habits and interests, did not act in concert, or towards the attainment of a common object: each member of it pursued its own peculiar plans and interests. The operations of Hyder Ali and of the Poonah Mahrattas have been already detailed: the army of the Berar Mahrattas, though it was put in motion, never arrived at the projected scene of action, and the Nizam speedily made peace.

Before we proceed to narrate the particulars of those wars which took place between 1784 and the present time, we shall, as shortly as possible, give an account of the divisions of Hindostan, as they existed in that year, when the British were at peace with all the Indian princes.

In 1784, the British possessed, in full sovereignty, the whole soubhah of Bengal, and the greatest part of Bahar. In Orissa they possessed the districts of Midnapore: the district of Benares also belonged to them. Of the five northern circars, four were in their possession, and these occupied the sea coast from the lake of Chilka to the northern banks of the Krishna river. Their territories in the Carnatic were confined chiefly to the tract called the Jaghire, which extends along the coast about 108 miles, and stretches inland 47 miles in the widest part. They also were masters of Bombay and Salsette. The dominions of the nabob of Oude lay on both sides of the Ganges, occupying nearly all the flat country between that river and the northern mountains, as well as the principal part of the Dooab, or the tract of land formed by the approximation of the Ganges and Jumnah, to within 40 miles of the city of Delhi. The district of Rampoor, at the foot of the northern mountains, was held by a Rohilla chief. The Seiks occupied the most western part of Hindostan, viz. the whole province of Lahore, the principal part of Multan, and the western part of Delhi. There were besides several petty princes in this part of Hindostan.

The Mahrattas formed two distinct states; that of Poonah, or the western; and that of Berar, or the eastern.

These states occupied all the southern parts of Hindostan proper, together with a large portion of the Decan, from the confines of Agra northward, to the Krishna southward, and from sea to sea across the widest part of the peninsula; comprehending Malwah, Orissa, Khandeish, and Bejapour; the principal parts of Berar, Guzerat, and Ajmeer; and a small part of Dowlatabad, Agra, and Allahabad. The western state was divided among a number of chiefs, who professed obedience to the Paishwah, or head. The Paishwah resided at Poonah, and there were three principal chieftains on the north of this city, and two on the south. Those on the north were Scindiah, Holkar, and Futty Sing. The first was indeed a sovereign prince. After the Mahratta peace he extended his frontier from Malway towards the Jumnah; carried his arms northward to Delhi, and obtained possession of the person of the Great Mogul. The principal part of Berar was held by the Nagpoor Rajah, and the remainder by the Nizam of the Decan. There were several states tributary to the Mahrattas; among others, the Rajpoot principalities of the soubhah of Ajmeer.

The possessions of the Nizam comprised the province of Golconda; the principal part of Dowlatabad; the western part of Berar; and Guntoor, one of the five northern circars. The dominions of Mahomed Ali, nabob of the Carnatic, commenced on the south of the Guntoor circar, and extended along the whole coast of Coromandel to Cape Comorin. The dominions of Tippoo Sultan comprehended generally the provinces of Mysore, Bednore, Coimbettore, Canara, and Dindigul, besides his father's conquests to the north; stretching as far as Travancore and Madura on the south; Soonda and Bejapour to the north; Guntoor and Ongole on the north-east; and the sea on the west. Tippoo was without doubt the most powerful of all the princes of Hindostan. His dominions were equal in extent to Great Britain; his revenue was computed at four millions sterling; and his military establishment consisted of 72,830 regulars; 49,000 in garrison; 7000 irregulars, and 26,300 auxiliaries; in all, 155.130 men. Of the regular troops, 27,400 were cavalry; 36,000 sepoy infantry, Hindoos and Mahomedans; 7300 topasses or hatmen, that is, the descendants of the Portuguese and other Europeans, infantry; 200 European cavalry; and 540 European foot. The artillery corps, consisting of European topasses, &c. amounted to 1390. There were 110 guns attached to the battalions; the horse garrisons on the frontiers amounted to 21,000, and the foot garrisons to 28,000. The auxiliaries were supplied from the rajahs of Rydroog, Darwar, &c. and consisted of 13,300 horse, and 13,000 peons, or irregular troops.

It was not to be supposed that a person, possessed of the ambitious and restless disposition which characterised Tippoo, would long remain at peace with such an immense force at his disposal, or that he would find any difficulty in raising pretences for commencing hostilities. Accordingly, towards the end of the year 1789, he approached the country of Travancore for the avowed purpose of recovering two places which the rajah of that district had purchased from the Dutch, but which Tippoo alleged were dependent upon him, as forming part of the possessions of his tributary the Rajah of Cochin. On the 29th of December, he stormed the lines of the Rajah of Travancore, who was not disposed to accede to his demands; but without success. As this Rajah had put himself under the protection of the British government, and was acknowledged to be so, by the treaty concluded with Tippoo in 1784, war between the latter and the British seemed unavoidable. Lord Cornwallis at this time was Governor General of India. His first object was to enter into a treaty offensive and defensive with the Nizam. This was accordingly concluded on the 4th of July 1790. A treaty was also formed with the Paishwah of the Mahrattas. The provisions of these treaties were, that measures should be instantly taken to punish Tippoo, and to deprive him of the means of disturbing the general tranquillity, and that the Nizam and the Paishwah should both vigorously prosecute the war.

The British Madras army was assembled on the plain of Trichinopoly, and on the 24th of May 1790, General Meadows, who was to take the command, joined it. On the 12th of June, he entered the territories of the Sultan. His first object was to relieve the Rajah of Travancore; and, before the end of the year, he was completely successful. In the mean time, the Bombay troops under general Abercrombie conquered the valuable districts below the Ghauts on the west and the north, as far as the river Baliapatam. The next campaign was carried on by Lord Cornwallis himself in the centre of Tippoo's kingdom. The important fortress of Bangalore was conquered. A successful battle was fought near Seringapatam; but the unfavourable season of the year, which now began, and the delay of the Mahrattas, prevented his Lordship from attacking that city, which had been his principal design when he commenced the campaign. In the mean time, the Bombay army was marching to join his Lordship; but being unable to effect the junction, from the badness of the roads, and the swelling of the rivers, they were compelled to retrace their steps over those mountains, which form an almost impassable barrier between Mysore and the Malabar coast. In this march and retreat, the troops suffered dreadfully; but the sufferings were mild compared to those which the Madras army underwent while obliged to remain inactive in the heart of Tippoo's dominions on account of the rains. They were infected with an epidemic disorder, the ravages of which were greatly increased by a scarcity of provisions; and, to add to these calamities, the small-pox raged in the camp. Fortunately, they were soon joined by the allied force of the Mahrattas, amounting to 32,000 cavalry; and soon afterwards, the troops of the Nizam joined them: but from neither of these allies could Lord Cornwallis expect much efficient assistance, especially in the moment of danger, as their equipment and discipline were excessively defective. In the month of June 1791, his Lordship set out towards Bangalore. His first object was to secure an easy and regular communication between the Mysore and Carnatic, as from the latter the supplies of the army were chiefly to be drawn: but this communication would be impracticable, so long as the various hill forts which commanded the passes were in the possession of Tippoo. They were uncommonly strong, both by nature and art. Of these, Savendroog, Chittledroog, and Kistnaghury, were the most remarkable for natural strength. The first is surrounded by a forest of natural wood, or jungle, several miles in depth, thickened with clumps of planted bamboos, to render it as impenetrable as possible. It is impossible to invest or blockade it closely, the rock forming a base of 8 or 10 miles in circumference, which, with the jungle and lesser hills that surround it, includes a circle of 20 miles. From this base, it is reckoned to rise above half a mile in perpendicular height. This huge mountain is further rendered strong by being divided above by a chasm that separates the upper part into two hills, each, with their defences, forming two citadels, and capable of being maintained independent of the lower works. This stupendous fortress, so difficult of approach, is no less remarkable for its noxious atmosphere, occasioned by the surrounding hills and woods, than for its wonderful size and strength.

The right wing of the main army, under the command of Lieutenant Colonel Stewart, was ordered to the siege of this tremendous fortress. In three days, a practicable breach was effected, and the troops advanced to the storm, Lord Cornwallis in person superintending the attack. On the appearance of the Europeans advancing, the garrison were seized with a panic and fled, and the breach was carried without meeting or even overtaking the enemy. The main body endeavoured to gain the western hill, and if they had done so, the siege must have recommenced; but they were closely pursued by a small party of the British, who entered the different barriers along with them, and gained possession of the top of the mountain. Thus, in less than an hour, in open day, this fortress, hitherto deemed impregnable, was stormed without the loss of a man, only one private soldier having been wounded in the assault. Other fortresses were also taken, so that the convoys reached the army without the least delay or opposition.

On the 22d of January 1792, the Bombay army, having passed the Ghauts, joined Lord Cornwallis. They consisted of 8400 men, and as soon as the armies of the Mahrattas and of the Nizam had also joined, Lord Cornwallis made preparations for besieging Seringapatam. On the 5th of February, the city was seen by the whole army from the heights which they had mounted, lying six miles to the north-east of it. The Sultan's army was encamped under the walls of his capital. Seringapatam is placed at the upper end of an island surrounded by the Cavery, which is here a large and rapid river, having a very extensive channel, impeded by rocks and fragments of granite. The fort occupies about a mile at the west end of the island, and is an immense and unfinished building. In fortifying the town, Tippoo retained the long strait walls and square bastions of the Hindoos, and his glacis was in many places so high and steep as to shelter the assailants.

The camp of the allies was pitched on the north side of the island. The British formed the front line, the reserve was placed a mile in the rear, and the Nizam and Mahrattas were stationed still farther in the rear. Tippoo's fortified camp was under the walls of Seringapatam, within a bound hedge strengthened by redoubts. In this line there were 100 pieces of artillery; and in the fort and island, which formed his second line, there were upwards of 300 pieces. The whole of his army amounted to 40,000 infantry, besides a large body of cavalry.

On the night of the 6th of February 1792, Lord Cornwallis resolved to attack Tippoo's camp. For this service he selected 2800 Europeans, and 5900 native infantry, but without artillery. The attack was completely successful. It was made in three columns. The centre column under Lord Cornwallis attacked the Sultan's redoubt, and having carried it, forced their way into the town; and, by the other columns, the enemy's positions on the north side of the river, and almost the whole of the island, were carried. Eighty guns were taken, and the loss of the Sultan in the battle is said to have been 4000; but the desertion was so great after the overthrow, that his army was reduced in number at least 20,000. The loss of the British was 535.

The British army having thus obtained possession of the island and town of Seringapatam, were immediately employed in making preparations for the siege of the fortress. But Tippoo, after several unsuccessful efforts to retrieve his fortune, at length, on the 24th of February, agreed to terms of peace, by which he agreed to pay 3 crores and 30 lacks of rupees, about 3½ millions sterling—to relinquish half his dominions—and to give up three of his eldest sons for the due performance of the treaty. Lord Cornwallis gave up to the troops his whole share of the prize money, amounting to *L*.47,244; and General Meadows, the next in command, his, amounting to *L*.14,997.

On this occasion, the force brought against Tippoo was one of the most formidable ever seen in Hindostan. On the 16th of March 1792, the British army above the Ghauts amounted in all to 11,000 Europeans, 31,600 natives, and 190 pieces of cannon. The Mahrattas, the Nizam's, the Rajah of Travancore, and the other auxiliary forces, amounted to about 40,000 men, of whom 30,000 were cavalry. Towards the conclusion of the siege, allowing four camp followers to every soldier, the total number of persons attached to the camp of the confederates exceeded 400,000.

After the termination of this war, the alliance between the British and the Nizam became more intimate; but, on the other hand, a coolness arose between them and the Poonah Mahrattas, principally on account of the close connection between them and the Nizam. Scindiah was acknowledged an independent power by Lord Cornwallis, who did not think it proper to prevent that chief's aggrandizement. The consequence was, the complete establishment of his power over the northern parts of Hindostan; the possession of the person of the Emperor of Delhi; the formation of a large and formidable corps of regular infantry, chiefly under French officers; the erection of founderies and arsenals; and, in short, the accumulation of those vast military powers and resources, which enabled his immediate successor to carry on a war, at the same moment, in the Decan and Hindostan, against the British government and its allies.

Lord Cornwallis had formed treaties with many of the Indian princes, the chief of whom were the Nabob of the Carnatic and the Vizier of Oude; with the former it was stipulated, that, in the event of a war in that part of India, the British should charge themselves with its conduct, on condition that the Nabob applied a certain proportion of his revenue to its support. If he failed in this condition, the British were vested by the treaty with a right to appoint superintendants and receivers in his territory; they were also to assume the management of the Carnatic, which was to remain in their possession during the continuance of hostilities. The treaty with the vizier of Oude related principally to the regular payment of the sums which, by former treaties, he had engaged to pay to the British.

When the account of war between France and England reached India, Pondicherry was immediately attacked, and taken by an army from Fort St George. In the month of August 1793, Lord Cornwallis sailed for England.

He was succeeded as governor-general by Sir John Shore, afterwards Lord Teignmouth. During his administration, no war with a foreign power occurred; but that period was marked by political changes in the state of India of great importance. A rupture took place between the Nizam and the Mahrattas: the former entertained the most friendly disposition towards the British government, whereas the latter viewed the success of our armies with alarm, and, consequently, could not regard the Nizam with any friendly feelings. They believed, that if they could reduce his power, they would not only increase their own, but injure the British government. As they trusted for the accomplishment of any object which they had in view, not more to their military strength than to intrigue, they had for some time gained over the Nizam's minister, who acted more at their command than at that of his master. As soon as the Nizam found this out, he put him to death. Immediately before the occurrence of hostilities between the Mahrattas and the Nizam, Tippoo, whose active spirit of hostility against the British had led him to commence intrigues with the French government, the court of Hyderabad, and the court of Poonah, almost at the same moment that the peace of Seringapatam was concluded, had assembled an army, and threatened to come forward as an ally of the Mahrattas against the Nizam, in the quarrel between those states. Sir John Shore seems to have been of opinion, that the British government was not bound, either by express treaty or by political expediency, to support its ally the Nizam, in the event of his being attacked by Tippoo, during the period when he was engaged in a war with the Mahrattas. This war, however, lasted such a short time, and Tippoo was so completely occupied in his own dominions, repairing the losses he had sustained, that he could not accomplish his object of attacking the Nizam.

The war between the Mahrattas and the Nizam began in February 1795; the advanced corps of the former, under the command of Dowlut Row Scindiah, marched towards the Nizam; and on the 11th of March attacked that prince, who had advanced from Bedar to meet him. After a general action, in which both parties were thrown into some confusion, and neither obtained any decided advantage, the Nizam, yielding to the fears of his women, who attended him in the action, retreated during the night of the 11th, and took shelter in the small fort of Kurdlah. This fort is completely surrounded by hills, except in one direction, which the Mahrattas immediately occupied; and by that means hemmed in the Nizam's army, and cut it off from all supplies. After remaining for some weeks in this situation, he was obliged to conclude a peace, the exact particulars of which are not known; but it is understood that he agreed to cede to his enemies a country, the annual revenue of which was about 35 lacks of rupees, including the fort and district of Dowlatabad, and to pay them three crores of rupees. After the convention was settled, the Nizam returned to his capital, and the Mahratta confederates towards their respective countries. Very shortly afterwards the young Paishwah died suddenly, and the eldest son of the Nizam rebelled against his father. The Nizam, alarmed at this, pressed the instant return of the English subsidiary force to Hyderabad, and took every step to manifest his attachment to the British government. The troops were immediately ordered to march; and they were already advancing to join the army acting against the son, when accounts were received of his defeat and capture.

At this period, the French, under M. Raymond, were employing every means in their power to ingratiate themselves with the Nizam; and as they had acquired great reputation by the active part which they took in the reduction of his son, they succeeded in their object; and the influence they possessed they directed against the British.

The death of the young Paishwah contributed to restore to the Nizam a part of that power and rank among the states of India, which he had lost by the treaty of Kurdlah, as it occasioned the most serious dissensions among the Mahratta chiefs, whose interests were deeply involved in the succession. The principal minister at Poonah was desirous of placing an infant on the Musnud, to the exclusion of the legitimate heir. This plan was opposed by the agent of Dowlut Row Scindiah; and that chief prepared to march to Poonah to support the legitimate heir. Under these circumstances, the minister endeavoured to gain the support of the Nizam, and for this purpose he resigned all those great cessions which had been obtained from the Nizam by the convention of Kurdlah. In the mean time, however, Dowlut Row Scindiah, having arrived at Poonah with a force, which gave him a decided superiority, and thus placed the legitimate heir, Badgeron, on the Musnud, a new negociation was opened with the Nizam, not so favourable as that which he had just concluded; for by this he agreed to cede one fourth of the territory, and to pay one fourth of the sum fixed by the convention of Kurdlah. The success of Dowlut Row Scindiah in this important transaction established his influence and ascendency in the Mahratta empire. This was greatly augmented by the death of Tuckojee Holkar, most of whose possessions he usurped, after putting to death his eldest son, and imprisoning the other members of his family. He also obliged the Paishwah to cede to him the important fortress of Ahmednagur and its surrounding district, by which he not only obtained the command of the city of Poonah, but the best passage into the territories, either of the Paishwah or the soubhadar of the Decan.

This great and rapid increase of power and influence, especially as it was supported by an army disciplined in a great measure after the European manner, by French officers, gave some uneasiness and alarm to the British government of India. Almost the whole of that part of Hindostan which had been subdued by Scindiah, as well as the establishment and realization of his claims upon the Rajpoot states, were entrusted to the management of the French general who commanded his infantry.

In 1798, a treaty was entered into by the British and Saadut Ali Khan, who had claims to the Musnud of Oude, which the British promised to support; in return for their assistance, he promised to vest in them the defence of his dominions, and to pay them 76 lacks of rupees; and in the event of the failure of any of these instalments, the British were to be put into possession of the country of Oude, of the value of ten lacks of rupees. Saadut Ali Khan also agreed to pay the amount of any expence which the British might incur in placing him on the throne, and to cede the fortress of Allahabad. There were several other articles highly favourable to the British, and which were evidently calculated to assist them in obtaining the entire sovereignty of the province at some future period. These were the principal transactions which happened in India during the government of Lord Teignmouth.

On the 26th of April, 1798, Lord Wellesley reached India. Affairs at this time were rather critical for the British interest. The designs of Tippoo to renew the war were undoubted; a French party prevailed at the courts of the Nizam and of Scindiah; the Poonah Mahrattas were entirely under the power of the latter; and the court of Berar was suspected to be adverse to the British, whom it had long looked upon with jealousy and apprehension. The territory of Oude was not yet quiet under the government of Saadut, who still called upon the British for support in the exercise of that power to which they had raised him. The Carnatic, also, over which Omdut Ul Omrah ruled, was in a weak state; and yet it was evident, that in the event of hostilities in that part of India, the British must rely greatly on the assistance of its nabob. The finances of the British government had been greatly exhausted by the expeditions against the Dutch possessions in Ceylon and the Spice Islands, and a considerable part of the army of Coromandel was likewise absent on these expeditions.

Lord Wellesley immediately began a system of measures and operations, which in his opinion would strengthen the British dominions in India, and secure them against any formidable attack by the native princes. In September, 1798, a favourable treaty was concluded with the Nizam, by which, among other conditions, he promised to disband the French corps in his service, and to deliver over its officers to the British government, whenever the whole of the British force, to be stationed in his dominions, reached his capital. The British, on their part, agreed to arbitrate the points that were in dispute between him and the Poonah Mahrattas; and if these were not settled, to protect his dominions from any unjust demand made by them. That part of the treaty which related to the dismissal of the French army was of difficult execution; but at length was accomplished by the firm and decisive measures of the British, aided by a mutiny, which at this time broke out in that army.

Lord Wellesley next endeavoured to bring Tippoo to reason; but his attempts failing of success, in the month of February, 1799, he directed the British armies to advance against that prince. empowering, however, the commander in chief, General Harris, to treat with Tippoo, if he shewed a sincere desire for peace.

The army under General Harris, after having been joined by that of the Nizam, entered the territories of Mysore, on the 3d of March, unopposed by the Sultan; who had, as soon as he saw the preparations of the allies, hastened to attack the Bombay army under General Stewart, which was posted in Coorgah, and ready to co-operate in the reduction of Seringapatam. He was however repulsed in his attack on the Bombay army, with great loss. His next object was to impede the march of General Harris' army, which he met between Sultanpet and Malavilly, on the 27th of March. Here a partial action took place, which ended in his defeat, and instant retreat to Seringapatam. That fortress was a few days afterwards regularly invested by the combined armies of the British and the Nizam. Tippoo now endeavoured to make peace; but as he was unwilling to accede to the terms proposed by General Harris, the siege continued. On the 4th of May, the fort was taken by assault. Tippoo was killed under a gateway, but by whom, or in what manner, is not known; no individual ever appeared to claim the honour of having slain him, nor was it ever discovered who had obtained possession of his valuable necklace of pearls. A great proportion of the garrison, which amounted to about 8000 men, was slain.

The talents of Tippoo were undoubtedly great; but he did not possess them in an equal degree with his father, and he was yet more below him with respect to prudence and knowledge of human nature. He succeeded best in attaching to him the lowest classes of the Mahomedans, and he possessed all the bigotry and zeal necessary for that purpose. None of the Mahomedan soldiers entered the British service, though many suffered extreme poverty, and they still revere his memory, regarding him as a martyr, who fell in the defence of their religion.

By the treaty with the Nizam, the fall of Seringapatam, and the death of Tippoo, the Mahomedan branch of the grand confederacy, which the French had raised against the British in India, was completely destroyed.

As soon as Lord Wellesley learnt the fate of Tippoo, he formed a plan for the partition of his country. This was carried into effect. The districts of Canara, including all the sea coasts of Mysore, and the provinces immediately adjoining the possessions of the British on the coast of Malabar, and the Carnatic, were kept by the British; they also retained the forts and posts at the different passes into the Mysore, and the fortress and island of Seringapatam. The districts of Goorum, Condah, Gooty, and others contiguous to his dominions, were given to the Nizam. Lord Wellesley moreover resolved to cede some districts, contiguous to the Poonah government, to the Paishwah, provided they would enter into a new treaty with him. Over what remained of the Mysore territories, Lord Wellesley placed the descendant of the ancient Hindoo family of Mysore; and, as he was an infant, a Bramin of great ability and reputation was appointed his minister. Two treaties were formed with this prince. The first related to the partition of the Mysore; the second to the relations which were to subsist between the prince and the British government. By this last treaty, the British were to maintain a military force for the defence of the kingdom of Mysore against all external enemies; and the Rajah agreed to pay an annual subsidy of seven lacks of pagodas, for the support of this force. In case the Rajah failed in executing his part of the treaty, or its appearing probable that he might, the British government were either to introduce such regulations in the management of the revenues, or to assume such parts of the country of Mysore, as appeared necessary to render the funds fixed for the maintenance of the troops efficient and available. The Rajah also agreed to permit the British to garrison with its own troops such fortresses in Mysore as it might think necessary to enable it to fulfil its engagements of defending that kingdom.

On the 12th of October, 1800, a new treaty was formed between the Nizam and Lord Wellesley, by which the former agreed, in consideration of a larger British force being kept for his defence, to cede, in order to secure the payment of this augmented force to the British, in perpetuity, all the territories which he had acquired by the treaty of Seringapatam in 1792, and the treaty of Mysore in 1799; and the British bound themselves to prevent any power from invading the territories of the Nizam.

It has been stated, that the British government had reserved a considerable portion of the territories which they had conquered from Tippoo, to be given to the Paishwah, on certain conditions; but he, having refused to accede to the terms proposed, the reserved territory was shared between the British and the Nizam. Lord Wellesley was still desirous of connecting the Paishwah more closely with the British; and a favourable opportunity to accomplish these wishes occurred in the beginning of the year 1801. At this time a war took place between Holkar and Scindiah, which obliged the latter to remove from Poonah, and consequently weakened his influence with the Paishwah. The latter seemed disposed to form an alliance with the British; and indeed his territories were in such a weak and unsettled state, that an alliance with them was highly desirable. Hordes of banditti were daily pouring in from Malwah and Hindostan, to contend at Poonah for the sovereignty of the Mahratta empire. In 1802, the Paishwah, under these difficulties, united himself with Scindiah; but his army sustained a signal defeat near Poonah, on the 25th of October. The Paishwah was now more anxious than ever to place himself under the protection of the British; accordingly, a definitive treaty of alliance was concluded on the 31st of December, at Bassein, where the Paishwah resided under the protection of the British. By this treaty, the British government bound itself to furnish to the Paishwah six battalions of native infantry, with a suitable train of artillery; and for the payment of this force the Paishwah agreed to cede territory to the amount of 26 lacks of rupees. All his claims on Surat, and the English districts in Guzerat, were given up.

In order to support this treaty, which included the restoration of the Paishwah to his throne at Poonah, the army of Fort St. George, under the command of General Stewart, advanced to the bank of the Toombuddra, and General Wellesley was detached in front; the latter advancing in co-operation with the subsidiary force in the Deccan, commanded by Colonel Stevenson, through the southern parts of the Paishwah's territory, reached Poonah on the 20th of April. The troops of Holkar fled at his approach; and the Paishwah, who had left Bassein, when he learnt that the British forces were coming to his aid, entered Poonah, and was reseated on his Musnud, on the 13th of May. This measure was effected without any opposition; and all the principal Mahratta chieftains, who are the more immediate feudatories of the Paishwah, joined their troops to those of General Wellesley, and advanced with him to Poonah, where they paid their obeisance to the Paishwah.

As Holkar had fled on the advance of General Wellesley, it was hoped that the Paishwah would be allowed to sit quiet on his Musnud. These hopes, however, were soon disappointed; for Scindiah, after remonstrating against the advance of the British troops to Poonah, and finding his remonstrances disregarded, marched towards the frontiers of the Nizam. Lord Wellesley at first endeavoured to negociate with Scindiah, but not succeeding, he vested the officers in command of the armies in Hindostan and the Decan with the fullest civil, military, and political powers. General Wellesley was authorised to negociate treaties with Scindiah, Holkar, or the Rajah of Berar; and Lord Lake, who was at the head of the Hindostan army, was directed, in the first place, to reduce the formidable and independent French authority which had been established there; and then to occupy the whole country forming the Dooab, between the Jumnah and the Ganges, to the mountains of Cumaoun, and also to take possession of Delhi, Agra, and a chain of posts on the right banks of the Jumnah, from the mountains of Cumaoun to the province of Bundelcund.

The first operation of the war was the reduction of the fortress of Ahmednagur, on the 8th of August, by General Wellesley; this success was followed up, both by him and by Lord Lake, by the most splendid and decisive victories, especially those of Assaye and Arghaum by the former, and those of Delhi and Laswaree by the latter. The battle of Assaye was fought near that town, which is situated in the province of Berar, on the 23d of September. General Wellesley's army consisted of 4500 men, of which number 2500 were Europeans: the armies of Scindiah and the Rajah of Nagpoor amounted to 30,000 men. The battle was obstinate, but at length the allied troops gave way, and fled in great confusion: 1200 of them were killed on the field; 98 pieces of cannon, seven standards, their camp equipage, a large quantity of ammunition, &c. were taken. General Wellesley immediately followed up his success; and on the 28th of November was fought the battle of Arghaum, equally splendid and decisive in its results with the battle of Assaye. These defeats led both Scindiah and the Rajah to solicit peace; and the latter, immediately after his principal fortress, Gawelghur, was reduced, made peace with General Wellesley. In the treaty he was compelled to submit to very unfavourable terms: the province of Cuttack, and that part of the provinces of Berar to the west of the Wurdah, which belonged to him, were ceded to the British; he also promised not to permit, for the future, any person belonging to a European or American state, at war with Britain, to be in his service.

Scindiah, thus beaten and deserted by his ally, sued for peace, which was granted him in December, 1803. He gave up to the British all his territories in Hindostan, which lay to the southward of those possessed by the Rajahs of Jypore, Joudpoor, and the Rajah of Gohud: he also ceded the lands to the south of Adjuntee, and the fort and territory of Baroach; and he resigned all claims which he had on the British and their allies.

During this war, Holkar had remained quiet and inactive, though he had engaged to assist the allies against the British. As Lord Wellesley was informed of this circumstance, he deemed it indispensably necessary to obtain from this chief an early and satisfactory explanation of his views and plans. This, however, Holkar at first evaded, and afterwards made such proposals for a treaty with the British as Lord Wellesley could not accept. These proposals being rejected, Holkar openly prepared for hostilities: he endeavoured to persuade Scindiah to assist him in an attack on the British territories; and at the same time invaded and plundered the country of the Rajah of Jypore. Lord Lake immediately advanced against him, but he retreated from the position which he occupied. The war with Holkar was distinguished by the suddenness and rapidity of the movements, by which he for a long time contrived to elude the attacks of the British, though his territories were invaded by them in every direction; and by the reverses which attended the British arms. Two corps under the command of Colonel Monson, and Colonel Murray, had been sent against the capital of Holkar's dominions: the latter arrived at it, and succeeded in reducing it; but the former having been led astray by his guides, was attacked by Holkar with such a decided superiority of force, that he was compelled to retreat towards Agra: at first the retreat was conducted with a good deal of order; but afterwards, in consequence of several conflicts in which the British suffered severely, and the loss of most of their artillery, ammunition, &c. they retreated in the utmost confusion. As the country was nearly impassable from the rains, Colonel Monson did not reach Agra till after the space of seven weeks; and then only a very few of his troops entered it, the rest having been either killed by the enemy, or having perished through fatigue.

Holkar hitherto had eluded all attempts of General Lake to bring him to battle; but at length, having encamped his army under the walls of Deeg, in the province of Agra, with several ranges of batteries before them, to the depth of two miles, he resolved to wait the attack of the British. The attack was made with complete success. Holkar's regular infantry and artillery were nearly all destroyed; and after a short but vigorous siege, the town surrendered to the British.

In order that he might have time to collect his scattered troops, Holkar persuaded the Rajah of Bhurtpoor to embrace his cause. As the reduction of this fortress was deemed an object of great importance, General Lake sat down before it; but the defence made by the garrison proved most obstinate. They repulsed with great slaughter the assaults of the besiegers; so that in the course of the siege the loss of the British exceeded that which they had sustained in any three of the greatest battles they had fought in India. At last the Rajah sued for peace, which was granted him, on condition that he paid to the British 20 lacks of rupees, five immediately, and the remainder by instalments.

Notwithstanding the defeats which Holkar had sustained, and the desertion of nearly all his allies, he still persevered in the war; but he conducted it more like the chief of a band of marauders, than the general of an army. In his last campaign he entered the British territories to the westward of Delhi. Lord Lake immediately marched after him, but on the approach of the British he fled; and his flight was uninterrupted and most rapid, till he reached the banks of the Beyah, in the Punjab, when, being reduced to the utmost distress, he solicited peace from Lord Lake. The treaty was ratified on the 6th of January 1806, by which he gave up all claims on Koonah and Bundelcund, and the districts north of the Chumbul; the latter, however, were afterwards given back to him.

Before Holkar was finally overcome, Lord Wellesley had left India. We have briefly related the military transactions which took place during his government; but it will be also proper to advert to those changes in the British possessions in India which he effected without the aid of war.

In November 1801, all the frontier provinces of Oude were ceded to the Company. The reason assigned for this cession was, that the British possessions might become a barrier between the dominions of the vizier of Oude and any foreign enemy. On the 25th of July 1801, the civil and military government of the Carnatic was given up to the British, on condition that they should pay the debts of the Nabob, and allow him an annual sum, equal to one fifth of the revenues of the Carnatic.

At the period of Lord Wellesley's departure for England, the allies of the British were more secure, and their enemies less numerous and formidable, than they had ever been before. Of the former, the Soubhadar of the Decan was the most important; and he had been placed in a situation of security, by the reduction of the Mahratta chiefs, and by maintaining within his territories a subsidiary European force. The sovereign of Mysore was now friendly to the British, instead of being one of their most inveterate enemies. The two Presidencies of Madras and Bengal were connected by the conquest of Cuttack; and this conquest, together with the territories which the British now possessed in Guzerat, Malabar, and Canara, rendered them the masters of nearly all the sea coast from the mouths of the Ganges to those of the Indus.

In Hindostan proper the influence of the French was completely destroyed; the incursions of the Mahrattas into it had been effectually checked, and were not likely to be soon renewed; as by the territories ceded to the British in the Dooab, and on the right banks of the Jumnah, as well as by the protection which the British gave to those small states which stretch from the mountains of Cumaoun to Bundelcund, the British provinces were defended from the encroachments of the Mahratta chiefs.

On the 31st of December 1805, during the administration of Sir George Barlow, a new treaty was concluded with Scindiah, by which that chief gave up all claims on the countries of Boondee, Surredee, Dhoolpoor, Barree, and Rajah Keriah.

During the administration of Lord Minto, the only events of importance which occurred in India were, the reduction of Java, for an account of which see Java; the renewing of the British protection to the Seik chiefs on the north-west of the Jumnah, and the south of the Sutlege, thus strengthening and extending the frontier of the British territories in Hindostan; and the protection afforded to the Rajah of Berar from the attacks of Meer Khan, a chieftain of Malwah, and a noted pindaree, or freebooter.

Lord Minto was succeeded in the government of India by the Earl of Moira, now Marquis of Hastings, who found himself compelled to make war on the Rajah of Nepaul in 1815, in consequence of that chief having invaded the British territories contiguous to his dominions. In this war, the British met with more hardy and formidable opponents than they had been accustomed to encounter in India; but after surmounting many difficulties, principally arising from the mountainous nature of the country of Nepaul, and getting possession of the Rajah's capital, a treaty was concluded, by which he agreed to give up certain districts deemed necessary, by Lord Moira, for the better protection of the British territories. Scarcely, however, had the British army been withdrawn from Nepaul, when the Rajah refused to fulfil the treaty, and a second war became unavoidable. The British in this were equally successful; and, in 1816, the fulfilment of the former treaty was enforced.

This year, also, the Pindarees, or freebooters, taking advantage of the Nepaulese war, traversed, to the number of several thousands, the whole of India; and penetrating to the bay of Bengal, laid waste the province of Cuttack, in the immediate vicinity of Calcutta.

The following sketch of the military strength of the powers bordering on the British dominions, is supplied by the latest intelligence from India:—

"1. The Seiks possess a large tract of country. Their tribes are headed by Runjet Sing, a warlike and ambitious leader. Their usual military establishment may be estimated at 28,000. The Seiks under the British protection can bring into the field about 17,000 soldiers.

"2. Scindiah has about 40,000 soldiers. He is said to be in close alliance with the Rajah of Berar, and with the Bhurtpoor Rajah. He has acquired much strength since the Mahratta war, by bringing the feudatory states under his immediate control.

"3. Meer Khan may have 28,000 soldiers. Mahomed Shah and Lally Sing, who generally act with him, can bring 20,000 more into the field. Meer Khan is generally much in want of money; and when his troops become mutinous from being kept in arrears, he gives them perhaps half their pay, with authority to plunder to the amount of what is still due to them.

"4. Holkar is poor, and has only 17,000 men. Meer Khan, Mahomed Shah, and Lally Sing, are nominally his generals.

"5. The Pindarees are a tribe of military adventurers, who, having followed the standards of different chiefs, and, from the present tranquil state of Hindostan, being out of employ, have joined with other vagrants, and cemented themselves into one great body, which is daily accumulating, so that at present it is said their force amounts to nearly 80,000 men, most of whom are well equipped, and all well mounted. Their mode of making war is most destructive, as plunder is their only object. They separate, for the purpose, into bodies of from 100 to 4000 or 5000 horse, and ravage a territory of 50 miles, or more, in circumference; whence, after rendering it a perfect desert, they march elsewhere to similar devastations. They will fight under any chief who will best pay them."

PART III. STATISTICS.

CHAP. I.

Extent,—Boundaries,—Divisions,—Progressive Geography.

We have already mentioned the grand divisions of Hindostan, into North Hindostan; Hindostan Proper; the Decan; and the South of India; and the boundaries of the whole, as well as of each division. We have also mentioned, that this article will be confined to Hindostan proper, the Decan, and the south of India; referring the reader, for information respecting Northern Hindostan, to the articles Cashmere, Nepaul, Bootan, Tibet, &c.

Taking Hindostan in the largest acceptation of the term, its area comprehends about one million geographical square miles, or an extent equal to the whole of Europe, with the exception of Denmark, Norway, Lapland, Sweden, Russia, and Poland. Hindostan proper is equal in size to France, Italy, Germany, Bohemia, Hungary, Switzerland, and the Netherlands; and the Decan, and the south of India, are about equal to the British islands, Spain, and Turkey in Europe.

I. Hindostan Proper contains eleven provinces. 1st, Lahore. The boundary of this province on the west is the Indus, by which it is separated from Afghanistan; on the east the river Sutlege, a subsidiary stream of the Indus, divides it from Northern Hindostan; on the north it is bounded principally by Cashmere; and on the south by the provinces of Multan, Delhi, and Ajmeer. Its length is about 320, and its breadth about 30 miles. From the 32° to the 34° of north latitude it is mountainous; from the 32° to the 30°, its southern limit, it is flat, constituting what is called the Punjab, a natural division of Hindostan proper, which we shall afterwards notice. The greatest part of Lahore belongs to the Seiks. The city of Lahore is the capital of the province; but Amretsir is the capital of the Seik nation. 2. Multan, which lies between the 28° and 31° of north latitude, is bounded by Lahore and Afghanistan on the north; by Ajmeer and Sinde on the south; by Belochistan on the west; and by Lahore and Ajmeer on the east. Its extent is not accurately ascertained. It is possessed by several petty princes, of whom the nabob of Multan is one of the principal; but they are continually exposed to the incursions of the Afghans, Seiks, &c. and are also almost always fighting with one another. Multan is the capital of this province. Sinde is generally regarded as part of the province of Multan, though it ought with more propriety to be regarded and described as a separate province. Sinde lies on both sides of the Indus. The eastern division, the only one which we are called upon to notice in this article, is bounded by Multan and Afghanistan on the north; Cutch and the sea to the south; Cutch, the Sandy Desert, and Ajmeer, on the east; and the Indus on the west. The whole of Sinde is governed by a prince of the Talpoony family; but one of his brothers, though nominally dependent upon him, exercises all the powers of sovereignty over the districts on the eastern banks of the Indus. 3. Guzerat is bounded on the south chiefly by the sea, and in a small part by the Decan; on the north by Ajmeer; on the east by the Gulf of Cambay, and the provinces of Malwah and Khandeish; and on the west by the Gulf of Cutch, the province of Cutch, and the Sandy Desert. It lies between the 21° and 24° of north latitude. Its length from north to south is about 320 miles; its breadth varies very much, but on an average it may be 180 miles. Those parts of this province which are the best cultivated, are in the possession of the British, the Paishwah, and the Guicowar. The territories of the first stretch along both sides of the Gulf of Cambay, and comprise the cities of Surat, Baroach, Cambay and Gogo. The sea coast from this gulf to the mouth of the Indus is governed by a number of petty princes. The principal places in Guzerat, besides those belonging to the British, are Ahmedabad, which belongs to the Paishwah, and Chumpaneer, which belongs to a Mahratta chief called the Guicowar, whose dominions lie in this part of the province. Cutch may be considered in connection with Guzerat, which lies to the east of it. On the west it is bounded by Tatta, a district of Sinde; on the south by the Gulf of Cutch; and on the north by the Sandy Desert and Sinde. Its length is supposed to be about 110 miles, and its average breadth about 70. It is entirely possessed by a number of tribes, who live by plunder and piracy. 4. Ajmeer is situated nearly in the centre of Hisdostan Proper, between the 25° and 30° of latitude. On the west it is bounded by the province of Sinde; on the east by Delhi and Agra; on the north by Multan and Delhi; and on the south by Malwah and Guzerat. From north to south it extends about 350 miles, and its average breadth is about 220. It is also called Rajpootana. The city of Ajmeer, and the surrounding district, belongs to Scindiah; the district of Tonk Rampoorah to Holkar; and the rest of the province to the Rajah of Joudpoor, and other less powerful rajahs, who are chiefly tributary to the Mahrattas. 5. Delhi, situated between the 28th and 31st degrees of latitude, is bounded on the north by Lahore, and some districts in northern Hindostan; on the south by Agra and Ajmeer; on the west by Ajmeer and Lahore, and on the east by Oude, and the hills which divide it from northern Hindostan. Its length is about 240 miles, and average breath about 180. The city of Delhi, with a tract of country round it, the whole of the province to the east of the Jumnah, and the north-eastern division of it, belong to the British. The south-west districts belong to various rajahs, all of whom are allies of the British. The Seiks principally occupy the tract to north-west of the Jumnah, and south of the Sutlege. The principal towns are, Delhi, Sirhind, Hissar, Sarahungpoor, &c. 6. Agra, between the 25th and 28th degrees of latitude, is bounded on the north by Delhi; on the south by Malwah; on the west by Ajmeer; and on the east by Oude and Allahabad. Its length is 150 miles, and its average breadth 180. Several rajahs, who are allies of the British, possess the north-western and western districts. The city of Agra, a small district round it, and the country to the east of the Jumnah, belong to the British; the rest of the province, with a trifling exception, is possessed by the Mahrattas. The principal towns, besides Agra, are, Bhurtpoor, Deeg, two strong fortresses; Canoge, Kalpy, and Narwar. 7. Malwah, between the 22d and 23d degrees of latitude, is bounded on the north by Ajmeer and Agra; on the south by Khandeish and Berar; on the east by Allahabad and Gundwana; and on the west by Ajmeer and Guzerat. Its average breadth is about 150, and length 250 miles. It is occupied almost entirely by Scindiah and his tributary chieftains. Holkar also possesses a small portion of this province. The principal towns are, Indore, Mundah, Boopal, &c. 8. Allahabad, between the 24th and 26th degrees of latitude, is bounded on the west by Malwah and Agra; on the east by Bahar and Gundwana; on the north by Oude and Agra; and on the south by Gundwana. Its length is about 270 miles, and its breadth averages about 120. Nearly the whole of this province belongs either to the British, or to their ally the nabob of Oude. The principal towns are, Allahabad, Benares, Callinger, Chunar, &c. 9. Oude, between the 26th and 28th degrees of latitude, is separated, on the north, by a range of hills from Nepaul; on the south it is bounded by Allahabad; on the east by Bahar; and on the west by Delhi and Agra. Its length is 250, and its average breadth 100 miles. The whole of this province is either possessed in full sovereignty by the British, or, though still held nominally by the Nabob, entirely under their protection and controul. The principal towns are, Lucknow, the capital and residence of the Nabob, Fyzabad, the former capital, Oude, Gooracpoor, &c. 10. Bahar, between the 22d and 27th degrees of latitude, is divided, on the north, from Nepaul by a range of high hills; on the south is bounded by Gundwana; on the east by Bengal; and on the west by Allahabad, Oude, and Gundwana. It is 250 miles long, and 200 broad. According to Mr J. Grant, in his *Supplement to the Historical and Comparative Analysis* *of the Finances of Bengal*, &c. published in the Appendix to the Fifth Report from the Select Committee of the House of Commons, there are in this province 26,000 square British miles of plain arable land, out of 51,973, the total superficial contents. This plain country is naturally divided, by the Ganges, into two portions, nearly equal; one of them stretches 70 miles from that river to the forests of Nepaul and Morung, at the foot of the Tibetian mountains; the other division stretches from the Ganges southward, to the hills which lie between the lower plains and the Balaghaut, or country above the Ghauts. To the south of these two divisions of Bahar, there is a district, almost entirely covered with detached and straggling hills, the area of which comprises 8000 square miles; and still further to the south, there is a highland district, which, since the age of Ptolemy, has been divided into three bellads, or cantons. The British possess the eight districts into which the plain country, north and south of the Ganges, is divided; as well as the greatest part of the highland districts. The principal towns are Patna, Monghir, Buxar, &c. 11. Bengal, between the 21st and 27th degrees of latitude, is bounded on the north by Nepaul and Bootan; on the south by the Bay of Bengal; on the east by Assam and Ava; and on the west by Bahar. Midnapoor, a district formerly belonging to the province of Orissa, is now deemed part of Bengal; and, if this be included, the length of Bengal will be 350 miles, and its average breadth 300. The whole of this province belongs to the British. The principal places in it are, Calcutta, Dacca, Moorshedabad, Hooghly, Cossimbazar, Maulda, &c.

II. The Decan. 1. Aurungabad, between the 18th and 21st degrees of latitude, is bounded on the west by the sea; on the east by Berar and Hyderabad; on the north by Berar, Khandeish, and Guzerat; and on the south by Bejapoor and Beder. Its length is about 300 miles, and its average breadth 160. Bombay and Salsette belong to the British. Of the mainland, the Paishwah and his feudatories possess nearly three fourths; and the other fourth belongs to the Nizam. The principal towns are Aurungabad, Ahmednagur, Bassein, Damaun, and Dowletabad. 2. Khandeish, between the 21st and 23d degrees of latitude, is bounded on the north by Malwah; on the south by Aurungabad and Berar; on the east by Berar; and on the west by Guzerat. Its length is about 200 miles, and its average breadth 90. The Paishwah, Holkar, and Scindiah, possess the whole of this province; the greatest part belonging to Holkar, and the least to the Paishwah. The principal towns are, Boorhanpoor, Hindia, and Asseer. It is full of strong fortresses. 3. Beder, between the 16th and 18th degrees of latitude, is bounded on the north by Aurungabad and Nandere; on the south by the Kristhnah; on the west by Bejapoor; and on the east by Hyderabad. Its length is 140, and its breadth averages 65 miles. It is wholly possessed by the Nizam. Its principal town is Ahmedabad, built near the ruins of the ancient city of Beder. 4. Hyderabad, between the 16th and 19th degrees of latitude, is bounded on the south by the Kristhnah; on the north by the Godavery; on the west by Beder and Aurungabad; and on the east by Gundwana. Its length is 180, and its average breadth 150 miles. It belongs entirely to the Nizam. The principal towns are, Hyderabad, the capital of the Nizam's territories, Golcondah, Warangol, &c. 5. Nandere. This small province, lying in about the 19th degree of latitude, is bounded on the north by Berar; on the the south by Hyderabad and Beder; on the west by Aurungabad; and on the east by Gundwana. It belongs entirely to the Nizam. The principal towns are, Nandere, Candhar, Balcundah, &c. 6. The Northern Circars, a narrow slip of maritime country, extending from the 15th to the 20th degree of latitude, is bounded on the east by the sea; it is divided from Hyderabad on the west, by a ridge of small detached hills; from Berar, on the north, by another ridge of a much greater height, and nearly impassable; and from Orissa on the north-east by the same hills, and the Chilka lake; the river Gundezama divides it, on the south, from the Carnatic Payenghaut. The length of this province is about 470 miles, and its breadth varies from 50 to 70 miles. In the year 1765, four of the circars were ceded to the British; and in 1788, the remaining circar came into their possession. The principal towns are, Ganjam, Visagapatam, Masulipatam, and Guntoor. 7. Berar, between the 19th and 22d degree of latitude, is bounded on the south by Nandere, which is frequently included in it; on the north by Khandeish and Allahabad; on the east by Gundwana; and on the west by Khandeish and Aurungabad. If Nandere be considered as part of it, its length will be 230 miles: its average breadth is 120. Three fourths of it belong to the Nizam, and the remainder to the Mahrattas. The principal towns are, Ellichpoor, Gawelghur, Poonar, &c. 8. Gundwana, lying between the 19th and 25th degrees of latitude, is bounded on the north by Allahabad and Bahar; on the south by Orissa and the Godavery; on the east by Orissa, Bengal, and Bahar; and the west by Malwah, Berar, and Allahabad. It is 400 miles long, and 280 miles in average breadth. The fertile districts of this province are held by the Nagpoor Mahrattas; the mountainous and barren parts are still in the possession of the native inhabitants, called Goands. The principal towns are, Nagpoor, Gurrah, &c. 9. Orissa, lying between the 16th and 23d degrees of latitude, is bounded on the north by Bengal and Bahar; on the south by the Godavery and the Circars; on the east by the Bay of Bengal; and on the west by Gundwana. Its length is about 530 miles, its average breadth not exceeding 90 miles. Three-fourths of Orissa belong to the British; the rest is possessed by several native chiefs, over whom the Nagpoor Mahrattas claim the sovereignty. 10. The greatest part of the province of Bejapoor lies to the north of the Kristhnah, and consequently may justly be considered as a province of the Decan. It stretches from the 15th to the 19th degree of latitude. It is bounded on the south by the Toombuddra, a branch of the Kristhnah, and North Canara; on the north by Aurungabad; on the east by Aurungabad and Beder; and on the west by the sea. Its length is about 350 miles, and its average breadth 200. Four-fifths of this province belong to the Poonah Mahrattas; and of this part the Paishwah possesses in full sovereignty little more than the maritime district of Concan. The Nizam possesses the remaining fifth. The principal towns are, Poonah, Bejapoor, Darwar, Mirjee, &c.

III. The South of India.—Bejapoor, a small part of which lies in the grand division of India, has been already described. 1. The ceded districts comprehend the country lying to the south of the Toombuddra and Kristhnah rivers, which was ceded by Tippoo, in the years 1792, and 1799; at that time assigned by the British to the Nizam; and afterwards, in 1800, given up by the Nizam to the British. The greater part of these districts consists of Table land, or that country which lies above the Ghauts, called Balaghaut; and besides this, it comprises those portions of Punganoor and Goodiput, which, by the treaty of Mysore, were reserved for the Paishwah; but which, in consequence of his not complying with the conditions that were stipulated, were occupied by the British. The exact extent of the ceded districts has not been accurately ascertained, but they are supposed to contain an area of about 27,000 square miles. The principal towns are, Cudapah and Balharry. 2. The Carnatic extends from the 8th to the 16th degree of latitude. It is bounded on the north by the river Gundezamor, which separates it from the northern Circars; on the south, it stretches as far as Cape Comorin; on the east, it is bounded by the sea; and on the west by the Ghauts. Its length is about 500 miles; its breadth varies much, but may average about 75 miles. The Carnatic is divided into three parts, the northern, central, and southern. The first is bounded on the north by the Gundezama, and on the south by the river Pennar; the centre extends from the Pennar to the Coleroon; and the southern from the Coleroon to Cape Comorin. The whole of this territory belongs to the British. The principal towns in the northern Carnatic are, Ongole and Samgaum; in the central, Madras, Pondicherry, Arcot, Vellore, Pulicat, and Cuddalore; and in the southern, Tanjore, Trichinopoly, Madura, Tranquebar, Negapatam, and Tinnevelly. 3. Mysore, between the 11th and 25th degrees of latitude, is surrounded by the British territories under the Madras presidency, the whole of the country being inclosed by the eastern and western Ghauts. It is about 210 miles long, by an average breadth of 140 miles. The whole of the Mysore, with the exception of a small district, allotted, by the treaty of Seringapatam, to the family of the Rajah, is possessed in full sovereignty by the British. The principal town is Seringapatam. 4. Canara is bounded on the east by Mysore, and the ceded districts; on the west by the sea; on the north by the province of Bejapoor; and on the south by the province of Malabar. Its length is about 200 miles, and its average breadth about 35. It is divided into two parts, North and South Canara. The former lies between the 13th and 15th degrees of latitude; its principal towns are, Battecola, Carwar, and Ongore. South Canara stretches from the 13th to the 12th degree of latitude; its chief towns are, Barcelore, Mangalore, and Callianpore. The whole of Canara belongs to the British. 5. The province of Malabar is a particular part of the coast of Malabar to which this name is appropriated. It is situated between the 10th and 13th degrees of latitude. On the north it is bounded by the province of Canara; on the south by Cochin; on the east by the Ghauts; and on the west by the sea. Its length is about 155 miles, and its average breadth about 35. The whole of the province belongs to the British. The principal towns are, Calicut, Tellicherry, and Paniany. 6. Baramahal, situated between the 12th and 14th degrees of latitude, and bounded on the west by the Ghauts, and on the east by the sea, belongs entirely to the British. 7. Coimbetoor is bounded on the north by Mysore; on the south by Dindigul; on the east by Salem and Kistnagerry; and on the west by the province of Malabar. It lies entirely above the Ghauts. It belongs entirely to the British. The principal town is Coimbetoor. 8. Dindigul lies between the 10th and 11th degrees of latitude; and is bounded on the north by Coimbetoor and Kistnagerry; on the south by Travancore and Madura; on the east by the southern Carnatic and Madura; and on the west by Travancore, Cochin, and Malabar. It belongs entirely to the British. The principal towns are, Dindigul, Balmy, and Palapetty. 9. Cochin is a very small province, bounded on the north by Malabar; on the south by Travancore; on the east by Dindigul; and on the west by the sea. The Rajah of Cochin is tributary to the British. The principal town is Cochin. 10. Travancore is bounded on the south and the west by the sea; on the north by Cochin; and on the east by the Tinnevelly district of the southern Carnatic. It lies between the 8th and 10th degrees of latitude. Its length is about 140 miles, and its breadth about 40. The Rajah of Travancore is subject to the British. The principal towns are, Anjengo, Coutan, and Travancore.

Such are the geographical divisions of Hindostan. There are, however, natural and political divisions, which it will be proper to notice.

Of the natural divisions, the Punjab is one of the most celebrated in history, as well as one of the most striking in its character. The Punjab is sometimes considered as consisting only of the flat portion of the province of Lahore; but, in its proper and most extensive meaning, it comprehends all that tract of country to the west of the Himalaya Mountains, through which the principal tributary streams of the Indus run. Its south-east boundary is formed by the Sutlege; and, from this river to Altach on the Indus, its breadth is computed to be 259 geographical miles. Its length from north to south has not been ascertained. The Dooab is another natural division of the country, which frequently occurs in the history of Hindostan. The term Dooab properly means any tract of country included between two rivers: of course there are many Dooabs in Hindostan; but the term is emphatically applied to the country between the Jumnah and the Ganges, or, in its strictest sense, to the southern portion of that territory, for the most part comprehended in the province of Agra. The Deltas of the Ganges and the Indus are also natural divisions of Hindostan. The former commences about 220 miles from the sea. The lower part of it is called the Sunderbunds, and extends along the bay of Bengal about 180 miles. The Sunderbunds are almost entirely formed of woods, interspersed with creeks, and numberless islands, and salt marshes. This tract is in extent equal to the principality of Wales. The Delta of the Indus is about 150 miles in length along the sea coast, and about 115 from the point of separation of the superior branches of the river to its most prominent mouth. The lower part of the Delta of the Indus resembles the lower part of the Delta of the Ganges, in being intersected with rivers and creeks; but there are no trees on it, the greatest part being sandy, or covered with swamps and stagnant lakes. The last natural division of the country which we shall mention is, the Table land in Central and Southern Hindostan. This is supported by the eastern and western Ghauts. It stretches not only through the Mahratta territories, but also through the peninsula to the southern extremity of Mysore. Properly speaking, however, it is not table land, as the surface is considerably varied, being broken into hill and dale.

In the geographical description which has been given of the different provinces of Hindostan, mention has been made of the powers by whom they were possessed. It will be proper, however, to bring into one view the political divisions of the country, by exhibiting a connected account of the possessions held by the British; the princes tributary to the British; the independent princes; and the petty chiefs.

The British possessions are divided into three presidencies, Bengal, Bombay, and Madras. Bengal is the supreme presidency, and in it are comprised the whole provinces of Bengal and Bahar; three-fourths of the adjoining province of Orissa; the districts of Benares, Allahabad, and Bundelcund in the province of Allahabad; a small part of Berar; and a great portion of the territories of the Nabob of Oude, ceded by the treaties of November 1801; the eastern and north-eastern districts of Delhi, and that part of Agra which lies to the east of the Jumnah, are also under the Bengal presidency. The Bombay presidency extends its influence over the whole western coast of India; but the possessions under its absolute and immediate jurisdiction are of trifling extent, compared with those subject to the presidencies of Bengal and Madras. They consist of the districts of Surat, Baroach, Cambay, Goslewarah, and in general the tract which lies along both sides of the Gulph of Cambay, comprehending the most fertile and populous part of the province of Guzerat. Under the presidency of Madras, the whole of India south of the Kristhnah, and the northern Circars in the Decan, are placed. The Rajahs of Mysore, Travancore, and Cochin, indeed, collect the revenues, and direct the internal policy of their respective states; but they are, in fact, vassals of the British in every thing relating to external politics. In the northern Circars, there are five districts; in the Carnatic, six. Part of Mysore and the southern Carnatic form one district. Tinneveily, in the southern Carnatic, constitutes another district; and, in the rest of the Mysore, there are eight districts: in all 21 districts, under the Madras presidency.

The Nizam possesses the centre of the Decan, his dominions comprising the greater part of Berar, the whole of the province of Hyderabad, Nandere, and Beder, and part of Aurungabad and Bejapoor. His territories are divided from those of the British by the Kristhnah and Toombudra; and from those of the Nagpoor Rajah by the Wurdah. Their length is about 420 miles, and their average breadth 220. The Nizam is one of the principal of the British allies.

By the treaty of the 31st of December 1802, between the Paishwah and the British government, the federal power of the Mahrattas was annihilated, and the independent state of the Paishwah, the Rajah of Nagpoor, Scindiah, Holkar, and the Guicowar, were established and recognised. The territories of the Paishwah are by no means extensive; they lie in Guzerat, where they are much intermixed with those of the British; above the Ghauts, to the north and west of Poonah; and in the provinces of Bejapoor, Aurungabad, and Allahabad. Poonah is his capital: he is still the nominal head of the Mahrattas. The Mahratta chieftain, known by the family name of the Guicowar, possesses the northern districts of Guzerat; his capital is Brodrah; he is also an ally of the British. The Nabob of Oude is completely dependent upon the British; a great part of his dominions having been ceded by him to them, and they also having the right of interfering at pleasure in the administration of his remaining provinces. The districts of Lucknow and Oude still belong to the Nabob; the city of Lucknow is his capital and residence. The Mysore Rajah's dominions are divided into three great districts, one of which alone contains a greater extent of territory than was originally subject to his family. The Rajahs of Cochin and Travancore, who are also tributaries to the British, possess the territories already described under the geographical divisions of Cochin and Travancore.

Scindiah is one of the most powerful independent princes of Hindostan; the greater part of the province of Malwah belongs to him: Oojain is the capital of his dominions. The Rajah of Nagpoor, the chief of the Berar Mahrattas, possesses the greater part of the ancient Hindoo province of Gundwana; his territories bordering on Bengal, the Northern Circars, and the Nizam possessions in the Decan. Over this extensive tract of country he has a nominal territory; but his actual power does not reach much beyond the vicinity of his capital, Nagpoor.

The Seiks inhabit and possess the territory that extends from 28° 40′, to 32° 20′ North Lat. comprehending the whole of the Punjab, a part of Multan, and those districts of the province of Delhi which lie between the rivers Jumnah and the Sutlege. Their dominions are bounded on the north by Caubul; on the east by the territories of some petty Rajahs in the mountainous parts of Lahore; on the south by the British provinces, and on the west by Caubul. The Seiks between the Jumnah and Sutlege are called Malawah Singhs; those bordering on the Indus, Sinde Singhs; and those residing in the province of Multan, Nakai Singhs. The province of Sinde is almost entirely possessed by five Ameers, or noblemen of the Talpoony family; that part of the province which is, properly speaking, in Hindostan, is governed by Meer Sohrab, and his brother Meer Thora; the districts subject to the authority of the former are situated on the north-east quarter of Sinde; those belonging to the latter lie more to the south, on the eastern banks of the Indus; these brothers, however, are subject to the authority of another Meer, who has the title of hakim, or ruler of Sinde, and is regarded as the head of the government. The dominions of the Rajahpoot princes are situated on the northwest side of Hindostan, and principally in the central division of the province of Ajmeer. The eastern quarter of this division is subject to the Rajah of Jegenajur; the south eastern to the Rajahs of Kotah, Boonde, and other chiefs tributary to the Mahrattas; the western parts to the Rajah of Joudpoor, and the south western to the Rana of Odeypoor.

The following Table, given by Mr Hamilton, exhibits, at one view, the extent of territory possessed by the different modern rulers of Hindostan; it will be observed, however, that it comprehends Northern Hindostan, the description of which does not fall within the scope of this article.

	Geographical Square Miles.
Bengal, Bahar, and Benares	162,000
Acquisitions in Hindostan Proper, and Orissa, since 1799	60,000
Under the Bengal presidency	222,000
Under the Madras do.	125,000
Under the Bombay do.	10,000
Total of British Hindostan	357,000
British Allies and Tributaries.	
The Nizam	76,000
The Paishwah and Guicowar	53,000
Nabob of Oude	13,000
Mysore Rajah	22,000
Travancore and Cochin Rajahs	5,000
Total under British jurisdiction and influence	526,000
Independent Principalities.	
Under the dominion and influence of Scindiah, Holkar, and other Mahratta chiefs	75,000
Ditto of the Nagpoor Rajah	58,000
Ditto of the Lahore Rajah and the Seiks	54,000
	776,000
Under the Rajahpoot chiefs; the Ameers of Sinde; the Caubul and Cashmere governments; the Rajahs of Bootan, &c.	244,000
Total of Hindostan	1,020,000

The first notice of India by the ancient authors is given by Herodotus: Prior to the invasion of that country by Darius Hystaspes, the Persian monarch sent Scylax of Caryandra to trace the course of the Indus, and ascertain the place where it discharged itself into the sea. From his account, Herodotus was supplied with his knowledge of India, but it evidently does not extend beyond the sandy tract which lies east of the Indus and south of the Punjab.

The conquests of Alexander supply us with the next step in the progressive geography of this country; he is generally supposed to have crossed the Indus at Attock; but Major Wilford is of opinion that he crossed at the ferry of Torbeilam, a few miles to the south of Attock: from the east side of the Indus, he advanced to the Acesines or Chunaub, which he crossed, and also the Hydraotes or Rauvy. After this he deviated from the direct road leading to the Ganges, and advanced in a south-westerly route to Sangala; from this place he turned again to the east, and reached the Hyphasis Beyah. This was the limit of his march; and consequently the information which Arrian and other historians afford reespecting India, derived from his victories, does not extend beyond this tract of country; that is, about 200 miles across the Punjab, or the modern province of Lahore, and the countries which, on his return, Alexander traversed from Multan to the sea.

Our first knowledge of the Ganges is derived from Megasthenes, who was sent ambassador by Seleucus to Chandragupta or Sandracottus, king of the Prasii: the capital of this kingdom was Palebrotha, generally supposed to be Patna, on the south side of the Ganges, in latitude 25° 37′, and longitude 85° 15′. In this city Megasthenes resided three years, and as he kept a journal of what he saw and heard regarding India during his residence, it may be supposed that his information added very much to the knowledge which the ancients possessed of India. Diodorus Siculus, Strabo, Arrian, and Pliny, seem to have derived all the accounts which they gave of India from Megasthenes. All these authors lay down the proportional dimensions of this country with tolerable accuracy. According to Diodorus, the breadth is seven-eighths of the length. Arrian's geography of India is principally confined to the northern parts, which had been visited by Alexander and Megasthenes: he gives a tolerably accurate account of most of the rivers which flow into the Indus and Ganges; and the extent of India, which he derived from Megasthenes, is as near the truth, according to Mr Rennel, as that which we assigned it 60 years ago. Pliny was evidently acquainted with the form of the Peninsula, from the measures which he gives along the coasts between the mouths of the Ganges and the Indus. One of the most important ancient records of this country is to be found in the map and description of Ptolemy. In some respects this author is very minute and accurate; but in other respects he is most grossly erroneous: though he lived 60 years after Pliny, he describes the peninsula of India as stretching from the gulf of Cambay from east to west, instead of extending from north to south. This is the more extraordinary, not only because he had access to the comparatively accurate information respecting India, recorded by Strabo, Diodorus Siculus, and Pliny, but because he himself traces, with great minuteness, the sea coast, specifies the most remarkable places on it, and assigns the latitude and longitude of each from Cape Comorin to the mouth of the Ganges. Hence it would appear, that his general account of the form of India was expressly contradicted by his detailed description of the country. To Ptolemy also we are indebted for the enumeration and relative position of the different mouths of the Ganges; and for a curious delineation of various roads used by the traders to China, across the north of Hindostan. The geography of this part of Hindostan is also greatly illustrated by the description given by Pliny, Dionysius Periegetes, Ptolemy, and the Peutingerian tables of the famous royal or Nyssæan road. This was made with great care, and at the end of every Indian itinerary measure a small column was erected. The first part of it corresponds with the route pursued by Alexander from the Indus to the Hyphasis; the remainder led to Palebrotha: its whole length was nearly 1500 miles. This road has been illustrated with considerable learning, but not always with the soundest judgment, by Major Wilford.

After the age of Ptolemy, we derive no additional or more accurate information regarding India, till the 6th century after Christ. At this period Cosmas, an Egyptian merchant, made some voyages to India. From his work, it appears that he was well acquainted with the west coast of the Peninsula, which he particularly mentions as celebrated for its trade in pepper. After this time, till the discovery of the Cape of Good Hope, the geography of India is almost entirely illustrated by the Arabian writers, particularly by two Mahomedan travellers in the 9th century, whose travels have beeen published by Renaudot, by Massoudi, and by another Arabian author, who wrote about the middle of the 14th century. The Mahomedan travellers mention a great empire on the Malabar coast: their relation in this and other respects is confirmed by Massoudi, who published his account of India in the 10th century. This last author describes India as divided into four kingdoms; the first comprised the provinces on the Indus and its tributary streams, of which Multan was the capital. The second kingdom seems to have lain on the banks of the Ganges; of this, Kanoge was the capital. This kingdom and its capital are much celebrated in the most remote times of ancient Hindoo history. The third kingdom was Cashmere; the fourth was Guzerat. From this description, it is evident that the information respecting India possessed by Massoudi, and probably by his countrymen in general, was confined to Hindostan proper. The Arabian author who wrote about the middle of the 14th century, divides into the northern part, comprehending all the provinces on the Indus; the middle, which stretched across from Guzerat to the Ganges; and the southern, which he calls Comar, probably from Cape Comorin. About the middle of the 13th century, Marco Polo visited different parts of Hindostan: he is the first author who mentions Bengal and Surat by their present names, as rich and powerful kingdoms.

The next illustration of the geography of Hindostan is derived from the Ayin Acbaree, a work which we have already mentioned under the reign of the Emperor Acbar. This sovereign divided Hindostan Proper into eleven soubahs or provinces, which were again divided into circars, and these subdivided into parjahwahs. Caubul, and the countries west of the Indus, constituted a 12th soubah; and the conquests in the Decan afterwards were divided into three more. The details given in the Ayin Acbaree, of the extent, boundaries, divisions, productions, military force, &c. of these provinces, are surprisingly minute, and apparently the result of much attentive and laborious investigation and inquiries. But our object is only to notice such provinces as have a different extent assigned to them in the Ayin Acbaree from what is assigned to them at present, in order that we may thus illustrate the progressive geography of Hindostan. In the reign of Acbar, Multan was one of the largest provinces of the empire, extending to the frontiers of Persia, and also comprehending several of the Dooabs now belonging to the province of Lahore. The province of Ajmeer at present extends rather more to the south than it did in the reign of Acbar, when this part of it was probably possessed by independent Rajpoot princes. In the soubah of Bengal are included Orissa and Cuttack, with the country to the south-east as far as Chittagong. Malwah, instead of being bounded on the south by Khandeish and Berar, extended beyond the Nerbuddah, while on the south-west and south it touched on Baglana, and on Berar on the east. The very ancient limits of Guzerat included the greater part of Khandeish and Malwah; and in the reign of Acbar it extended southward to Damaun, where it touched on Aurungabad. The present province of Nandere was comprehended in that of Berar, while the western parts of the latter do not seem to have been conquered by Acbar. The province of Khandeish differed in its dimensions and boundaries only very little from what it is at present, then having Aurungabad on the west, instead of Guzerat, which now bounds it on that quarter. The province of Aurungabad, which in the time of Acbar was known by the name of Ahmednagur, having been partially conquered by that monarch, its boundaries were constantly fluctuating; nor were they permanently fixed, till, the capital having been taken in 1634, the whole of the province was annexed to the Mogul empire.

Notwithstanding the conquests and settlements of the Portuguese in India, yet, as they were almost entirely confined to the sea-coast, they did not much increase the geographical knowledge possessed by Europeans respecting this country. Indeed, till the conquests of the English, during the middle and latter end of the 18th century, little was accurately known respecting the interior of Hindostan. In 1788, Major Rennell published the first edition of his *Memoir of a Map of Hindostan*; in this work, with wonderful research and information, though not always with the most perspicuous or satisfactory arrangement, he has thrown great light on the geography of this country; and, except with regard to those districts which at that time had been little, if at all explored by the English, he left scarcely any point uninvestigated. In the subsequent editions of his Memoir, as well as in the *Oriental Repertory* of Dalrymple, the *Asiatic Researches*, the valuable *Travels* of Dr. Francis Buchanan, and other authors, the geography of Hindostan has received such ample and minute investigation, as to leave very few parts of that extensive country unexamined.

CHAP. II.

Face of the Country,—Mountains,—Plains,—Deserts,—Rivers,—Lakes,—Canals,—Sea Coast.

The general description of the face of the country may be given in a few words. In Hindostan Proper, it is for the most part champagne, with occasional hills of no great elevation. In the Decan and the south of India, it is flat near the sea coast on both sides, and mountainous in the interior. But it may be satisfactory to give a more regular and minute description of the face of the country. If we enter Hindostan at the north-west corner into Lahore, the face of the country is hilly, till we reach the southern extremity of this province, where the Punjab commences; passing thence to Multan, we again meet with hills in its northern extremity. The face of the country in Ajmeer is nearly the same, but when we pass to the south west into Guzerat, the surface is very flat; on the contrary, if we pass into the south or south-east, into Malwah, we enter a very elevated region, one of the most elevated, indeed, in Hindostan, as the rivers flow from it in every direction. If from the province of Lahore we change our route, and enter Delhi, we find the face of the country very flat; indeed Delhi, Oude, and Bengal, are the most flat provinces in Hindostan. The surface of Orissa, also north of the river Chumbul, is flat, but to the south of that river, as well as in the north-west, it is hilly. Proceeding to the south, the first lofty land we meet with in Hindostan Proper is in the Bundelcund district of the province of Allahabad, in the south-west. The southern part of Bahar is also hilly, while the northern division of this province, beyond the Ganges, partakes of the flat character of Bengal and Oude. On the east side of the Decan, before we arrive at the Ghauts, there is a mountainous ridge, extending from the Godavery to the Mahanuddy: proceeding across the country in a direction nearly due west from this ridge, we enter the province of Berar, the surface of which is for the most part elevated and hilly; the same character applies to the province of Gundwana, Khandeish, Hyderabad, Orissa, and the Northern Circars. The south of India consists of table land, or rather an elevated surface considerably broken in the centre, and remarkable for many precipitous rocks, the natural strength of which has been greatly augmented by the erection of fortresses on them; the Ghauts on the east and west of this table land, and a flat country between both the chains of Ghauts and the sea. In the province of Malabar, however, there is a chain of low hills, separated from one another, and from the Ghauts, by narrow vallies; in some places these hills rise to the sea coast, but in other parts there is between them and the sea a flat tract, seldom above three miles wide, and in general not so much; near the low hills these plains are the most level.

On the north, Hindostan, in the largest acceptation of the word, is bounded by the Himalaya mountains. These are now known to be superior in elevation to the mountains in South America; their height above the plains of Rohilcund being about 27,000 feet: branches spread from them to the south, as far as the borders of Bengal, Oude, and Delhi. The last province is also separated from Northern Hindostan by the Seevalic or Kemaoon mountains, which are low compared with those of Himalaya; the principal pass into these mountains from the province of Delhi is called the Lottdony Pass. The Vendhya mountains, among which lies the Arcadia of India, pass through Bahar, Benares, Allahabad, and Malwah, along the north side of the Nerbuddah, nearly to the western coast: to the south of these is a less elevated chain, called the Tahya hills. The Ghauts, however, are the most remarkable mountains in India. They are divided into the Eastern and Western; the latter, which are called Sukhien Purbut, or hills of Sukhien, stretch from Cape Comorin to the Tuptee river near Surat, in a line nearly parallel with the sea coast; their general distance from it is 40 miles; in some places 70, and in one part only 6 miles. At the Tuptee, their direction is suddenly changed from north, with a little inclination to the west, to east, running nearly parallel with that river. These Ghauts run through 13 degrees of latitude, being nearly unbroken the whole of their course, except opposite to Paniany: here there is a valley which extends 14 or 15 miles between the termination of the northern Ghauts and the commencement of the southern Ghauts; through this valley the river Paniany flows from the Coimbetoor province. In that part of the western Gauts which runs parallel to the Tuptee, there are several passes from which there is a descent into the province of Khandeish. There are also some passes from the Concan district of the provinces of Bejapoor through the Ghauts; the principal of which are the Ambah-Ghaut and the Tourna-Ghaut, (for the word Ghaut properly signifies a port or pass.) The mountains near the Ambah-Ghaut rise to a very great height; the pass at Tourna is much more rugged and steep than that of Ambah; and in the middle of it there is a plain of some extent. The principal pass from the Mysore country through the Western Ghaut is Bergeley Ghaut, which leads into the maritime province of Canara. As this pass is much frequented for the purpose of conveying grain by means of oxen to the sea-coast, and bringing back salt, the road has been formed with great labour; notwithstanding which the strength and rapidity of the torrents are such, as frequently to wash away all the smaller and softer parts, and to leave single rocks four or five feet in diameter, in the centre of the road, not above two feet asunder. This pass is often travelled at night by torch light. The western Ghauts, especially about the latitude of 15°, are covered with a rich mould, on which various kinds of forest trees grow with great luxuriance. Their height has not been measured, but it is supposed to be about 5000 feet. The eastern Ghauts do not extend so far to the south as the western, beginning only a little to the north of the Cavery, about the latitude of 11° 20′. Their line is nearly straight, and is uninterrupted as far as the banks of the Kristhnah, in latitude 16°. At Madras their height is greatest. It is estimated to be 3000 feet; as Bangalore, in latitude 12° 57′, and longitude 77° 46′ east, which lies within the Ghauts, was ascertained by barometrical observations to be 2901 feet above Madras. To the south of the Nerbuddah, all the rivers flow eastward, as the eastern Ghauts are not so high as the western; they are also less abrupt in their elevation; and their general character is less fertile and pleasing, in the most part exhibiting naked, sun-burnt, and rocky peaks. To enter the Mysore country, there are several passes, the principal of which are, those of Muglee, Palicand, Amboor, Changama, Attoor, and Sautgur. The last was always considered one of great importance, as it commands the main road leading to the upper Carnatic from the Valley of Veniambody, in the Barramahal, which is the most direct route to and from the Mysore. This pass has been levelled and widened since the British gained possession of the province. The other passes all centre in the Palicand pass; hence, though Hyder and Tippoo possessed the advantage of all these routes when they attacked the low country, they had but one entrance at this part into the Mysore to defend.

From the general description which has been given of the surface of the country, it will naturally be expected that the most numerous and extensive plains must be sought for in Hindostan Proper. Indeed, the whole country through which the Ganges flows, from the Seevalic mountains to the sea, is one vast plain. There is also a plain stretching from Sirhind to the city of Delhi. in a N. N. W. direction, a distance of 155 miles. This plain contains the towns of Panniput and Carnawl, and is celebrated as the scene of two great battles, one in A. D. 1525, between the Emperor Baber and the Patan Sultan Lodi; and the other in 1761, between the Mahrattas and the Mahomedan army commanded by Abdalli. Across the eastern entrance of the pass of Paniany, already described, there is an elevated plain 60 miles in extent, which rises suddenly from the level of the surrounding country, resembling an extensive terrace. It is bounded on the west by a forest. There are similar elevated plains in Bengal, and in the Bundela country, south of the Ganges, near the Soohagee Ghaut. From the summit of the Minaret in front of the Mausoleum of Acbar, at Secudra, 6 miles to the north of Agra, there is an extensive plain. 30 miles in a direct line, filled with the ruins of ancient grandeur.

Of the Sandy Desert, mentioned by Herodotus, our knowledge is but imperfect. Cutch lies to the south of it; Guzerat to the east; Sinde to the west, and Ajmeer to the north. These are the limits generally assigned to it; but, according to Major Rennell, it extends from the sea to the Punjab country. In this extent, however, he probably comprehends the Run, a large salt morass, which bounds the western frontiers of the province of Guzerat, and communicates with the Gulf of Cutch, and which in some places seem to adjoin, and in other places to be intermixed with the Sandy Desert. The latter is about 550 miles in length, and about 160 miles in the widest part. In some parts of it there are spots of clay mixed with the sand; but, in general, the country is dreadfully bare, desolate, and sterile; and the wells are frequently at the distance of 8 or 10 coss from one another. All over this sandy tract there is scattered jungles, but of stinted growth. The Run, or salt morass, in some places consists of water only a few inches deep; in others it is an impassable swamp; and in others a bank of sterile and loose sand. It is every where saline. It bends round the north of Cutch, and, including its windings, is supposed to extend several hundred miles. This marsh evidently must have been, at some remote period, covered by the sea, the waters of which are still slowly draining off; but when it was so covered is not known. Legendary tales and songs record the passage of the Run at Millia on the river Muckoo, by Jam Bhamanu, who invaded Guzerat from Sinde, about the year A. D. 700. This is evidence of the existence and extent, in this quarter, of the morass at this period.

The only rivers of Hindostan of a very lengthened course, or great volume of water, are those which run through Hindostan Proper, the Indus and the Ganges, with their respective tributary streams. The Indus enters Hindostan about the latitude of 33° 15′. Here it is an inconsiderable stream, but its breadth and volume of waters is much increased by the junction of the Attock, which, as flowing into it from the west, requires no farther notice under this article. The Indus pursues its course through Hindostan to the beginning of its Delta, about 170 miles from the sea, nearly in a straight line south by west. Of its two branches which form the Delta, the westernmost is the largest; and this, after flowing nearly 50 miles to the south-west, again divides into two other streams, which, as they approach the sea, are subdivided into numerous creeks. The whole course of this river, from its entrance into Hindostan, is about 900 miles; but the tide does not flow up more than 60 or 65 miles. At Tatta, about 130 miles, by the course of the river, from the sea, the Indus is very shallow: about five miles below this town, the greatest depth is four, and the common depth only two fathoms: the breadth here is about a mile. The land floods, occasioned by the melting of the snow, begin about the middle of July, and do not subside till the end of August. Notwithstanding the tide flows but a short way up this river, on account of the shallowness of its stream, yet it enters the mouths of the different branches with extraordinary violence and velocity, so as to carry up the current frequently, in some places, at the rate of four miles an hour. The tributary rivers of the Indus chiefly flow into it in the northern half of its course, in the province of Multan, forming the Punjab, or country of rivers. These rivers, the Jhylum, or Behut, the Chunaub, the Ravey, the Beyah, and the Sutlege, all rise nearly in the same place, at the foot of the Himalaya mountains. The Jhylum, the Hydaspes of the Greeks, after crossing the great road leading from Lahoreto Attock, and flowing along the eastern side of the Joud mountains in the province of Ajmeer, unites with the Chunaub, near Jehungseal, about 60 miles above Multan. Its whole course is about 400 miles. It is the most westerly of the streams that flow through the Punjab into the Indus. The Chunaub, the Acesines of the Greeks, is no where, after it enters the Punjab, more than 35 miles from the Jhylum; about 28 miles above the city of Multan, it flows into the Ravey;

the length of its course is about 420 miles. The Ravey enters the plains of Lahore near Shahpoor; its course is south-west till it passes the city of Lahore, above which it is 120 yards broad, and very rapid. After its junction with the united streams of the Chunaub and Jhylum, its breadth for a little way is upwards of a mile; but it soon contracts into a rapid stream not more than 350 yards across. It falls into the Indus 20 miles below Multan, bringing a volume of water nearly equal to that of the Indus itself. Its whole course is about 500 miles. The course of the Beyah, for the first 200 miles, is directly south; it afterwards flows to the west; it unites with the Sutlege about 300 miles from the sea; their junction, however, formerly took place much lower, where there is still a small canal called the Oldbedyke river. The whole length of its course is about 350 miles. The Sutlege is the most eastern of the rivers of the Punjab; it enters Hindostan at Bellegpoor in the province of Delhi. Before it is joined by the Beyah it is a very considerable stream; after their junction, they lose their respective appellations, and take the name of Kirah, the Hyphasis of the Greeks. About 20 miles below their junction they again separate, and four streams are formed. Near Multan they unite again, and fall into the Indus about 80 miles below that place; it is navigable 200 miles above the junction: its whole course is about 600 miles. These five rivers of the Punjab increase the breadth and depth of the Indus so much, that there is water sufficient for vessels of nearly 200 tons burden, from the Gulf of Cutch to Lahore, a distance of 760 geographical miles; these vessels, however, are flat-bottomed. See INDUS.

The course and termination of the Caggar, or Cuggar, a river to the east of the Indus, are not accurately known; by some it is supposed to be lost in the sands to the west of Batneer, a town 176 miles to the north-west of Delhi, and to have formerly joined the Sutlege; and by others, either to join the Indus, or to fall into the Gulf of Cutch.

The Ganges rises on the southern side of the Himalaya Mountains, and enters the plains of Hindostan at Hurdwar, in the province of Delhi, latitude 29° 57′, longitude 78° 2′. Its course is nearly straight till it passes Allahabad, when it becomes more winding, and its bed deeper and broader. After receiving the tributary streams of Bengal and Bahar, some of which are equal in volume to the Rhine, the channel attains its full breadth, which is commonly about three fourths of a mile, when the river is at its lowest. Its depth, at this time, is 30 feet for an extent of 500 miles, before it reaches the sea. Of the different branches into which this river is divided before it enters the gulf of Bengal, the westernmost, called the Hooghly, and the most eastern, which receives the Brahmapootra, are the widest and most important. The Hooghly is the only branch that is commonly navigated by ships. The whole course of the Ganges is about 1500 miles. For a fuller account of this river, see the article GANGES.

The first large river that joins the Ganges after it enters Hindostan Proper, is the Jumnah: Its source is supposed to be farther to the north-west than that of the Ganges. A little before it enters Hindostan Proper, (which it does in the province of Delhi,) the two rivers are only 40 miles distant from each other. After its entrance into Hindostan, its course is nearly parallel with that of the Ganges, at the distance of from 50 to 75 miles. These rivers unite at Allahabad. Its whole course is about 780 miles, on the west side of the Ganges. Ten miles below Etaweh, a town in the province of Agra, the Jumnah is joined by the Chumbul, which rises near the source of the Nerbuddah in the province of Malwah. Its course is north-easterly: its whole length is 440 miles. It constitutes the boundary between the British possessions in Hindostan Proper on the south, and those of Scindiah. The largest rivers that flow into the Ganges from Bengal and Bahar are, the Goggrah, the Soane, and the Cosa. The first is composed of the waters of the Goggrah and the Saregu, which unite at Swargadwara. They afterwards flow through the province of Oude, and unite with the Ganges at Bahar. The course of the Goggrah is nearly parallel to that of the Ganges on the east side. The Soane rises near the Nerbuddah, on the east side of the table land of Amercuntuc. Its direction is at first due north; it afterwards turns to the north-east, and joins the Ganges in the province of Bahar. Its whole course is about 500 miles. The course of the Cosa, which rises in the Himalayah mountains, is at first S.S.E.; it afterwards winds very much. Its junction with the Ganges takes place 45 miles above Rajemal, in the district of Purneah, in the province of Bengal. Formerly these rivers united at Rajemal: its course is about 400 miles. The Brahmapootra, which afterwards forms the great eastern branch of the Ganges, is supposed to rise very near that river. Its course for a considerable way is eastward, and at one place it reaches within 220 miles of the most western province of China. It then very abruptly turns to the west, through Assam, on the north-east of Bengal,—a country remarkable for the number and magnitude of its rivers, most of which flow into the Brahmapootra. It enters Bengal near Ranjamattey. Its course is now west, and afterwards south, in the Decan district of that province, where it is joined by the Megna. The Ganges and the Brahmapootra unite below Luckipoor. The whole course of this river, as far as it is known, is about 1650 miles. It flows 400 miles through Bengal. Though the Ganges and it rise near each other, yet at one part of their course they are 1200 miles distant.

The rivers in the Decan, or central division of Hindostan, are, the Nerbuddah and the Tuptee on the west, and the Subunreka, the Mahanada, and the Godavery, on the east. The Nerbudda's course has been already noticed; but while the Soane flows to the north-west, the Nerbuddah takes nearly an opposite course, flowing almost due west. It has fewer windings than most Indian rivers. After passing through part of the provinces of Gundwana, Khandeish, Malwah, and Guzerat, it joins the sea 25 miles below Baroach. Its whole course is about 750 miles. The Tuptee, or Surat river, rises in the mountains which bound the province of Berar on the north. Its direction is westerly, through Kandeish and Guzerat; and, after a course of about 400 miles, it falls into the sea about 20 miles below Surat. The Subunreka rises in the southern extremity of the province of Bahar. Its course is to the south-east for 250 miles, when it falls into the Bay of Bengal, about 30 miles to the west of the Hooghly mouth of the Ganges. This river is by some considered as the north-east boundary of Hindostan Proper. The Mahanada rises in the hilly country of Gundwana; its course is very winding. In the district of Cuttack, in the province of Orissa, it receives several streams, one of which afterwards separates from it. The Mahanada then directs its course to the bay of Coojung, where it falls into the Gulf of Bengal. Its whole course is 550 miles. The Godavery rises in the Western Ghauts at Trembuch Nassor, about 70 miles to the north-east of Bombay. Its course is at first due east, through Arungabad and Telligana; it afterwards turns to the south-east. At Rajamundry, in the Northern Circars, it divides into several branches, which form a fertile Delta, and several harbours for small vessels. Its whole course is about 850 miles. About 90 miles from its mouth it is joined by the Bainjunga.

To the south of the Tuptee, the course of all the rivers is to the east, in consequence of the superior elevation of the Western Ghauts. The few rivulets that flow into the western sea descend so abruptly from the mountains, that they have not time to collect into streams of any magnitude. Those on the eastern side are mostly choked with sand-banks, thrown up by a violent surf across their mouths. Some of these, however, require notice.

The Kristhnah rises in the Western Ghauts, not more than 50 miles from the west coast of India. Its direction is to the south-west till it reaches Mersetch, in the province of Bejapoor. Here it is joined by a number of streams from the Ghauts, united under the common name of Warnah. Its course is now more to the east, when its volume is again increased by several rivers, the principal of which are the Malpurba and Toombuddra. It forms a delta near Masulipatam, after a course of nearly 650 miles. It equals, if it does not surpass, any other Indian river, in the fertility which it creates during its course; watering, and of course fertilizing, the provinces of Bejapoor, Beder, Hyderabad, &c. To the south of the Kristhnah is the Pennar, the Palar, and the Cavery. The Pennar is said to spring among the hills of Nundydroog in the Mysore. Its course is northerly till it reaches Gooty, in the Balaghaut ceded districts, when it changes to the south-east, and afterwards to the east. It falls into the sea at Gungapatnam in the Carnatic, 108 miles to the north of Madras. The Palar also springs from the hills of Nundydroog, but its course is to the south. After flowing for 220 miles through the Mysore and Carnatic, it falls into the sea at Sadrass. The Cavery has its source in the Coorg country, a district among the Western Ghauts, but it is of no magnitude till it quits it. Near Seringapatam it forms an island; and opposite to Trichinopoly in the Carnatic, it again separates into two branches, which surround the island of Seringham. The northern branch is named the Coloroon, the southern retains the name of Cavery. About 13 miles farther to the east, these branches approach each other; and an immense mound is formed in order to prevent the Cavery from falling into the Coloroon, the bed of which is 20 feet lower. The Coloroon falls into the sea near Negapatam, and the Cavery at Tanjore. These rivers form a wider delta than any other river in this part of India: their whole course is about 300 miles. In North Coimbetoor, near Sivana Samudra, an island formed by the Cavery, there is a cataract, the fall of which is about 150 feet; another near the upper end of the island; and the ruins of a grand bridge across the Cavery, which was formed of blocks of granite 20 feet in diameter, and 20 feet long; when entire, the bridge was 300 yards in length.

There are but few lakes in Hindostan. The Chilka lake divides the northern Circars from the Cuttack district of Orissa. It is about 35 miles long, and eight broad. Towards the east and south, it is bounded by a narrow sand. very plain and flat, and about a mile in breadth, and on the north-west by a chain of mountains. The water is salt, as it has a communication with the sea by a very narrow and deep outlet; and, indeed, evidently has been formed by the sea breaking over the flat sandy shore. This lake receives one of the branches of the Mahanada. It contains several islands, which are inhabited. Between the Kristhnah and Godavery, in the lower part of their course, there is an extensive tract of flat and rich country, evidently alluvial, and formed by these rivers. It is about 150 miles in length along the sea coast, and from 40 to 50 wide. About half way between the two rivers, there is a hollow of considerable extent in this alluvial soil, in the lowest parts of which there is a lake at all seasons. The whole extent of this hollow ground is 47 miles from west to east, and 14 from north to south. During the rainy season, the whole is covered with water, except 60 or 70 very small eminences, on which the inhabitants take refuge. This is the Coloir lake. Between it and the Godavery and the Kristhnah, there are traces of a channel, formed by the natives either to drain the lake, or to irrigate and improve the adjacent lands. The latter purpose has indeed been effected by various other channels. The lake of Pulicat, on the coast of the Carnatic, is about 33 miles from north to south, and 11 miles in its broadest parts. Its water is salt, as it communicates with the sea by several narrow channels; and it evidently owes its origin to the same cause which produced the Chilka lakes. There are several large islands in it. The lake of Onore, in North Canara, reaches nearly to the Ghauts. As it is in fact a large basin, it is almost salt during the dry season; but when the rains bring down the torrents from the mountains, its waters become fresh. In the northern parts of Hindostan there are few lakes, especially in the vicinity of the Ganges and the Indus. There are also two lakes close under the walls of Ajmeer; the most northern is six miles in circumference, and very deep.

The greater part of Hindostan Proper is so much intersected by navigable rivers, that canals seem scarcely necessary; while, in the Decan, and the south of India, the surface is in general so very uneven, that they are almost impracticable. Nevertheless, this mode of internal communication was formerly not neglected in Hindostan Proper, though the canals were rather intended and used for the purpose of watering the country, than of conveying goods. The most celebrated were those made in the reign of Firoze II. It is doubtful whether they were ever completed; if they were, they would have united the Indus and the Ganges: for one of them was drawn from the Jumnah, near the northern hills, to the city of Hissar; and the object of the other was to form a water communication between the Sutlege and the same town. The first canal, which seems to have been completed, was 114 geographical miles in length. It was repaired and first used to Delhi, in 1626, by Shah Jehan; thus making its whole length 174 geographical miles. There is no precise or clear information respecting the part of the Sutlege from which the other canal was drawn. It is said to have been 100 miles long. Besides these main canals, there were several branches which united them in different parts, and in different directions. The design of Firoze was to fertilize a vast tract of land very dry and sterile, and also to facilitate and increase inland navigation. In 1810, the British government cleansed and repaired the canal of Delhi, which, during the convulsions of the Mogul empire, had been almost wholly choked up. From Shahpoor, where the Ravey enters the plains, a canal was drawn from this river to Lahore, about 80 miles in length; the object was to supply the city with water during the dry season. For the same purpose three other canals were drawn from the Ravey, near Shahpoor, to the south and east of Lahore. In the year 1803, a canal was made from the Black-town of Madras to the river Ennore. Its length is 10,560 yards; its greatest breadth at the top 40 feet; and its greatest depth 12 feet. By means of this canal, boats convey charcoal and fire-wood, the produce of the high land behind Pulicat, to Madras. The rivers of Tripapolore and the Panaur, which approach within about 1800 yards of each other near Fort St David, are joined by a canal, which runs nearly parallel to the sea, at the distance of about 1000 yards.

The eastern and western coasts of India differ in a very striking manner. The Malabar, or western coast. is high and bold, and possesses a few excellent small harbours, formed by insulated rocks and promontories. The Coromandel, or eastern coast, is low, sandy, and full of shoals and banks, without a port of any kind; the entrance to its small rivers being blocked up by the sand thrown in by the dreadful and dangerous surf, which beats against it at all seasons. Having given this general description of the two coasts, we shall commence a more detailed account of them at the north-west extremity of the western coast.

Cape Monze, which lies in the latitude of 24° 55′, and in the longitude of 65° 46′, is considered as the commencement of the coast of Hindostan in this quarter. The bay of Corachie lies between this cape and the Indus. It admits vessels of 300 or 400 tons during the rainy season: the tide rises 12 feet. On the eastern side of the bay are six rocky islets. From Cape Monze to the Gulf of Cutch, it is called the coast of Sinde. The Gulf of Cutch runs far inland towards the east. The upper part is full of shoals, and is bounded by a low narrow plain, always overflowed during the rainy season. It is said to have a communication with the Run, already described. On the south shore of this gulf, the coast of Guzerat begins. Between it and the Gulf of Cambay, it is rather high. The Gulf of Cambay is bounded by the coast of Guzerat on the west, and by that of Surat on the east. It runs nearly 150 miles inland. Near to Cambay, which stands near the upper part of the Gulf, the tides run with extreme rapidity, nearly at the rate of six miles an hour: at high water rise 40 feet, and at low water leave the Gulf dry, even for seven leagues below the town. Fifteen miles to the east of this town, the breadth of the Gulf is only six miles. It is here also completely dry at ebb tide; but the bottom is covered with mud and quicksands, so as to render a passage across without a guide extremely dangerous. Both in the Gulfs of Cutch and Cambay, the *bore* or rush of the tide is nearly as rapid as that at the mouth of the Indus and Ganges. The depth of water in the Gulf of Cambay is supposed to have been gradually diminishing for upwards of two hundred years. The river Jumbaisier runs into the east side of the Gulf, to the south of Cambay. On it stands a town of the same name. The Nerbuddah also falls into this part of the Gulf. On it stands the town of Baroach. As we approach further to the south, to the coast of Surat, the coast becomes more level. The first sea-port that occurs is Surat, on the left bank of the Tuptee, about six leagues from the sea. This river, however, is so shallow at the town, that large vessels are obliged to anchor at its mouth. During the south-west monsoon this anchorage is dangerous; but it is safe and commodious while the north-east and north-west winds blow. The coast between Surat and Cape St John continues so very low, that, during the prevalence of the south-west monsoon and high tides, it is inundated. There are several small rivers in this tract. From this cape to Bombay, a reef, lying three leagues off, stretches along. Bassein, a port in the province of Aurungabad, lies on a narrow strait, or rivulet, which separates it from the island of Salsette. Across the mouth of this there is a bar of sand, so that only small vessels can enter. Salsette, 18 miles long and 14 broad, was formerly divided from Bombay by a strait six miles long, and about 200 yards across, which was occasionally fordable; but these islands are now united by a causeway. Bombay is about 10 miles long, with an average breadth of three. This island, with Salsette, Caranga, and Elephanta, forms a most commodious harbour. The tides rise higher here than in any harbour possessed by the English in their Indian settlements. The usual height is 14 feet, but they sometimes rise to 17. Advantage has been taken of this circumstance, to construct docks large enough to build a 74 gun-ship. We now enter on the coast of Concan, on which the first object of importance is a rocky promontory, joined to the continent by a narrow neck of sand, about one mile long and a quarter of a mile broad. On this promontory stands Gheriah, formerly the capital of the celebrated pirate Angria. A river of some magnitude runs from the Ghauts into the sea, on the north of this promontory. About 30 miles to the south of Gheriah, lies Melunday or Malwan island, the principal abode of the pirates who at present frequent this coast. To the south of it, 4 leagues off the coast of Bejapoor, lie a cluster of rocks, called the Vingorla, or burnt rocks. On the left bank of a navigable river, and about seven miles from the sea, stands the town of Goa. There is here a fine bay, bounded on the south by the peninsula of Marmagon. From Goa to Cape Ramas the coast is low, with a beach of sand. Near this cape is Salsette river, a branch of which communicates with the river of Goa, thus making an island of the site of that town. There are few coasts so much broken into small bays and harbours, and at the same time retaining so strait a general outline, as the coast between Bombay and Goa, a distance of nearly 220 geographical miles.

After passing Cape Ramas, the coast of Canara begins. At Fort Carwar there is an inlet of the sea, with a wide and deep, but intricate channel. To the south of this is the island of Anjediva, about a mile in circumference, and two from the shore. It lies before a bay, which is formed by two promontories, so lofty, that they afford some shelter to ships, even during the S. W. monsoon. Meerjahur, a river of the same size, which, in the month of February, seven miles from the sea, is 700 yards across, affords the most convenient wooding and watering place on the coast of Malabar. The Lagoon of Onore, already described, succeeds in latitude 14° 18′. On the north entrance of this lagoon is an island that has been fortified by the British. To the south of this there are several promontories, forming bays tolerably well sheltered. There are also several small islands, of which the most remarkable are Hog Island and Pigeon Island. Mangalore, in South Canara, in latitude 12° 49′, is situated on a peninsula, which stretches into a large salt lagoon that is separated from the sea by a sand beach. Across this beach there was formerly an opening capable of receiving large ships; but at present this channel has become so shallow, as to admit only vessels drawing less than 10 feet. There is another channel with still less water. Twenty-five miles east by south from Mangalore stands Cumly, on a high point of land between two rivers, which run into a salt water lake, that is also divided from the sea by a narrow sand bank. In the rainy season both the rivers and the lake are fresh. From Cumly, for several leagues to the south, the coast is lined by a range of salt water lakes, which, however, are of little use to navigation, in consequence of the sand banks which lie between them and the sea.

The coast of Malabar begins at the river Chandragiri, in latitude 12° 27′. This coast is much indented by inlets of the sea and salt lagoons, lying within a chain of sandy and narrow islands. These inlets run for great lengths parallel to the coast, and receive the small and rapid streams that descend from the Ghauts. They open to the sea by narrow and shallow channels. The first remarkable spot on the coast of Malabar is Mount Dilla, which is separated from the main land by salt water creeks. The best bay on this part of the coast is formed by a point of land, on which stands the fort that protects the entrance to the town of Cananore. The town itself is situated at the bottom of the bay. Tellicherry, in latitude 11° 44′, succeeds; it stands on a small river. The coast here is very low and sandy. At Vadagherry, in latitude 11° 35′, the series of salt lakes commence, which run without interruption to the south, forming a kind of inland navigation, protected from the sea by a chain of sandy islands. Calicut is situated on a river, navigable by boats, 100 miles up the country; it is the port principally frequented by the Arabs of Muscat. Paniany, 40 miles south-east from Calicut, is situated on the south side of a river, which flows from Animalaya, or Elephant Hill. The entrance of this river, though wide, is so obstructed by a bar, that only the trading boats of the natives can reach the town. The salt lakes, islands, and small ports situated on them, now become numerous; but the first of consequence, to the south of Paniany, is Cochin, which is built on a very low island. The inlet to it is navigable for vessels of considerable burden. Cape Comorin, the southern extremity of Hindostan, in latitude 7° 57′, and longitude 77° 35′, is in itself low and level; but, about a half a mile to the north of it, there is the mountain of Komari, the southern termination of the Ghauts, the summit of which is said to be 1294 yards above the level of the sea. This is regarded by mariners as the cape.

The south-eastern extremity of Hindostan is occupied by the coast of Tinnevelly. In it are no ports of any moment. On some parts of it the tide rises only two or three feet. Between the island of Ceylon and Point Ramen is the island of Ramissoram, about eleven miles long and six broad. It is low and sandy. The strait between it and the main land is about a mile wide; but so obstructed by rocks, and with an entrance from the north so very narrow, that it cannot be navigated, except by very small vessels. This is an island of great sanctity in the opinion of the Hindoos. From Point Calymere to the river Cavery is the coast of Tanjore, which is so extremely low and flat, that the first objects seen, in approaching it, are the tops of the cocoa palms. Negapatam, 48 miles to the east of the town of Tanjore, in latitude 10° 45′, is situated on a small creek. Only coasting vessels, or ships for refreshments, frequent it. Tranquebar, in latitude 11°, is situated on a small river, across the mouth of which is a bar. The best roadstead on this part of the coast is off the town of Portonovo, in latitude 11° 30′; it is sheltered on the south by a shoal. Pondicherry, on the river Gingie, is a port of little consequence with respect to trade, as the river can only receive small vessels even during the rainy season. Its roadstead, however, is not so dangerous as that of Madras; and landing may occasionally be accomplished in ships' boats. To the north of Sadras, and about 38 miles south by west from Madras, the coast seems to have been encroached upon by the sea, to a considerable extent. About 100 yards from the sea, there is a high rock, covered with Hindoo sculpture and imagery. There are also other rocks washed by the sea, which, by the inscriptions on them, appear to have been formerly at a considerable distance from it. According to the traditions of the brahmins, a large city, called Mahabalipuram, or the city of the Great Ball, stood here in very remote times; and the surf is said still to break over its ruins. Madras, in latitude 13° 5′, and longitude 80° 25′, lies on a coast, where a rapid current runs, and on which a dreadful surf breaks, even when the weather is the most moderate; the shore here is perfectly strait. Hence the roadstead of Madras is the worst in India; the most dangerous season to remain in it is from the beginning of October to the end of December; large ships generally anchor about two miles from the shore. When the surface is unusually high, catamarans are used to convey passengers from the Manilla boats; the latter are formed of materials that easily yield to the stroke of the waves, and are always employed between the ships in the roads and the shore. In the latitude 15° 30′, the coast of the Carnatic terminates, and that of the northern Circars begins. After passing Masulipatam, on a branch of the Krishnah, and some other plains of less importance, we arrive at the bay of Coringa, in latitude 16° 49′; into this bay one of the branches of the Godavery falls; a bar of mud lies across its entrance, through which ships must be forced. This is the only place on the east coast of Hindostan where there is smooth water during the south-west monsoon, so that a ship of above 200 tons can be thoroughly refitted here by being *hove down*. A little to the north of Coringa bay, the low coast terminates, and a ridge of high mountains commence, which line the coast to Ganjam in latitude 19° 23′. There is nothing remarkable as we proceed northwards, till we arrive at Point Palmycas, which forms the entrance into the Bay of Balasore on the south. A reef extends nearly 10 miles to the E. N. E. of this point. There is but little depth of water in the Bay of Balasore; in some places the water leaves the shore for half a mile out at low tide; and even at the distance of three leagues there is not more than seven or eight fathoms: this arises from the immense quantity of mud and sand carried out by the Ganges. The shores of the bay are intersected by several small streams, some of which are navigable. The town of Balasore stands on the Booree Bellaun river, where the tide commonly rises eight feet: at high water vessels of 100 tons burden can cross the bar.

The coast of Bengal commences at the town of Pifley on the Subunreeka river, about 22 miles N. E. from Balasore, in latitude 21° 42′. This was formerly a port of considerable trade, but it is now little frequented, in consequence of the flood having formed a dangerous bar across the mouth of the river, as well as washed away a great part of the town itself. The course of the Ganges to the sea has been already described. Across the entrance of the Hooghly, or western branch of it, there are several sounds, which render the navigation difficult and dangerous, particularly two, called the eastern and western sea reefs. The whole of the coast from the western to the eastern mouth of the Ganges consists of low islands, divided from one another by inferior branches of the river, and intersected in almost every direction by creeks. The coast of Chittagong, a district lying at the south-eastern extremity of the province of Bengal, is divided from that province by the eastern mouth of the Ganges; and from Aracan, a province in the Birman Empire, by the river Naup. On this coast there is one good port, Islemabad, about two leagues and a half off the river of Chittagong. Ships of considerable tonnage are built here. To the south of the river on which Islemabad stands there is an island called Kuttubdea, separated from the continent by a strait in no place more than two miles broad. This island is about four leagues long, and one league broad: it is divided into two by a creek. To the south of Kuttubdea is Mascale Island, larger and of greater elevation. The coast which we have described, from Cape Comorin to Chittagong, forms the western side, and the bottom of the Bay of Bengal. The western side stretches from Cape Comorin to Balasore; that is, from latitude 7° 57′ to latitude 21° 31′, and the bottom of the bay from Balasore to Chittagong, or 4° 53′ difference of longitude. The depth of water on the western side is very great, at a comparatively short distance from the shore, there being no soundings about 30 miles off. At the bottom of the bay, however, the sea is shallow. The British and their allies are in possession of all the sea coast of Hindostan, except that part of it which stretches from the small islands to the south of Bombay, in latitude 18° 42′, to the small islands about 17 miles north by west from Goa, in latitude 15° 50′. This part of the coast is principally occupied by pirates. The sea coast from the Gulf of Cambay to the river Indus is also occupied principally by pirates.

CHAP. III.

Natural History,—Botany,—Zoology,—Mineralogy,—Climate,—Soil.

To discuss fully the natural history of India, and particularly those branches of it which relate to botany and zoology, would require much more ample space than can possibly be allotted to this article. It will be necessary to be both select and minute in the description of the botany and zoology of India. The mineralogy, not presenting either such ample or such characteristic materials, will be treated of with comparatively less brevity. With regard to its botany, we shall select for notices and description those plants chiefly which are used for the purposes of medicine, food, the arts, or domestic purposes, or which are distinguished by the beauty and elegance of their form or flowers.

Acacia Catechu, Catechu, called in the province of Bahar *Cocra*, grows in abundance in most of the mountainous districts of Hindostan. The extract from it, which is called *cult* by the natives of Hindostan, *cutch* by the English, and by different authors *khaath*, *cate*, *catechu*, &c. is brought to England both from Bengal and Bombay. According to the analysis of Sir Humphry Davy, the variety which comes from Bombay contains 109 of tannin, 68 of extractive matter, 13 of mucilage, and 10 of earths, and other impurities in 100 parts; and the variety from Bengal, 97 of tannin, 73 of extract, 16 of mucilage, and 14 of impurities. The name catechu, under which it is now more generally known, is derived from two oriental words, *cate* a tree, and *chu* juice. This species of acacia seldom exceeds 12 feet in height. The catechu is extracted from the inner wood. *Acacia Arabica*, the Babul tree of the Hindoos, grows in great abundance all over the Decan. Its flower is rather beautiful, consisting of a bright yellow ball, which is very sweet scented. The wood is hard and tough, and is considered to make the best wheels and axletrees of any in India. Its bark is used for tanning. The gum drawn from it resembles in its qualities gum arabic so nearly, that it is used instead of it for all purposes in Hindostan. In Guzerat, especially in the wastes, the Babul tree is very common. The poor inhabitants of this province used its gum as food. It is planted in some places to protect the villages and farm yards. It was formerly supposed that catechu was extracted from the nut of the areca; but this does not appear to be correct. The areca, however, which is a species of palm, is cultivated nearly over the whole of India for its nuts, which are used by the natives, mixed with the leaves of the betel, pepper, and a little quicklime or chunum, in the same manner as tobacco is used by Europeans. This tree is seldom met with in a wild state. It however grows spontaneously on all the hills in South Concar, and in North Canara. None of it grows above the Ghauts. In Malabar there grows, or is prepared, a sort of red areca, which is used in dyeing. Besides the areca, there are a great variety of other trees of the palm kind in India. The cocoa nut tree is found every where, especially on the coasts of Malabar and Coromandel, as it requires a low sandy soil. On the higher grounds, the cocoa-nut tree begins to yield its fruit when seven or eight years old. How long it lives cannot be ascertained; but it undoubtedly attains a very great age. If the trees are of good quality and young, they will supply 100 nuts annually, which are ripe at all seasons of the year. But the benefits which the natives derive from the tree are by no means confined to its nuts. It supplies oil for the lamp; coir cables are made from the fibrous covering of the nut; toddy or arrack is supplied by the juice of this and several other species of palm trees; and though the British confound all the kinds of arrack, the natives have distinct names for each kind of juice. What is drawn off in the night is the sweetest. It is curious to see the *bandaris*, or toddy gatherers, "climbing the short stems of the palms; having tied their ancles close together, they pass a band round the tree and round their waist, and, placing their feet to the root of the tree, they lean upon the band, and with their hands and feet climb nimbly up a tree without branches 50 feet high, carrying with them a bill or hatchet to make fresh incisions, or to renew the old ones, and a jar to bring down the toddy, which is received in a pot tied to the tree, and emptied every 12 hours." Graham's *Residence in India*, p. 26. Properly speaking, the arrack is the juice or toddy prepared by distillation; and the apparatus employed for this purpose is very simple. Besides the toddy, a fermented juice, jaghery, or an inspissated juice, is made from the palmyra, and other species of palm. In Bengal, the toddy and jaghery produced from the wild date are the most esteemed; but in the Jaghire district of the Carnatic, where the palmyra thrives extremely well, and requires little care or attention, the toddy and jaghery from it are considered the best. The leaves of the cocoanut tree are used to cover the houses, and out of two of them plaited together, the peasants form a kind of cloak, which defends them from the rain while working in the fields.

From the smaller fan palm toddy is also made: its leaves, which are broad, are used for writing on and for thatching. The palmyra or brab is another species, the leaves of which are also used for thatching, and for fuel. The largest species of this kind of trees is the greater fan palm, which is very abundant in the Payenghaut, or lower Carnatic: it is said that each leaf of this tree is capable of covering a dozen men, and that two or three of them are sufficient to roof a cottage. The wood of all these species of palms is excellent for water pipes and rafters. The most beautiful of the palm trees which grows in India is the sago palm, but this is by no means so common as any of the other species. We have by no means enumerated all the uses of the trees of the palm kind. F. P. Bartolomeo says, that he has reckoned up forty different properties that the real palm tree possesses, which are all useful to man.

Elettoria cardamomum, or the cardamon plant, grows in the mountains above Cochin and Calicut, chiefly in shady places on their declivities and in the vallies. The district of Wyniard, situated on the summit of the western Ghauts, about the 12th degree of latitude, produces the best cardamons in India. There are also found at the bottom of the Ghauts, at Maleatur, cardamon palm, jaypur, &c. The tree rises about 12 feet in height. The cardamons, or seeds, are brought chiefly in the ships from Bengal, in cases containing about 120 lbs. weight.

It has been long known that the long-pepper tree, *Piper longum*, was a native of India, particularly of the Malabar and Bengal provinces; but it is only within these thirty years that the discovery of the black pepper plant (*Piper nigrum*) was made in the district of Bampa, in the northern Circars. Dr. Roxburgh began the cultivation of it in this province in 1787. It is also much cultivated in the province of Malabar, and constitutes one of their principal articles of export. One thousand plants yield from 500 to 1000 lbs of pepper. The plant climbs like a vine; is from 8 to 12 feet in length; and is generally supported by the Moochy wood tree, *Erythrina corallodendron*. Nearly all the forests in the neighbourhood of Yellapura, a town above the western Ghauts, produce pepper spontaneously.

Piper betel, the leaves of which are called *betel*, is found to succeed best in India on such grounds as can be irrigated at particular seasons of the year. On that tract of land along the banks of the Megna, the river which bounds the Tipparah district of Bengal on the west, particularly between Daoudeaundy and Luckpoor, the *P. betel* is of excellent quality; the produce of this tract is so highly esteemed by the natives of the Birman empire, that they make regular contracts annually for the coming crop: it is nearly all bought up by them for ready money. The general use of it, along with the *cate* and *chunum*, has been already mentioned; the leaves of the betel inclose the cate and chunum.

Curcuma, Zedoary, the root of which is sometimes used in medicine as a stomachic, grows in sandy open places in Malabar, where it is called *acua* by the Brahmins. *Dolichos pruriens* grows in Bengal, where it is called *cadjuct*, the plant which produces the gum ammoniac. *Heracleum gummiferum*, is also a native of the East Indies. The *Laurus cassia*, which in some respects, but in a very inferior degree, supplies the place of cinnamon in medicine, and for domestic purposes, is a native of Malabar, and frequently is called Malabar cinnamon. There are two species of *Pterocarpus* found in India. The *P. draco*, which supplies the dragon tree resin, commonly called *dragon's blood;* and the *P. Santalinus*, which supplies the red sanders wood; the former is used in medicine, the latter as a colouring matter. *P. Draco* rises to 30 feet high. *P. Santalinus* is a native of the mountains of India; it was first discovered there by Kœnig. This tree thrives best on a strong soil, and is found in the greatest abundance, as well as of the best quality, in the Mysore, above the western Ghauts. About 20 miles to the south of Periapatam, there is a tract of land, on which an immense quantity of sanders wood is grown: it is fit to cut in about ten years: the sandal is merely the heart of the wood; and in order to obtain this, it is usual to cut the tree into pieces, and bury them in dry ground for a month or two: during this time, the outer wood is eaten by the white ants, but they do not touch the heart: the smallest pieces are generally bought up by the Arabians, who distil an essential oil from them: the Chinese buy the largest, and the Indians use those of middle size. In the neighbourhood of Periapatam, there is about 2000 weight produced annually. Tellicherry, on the Malabar coast, is the great mart of the Mysore sandal wood; but in the province of Malabar it is scarcely met with, and what there is, is destitute of fragrance. The *Sweitenia febrifuga*, which supplies an astringent and tonic bark, is a native of the East Indies, growing among the mountains of the Rajahmundry Circar: the natives use it for the cure of intermittents. The *Tamarindus indica*, tamarind tree of India, produces tamarinds of a darker colour, and drier than those from the West Indies; the pods also are nearly twice as long. The ginger plant grows in most parts of the Malabar coast where the sea-water cannot penetrate; it is called *ali* by the Brahmins.

The Bamboo trees are very common, and very useful in India; scarcely any tree equals them for rapidity of growth, as in the short space of five months they rise to the height of 20 yards, with a circumference of eight inches; its greatest height is completed during its first year; and during the second, it acquires those properties of hardness and elasticity, which compoundedly or singly renders its wood so extremely useful for such a variety of purposes. A single acre of Bamboos, if they are situated in a proper soil, and care is taken of them, produces more wood than ten acres of any other tree. The best bamboos used for palanquins grow near the summit of the rocks in the pergunnahs of Tolcan and Hindole, in the province of Orissa. They spring up in July, at which time the stringent shoots are fastened to stakes driven into the ground, in order to train them up to that form which will render them most useful for palanquins. As soon as the dry season begins their tops are cut off; for, if they were to stand longer, they would become too weak to support a palanquin, in consequence of the increase of the hollow part, and the wood growing thinner. In some places, they are used for the purposes of defence and protection, being planted on the banks of the country fastnesses on account of their thorns, which are three inches long, and very strong and sharp. In the dry season, however, they can afford little protection, as they are very inflammable. In the neighbourhood of Goonsur, at the north-west extremity of the northern Circars, the forests are almost entirely composed of bamboos; and as, besides their thorns, they grow closer and resist the axe better than any other tree, the inhabitants formerly trusted entirely to their forests of bamboos, binding and intertwining them so completely, as to constitute an excellent defence, in the room of redoubts, to their fortresses. Perhaps the best bamboos, for all the various purposes to which they are applied, grow on the western Ghauts, about the 15th degree of latitude. They here compose the greatest part of the forest, and equal in height the most lofty palms, sometimes rising to 60 feet. Besides their uses for palanquins and as a species of fortification, the first and smallest shoots are made into walking canes; the larger shoots and the trunk are employed by the Hindoos to construct their houses, and to make all sorts of furniture They likewise make of them a kind of pails, in which the water keeps extremely cool. In some parts, also, the young shoots are pickled with vinegar, salt, garlic, &c.

The qualities and uses of the teak tree seem to have been little known or appreciated in Britain till near the close of the last century. This valuable tree is found almost exclusively in India, along the western side of the Ghaut mountains, and other contiguous ranges of hills, particularly on the north and north-east of Bassein. On the east side of India, the forests of Rajamundry, which stretch from the hills on the banks of the Godavery to Potoonshah, contain abundance of these trees; and this is the only district in the east which furnishes this valuable timber. In North Canara they grow in considerable quantities. In the year 1800, the number of teak trees cut down annually in this district amounted to 3000. In the province of Malabar it grows mostly about Manarghaut, in the district of Palicaudcherry. From this district it is computed that about 45,000 cubical feet of this timber might be procured annually; and on the hills above Parupanoda, which might supply from 2000 to 3000 trees every year. The teak is also found at a very considerable height up the Ghauts, but here it is of an inferior size.

The banyan tree must not be forgotten in this sketch of Indian botany. The characteristics of this tree are well known. In Hindostan there are two of wonderful size. That which is described by Milton in his *Paradise Lost*, stands on an island in the Nerbuddah, within a few miles of Baroach. It is said by the natives to be 3000 years old, and is supposed to be the largest in the world, its shade being capable of sheltering 7000 persons. It must, however, have been considerably larger than it is at present, for part of its roots have been swept away, along with the banks of the river, by the floods. It still measures nearly 2000 feet in circumference, even if those branches alone which have taken root are included; and the area which it covers must be considerably larger, if the hanging branches are included. Of the smaller branches there are upwards of 3000; and of those which are larger, and have in fact become trunks, there are 350, most of which exceed in circumference most English trees. The other remarkable banyan tree grows in the Sarun district of the province of Bahar, not far from the town of Mangee. The following are the dimensions of it. Its diameter is from 363 to 375 feet; the circumference of its shadow at noon, 1116 feet; the circumference of the several stems, which amount to between 50 and 60, is 921 feet.

There are several trees and shrubs which produce oil, besides the cocoa-nut tree. In the vicinity of Beihoree, in North Canara, the *Calophyllum inophyllum* grows in abundance. It is a lofty tree, frequently 90 feet in height, and 12 in circumference. From the seed of it the common lamp oil of this part of India is extracted. It is also esteemed for the elegance of its shade, and the sweetness of its blossoms. The *Ricinus communis*, common ricinus, or Palma Christi, is cultivated in the Mysore; the castor oil which it produces is used for the lamp, and given to the female buffaloes, for the purpose of increasing the quantity of their milk, as well as applied to medical purposes. This species of ricinus is also cultivated in the province of Bengal, and in other parts of Hindostan. On the Almorah hills in Northern Hindostan, there grows a tree called by the Hindoos Phutwarrah. Its usual height is 50 feet, and its circumference six: from the kernels of the fruit a fat-like substance is extracted. There are only a few places where any species of the pine grows. It is found, however, in considerable abundance in the mountainous districts of the province of Lahore, which lies near Cashmere. It is used for torches or lamps by the natives, cut into small slips; but neither turpentine nor tar are made from it. The northern sides of the hills which lie on the north of the province of Delhi produce the common Scotch fir in great abundance. Indeed, it is a tree by no means uncommon in the northern districts of Hindostan Proper. The timber of the pines that grow in the Terriani district is remarkable for its straightness and durability; and from a species of the pine, called the Sulla pine, *Kota*, a pure turpentine is procured. The willow is generally found in those parts of India where the pine thrives.

In the vicinity of Sautjur, among the Eastern Ghauts, the great American aloe, *Agave Americana*, grows in great profusion. The district of India most destitute of trees is the barren sandy tract of the Carnatic. Here the only trees that grow spontaneously are the *Melia azadirachta*, or bread tree, and the *Robenia mitis*. All the three species of Molea grow in India. The *R. mitis* is also found among the rich muddy soil on the banks of the Ganges.

Of the fruit-bearing trees, we have hitherto noticed only such as are also valuable and useful in other respects; but we must not omit the enumeration of a few of the most celebrated for their fruit alone. Of all the Indian fruits, the mango is generally deemed the most delicious. It grows both in a wild and cultivated state in almost every part of Hindostan, especially in the southern districts. Mazagory, near Bombay, is celebrated for this fruit. Mrs. Graham informs us "that the parent tree, from which all those of this species have been grafted, is honoured during the fruit season by a guard of sepoys; and in the reign of Shah Jehan, couriers were stationed between Delhi and the Mahratta coast, to secure an abundant and fresh supply of mangos for the royal table. At Battalah, in the Punjab, a plum grows of excellent flavour, called by the natives *aloocha*. At Jamboc, in Lahore, the white mulberry produces fruit of a large size, and remarkably fine flavour. The trees of this kind which are cultivated for the support of silk worms will be afterwards noticed. In the Silhit districts of Bengal, orange plantations occupy a considerable tract of land. They form the principal export of the country, and are sold on the spot at 1000 for a rupee. Grapes have been long grown in Aurungabad, near Poonah, and in the province of Malwah; and, latterly, they have been introduced into Bombay. In the neighbourhood of Chickery, in the territories of the Paishwah, grapes of an extraordinary size are produced. Near Oogain, in the province of Malwah, where the soil is very rich, the vine produces a second crop of grapes in the rainy season, but they are by no means of good quality, being very tart. In Bombay, in order to prevent the fruit from setting at the commencement of this season, artificial means are employed to impede the growth. The Jumboo, a species of rose-apple, is esteemed not only for its fruit, but also for its crimson flowers, which hang down with much elegance from every part of the stem. Besides the grape, mulberry, fig, and a few other fruits, there are not many European fruits that grow in Hindostan. There are some apple-trees; the largest and best grow in the province of Lahore, near Battalah. Two species of the papan fig, "remarkable for the sweetness and rose-flavour of their fruit; the *spondius dulcis*, whose sweetness, pleasantly tempered with acid, renders it peculiarly agreeable in this hot climate; the *pillaw*, from the trunk and larger branches of which are produced fibrous bags, sometimes of the weight of 25 pounds, which are filled with nuts like the chesnut, and resembling the almond in flavour; the *dellenia Indica*, remarkable for its beauty, and valuable for its large pomaceous fruit of a pure acid, and equal to the white lily in fragrance; the *averrhoa carambola*, which produces three crops of fruit in the year; and another of the same genus, which is in a manner covered with large juicy berries of the size of a hen's egg, and resemble the grape; and the elephant apple, almost equally a favourite with the animal whose name it bears, and with the native Hindoos," are mentioned by Mr. Aikin as some of the most celebrated fruit-bearing trees of India.

After premising that the red lotus, the most beautiful of the *nymphæas*, is common on the banks in the south of India, and that the sensitive plant grows spontaneously in the Amran district of Guzerat, we shall conclude our account of Indian botany, (with the exception of a short notice or two regarding some of the grapes,) with another extract from the author whom we have just quoted, in which he is describing some of the trees, shrubs, and herbaceous plants, that are remarkable for their size or beauty. "The *hibiscus ficulneus* is remarkable by its magnitude and the profusion of its elegant blossoms; and is of peculiar value in a tropical climate, as hardly any insects are found under its shade. The cotton tree rises with a thorny trunk eighteen feet in circumference, to the height of 50 feet without a branch; it then throws off numerous boughs, which are adorned in the rainy season with purple blossoms as large as the open hand, and these are succeeded by capsula filled with a fine kind of cotton. The shrubs and herbaceous plants are innumerable, and multitudes would be well worth recording for their beauty or use, if the nature of this work allowed an opportunity; we cannot, however, omit the indigo and Indian madder, whence the beautiful colours of the Indian chintzes are procured. The *nyctanthes hirsuta*, and the *jasminum grandiflorum*, boast the most fragrant blossoms of the whole East, the former perfuming the night, the latter scenting the day. The *gloriosa superba*, and Indian vine, form, by their union, bowers worthy of Paradise; and the *butea superba*, a small tree, by the striking contrast of its green leaves, its black flowery stalks, and its large scarlet papilionaceous blossoms, attracts, with its ostentatious charms, the notice and admiration of the most incurious."

Of the *Poas*, the *Poa cynosuroides*, the kossa grass of the natives, deserves particular notice. It is regarded as a sacred grass, and is held almost constantly in the hands of such as are anxious to be regarded as particularly devout; it is used at sacrifices. It is also of considerable use in this climate, since from the roots of it a kind of mat called *tatts* is made, which are placed against the doors or windows, and constantly watered, in order to keep the rooms cool; as its fragrance is pleasant, it thus spreads an agreeable scent as well as freshness through the apartments. On the eastern frontiers of Bengal, there is an immense extent of land covered by a peculiar kind of grass, called by the natives the augeah grass. The soil on which it grows is sandy; it grows to the height of 30 feet, and is as thick as a man's wrist. The jungle grass is very common in many parts of Hindostan. In the Ragemal district of Bengal it attains the height of eight or ten feet, and on the top of it there is a beautiful and elegant down, resembling the feathers of a swan.

But we must conclude this desultory account of Indian botany, merely remarking, that when we come to treat of the agriculture of India, we shall have occasion to notice some plants, which more properly fall under that head.

The native breed of horses in India is a small ill-shaped vicious pony, in some parts not exceeding 30 inches in height, particularly on the confines of the Nepaulese territories. Wild horses, of a hardy and useful breed, spotted in a singular manner, and with great variety of colour, are regularly brought from the banks of the Bontsu, in Nepaul, for sale, into Hindostan; they are called tanyans. There are also a great many horses brought from Candehar and Tibet, and sold at the annual fairs of Hindostan. In some parts of the country itself, however, the breed of horses is good; and as most of the Hindoo princes, as well as the British, are obliged to have numerous cavalry, considerable attention, as may be supposed, has been paid to the improvement of this useful animal. In the Choteesgur district of the province of Gundwana, brood mares of the tattoo species are kept in considerable numbers. This is the same species that is common in Bengal; it is a thin ill-shaped animal. The horse commonly used by the Mahrattas in war, is also a poor looking animal, about 14 or 14½ hands high, with large bones; but in the Poonah Mahrattas, particularly near the Beemah river, there are excellent and beautiful horses, of a middle size, generally of a dark bay colour, with black legs, which are highly esteemed by the Mahrattas; they are called Beemarteddy horses, from the district where they are bred. In the province of Aurungabad, also, great numbers are reared for the Mahratta cavalry. These, however, are neither strong nor handsome, though they are of a hardy breed. The Mahratta cavalry almost entirely consist of mares. In that part of the province of Bahar which lies near the Nepaulese territories, a great number of horses are bred for the British cavalry. It has been satisfactorily ascertained, that this animal degenerates in size, and in most of his useful qualities, in low and moist situations; hence it is supposed, that the horses of Bengal are of such an inferior description and small size, some of them being no larger than mastiffs. In dry and moderately elevated situations, on the contrary, they not only thrive well, and attain a good size, and are strong and active, but handsome. Since the British began to pay attention to the breeding of them in the northern parts of the province of Bahar, many of the very first quality have been reared there, particularly in the districts of Tyrpoot and Hajypoor; and they are in such request, that horse dealers from Upper Hindostan frequent the fairs at Hurdwar and other places to purchase them. Farther to the north, however, where the country becomes very mountainous, the horses fall off in point of size; but though nearly as small as those of Bengal, they are much more handsome, active, and strong. The British have also frequently obtained horses from the middle districts of Guzerat and from Lahore: the latter are particularly excellent. Those from Guzerat consist principally of two breeds, from Cottiwar and Werrear; the latter are small in size. They are exported to the territories of the Rajah of Joudpoor.

In some parts of India the ass is a common and useful animal, particularly in Bengal, the Carnatic, and above the Ghauts. They are small in size, and are distinguished by the great variety of their colour. There are some entirely black; and it is remarked of these, that there is no appearance of the cross on their shoulder. This animal seems regarded with various feelings in different parts of India. It is generally deemed an animal which none but the lower castes would ride on, or otherwise employ; and yet in the Mysore, if a dispute arises in a village, one of the parties frequently terminates it by killing a jack-ass. By this, indeed, they both suffer; for no Hindoo would remain in the place where the ass was killed, and consequently they are both obliged to fly. This singular mode of revenge, if so it can be called, is also had recourse to by the inhabitants of the Mysore, when they consider themselves aggrieved, oppressed, or affronted in any thing relating to their caste by their rulers. The milk of the ass is never used. Herds of wild asses are sometimes seen near the mountains in the north of Hindostan.

The cattle kept in India are the common black cattle, and the buffalo. They are both very numerous, particularly in the ceded districts, where, in the year 1806, there were 1,198,613 black cattle, and 1,147,492 buffaloes—in Bengal, where it is supposed that there are of both kinds above 50 millions—in Guzerat, where the bullocks are reckoned the strongest, swiftest, and handsomest in India, from the Choteesgur district of this province, which contains about 20,000 square miles, part of which, however, is mountainous, or covered with jungle, they export in favourable seasons 100.000 bullocks. The British government in India have paid considerable attention to the improvement of the breed of bullocks for their ordnance; but there are only two districts in the Bengal presidency, in which bullocks of a size required by the British for this purpose are bred—the Purneah district of Bengal, and the Sarun district of Bahar. The bullocks of the former are of a large size, very strong and active, well formed, and much superior to the cattle employed for draught in the lower parts of Bengal. The bullocks in the Sarun district are not so excellent in their qualities, nor so large; but they are little inferior in these respects. Upwards of 5000 from these districts are employed by the Bengal government for the conveyance of artillery, camp equipage, &c. besides elephants and camels. The natives in these and the adjoining districts have made no attempts to improve their breed of bullocks, notwithstanding the example and success of the British. The common draught cattle all over India have a bunch on their shoulders, on which the yoke rests; they are of a white colour, small size, but active and well proportioned;—as used in agriculture, they will be afterwards considered, as well as the buffalo. See Buffaloe.

The sheep in India are small, generally of a black or dark grey colour, with wool-like hair for hardness and coarseness, and scarcely fit for any purpose. In Allahabad and on the Coromandel coast the sheep are small, and of an inferior quality, even compared with those of Bengal. In the year 1806, the number of sheep in the ceded districts amounted to 1,147,492. They are also numerous in the Mysore, where they are of three varieties of colour, red, black, and white. Here the shepherds and their families live with their flocks; the men sleeping in the open air among their sheep, wrapped up in blankets; and the women and children under baskets made of leaves, and about six feet in diameter. These baskets will keep out the rain. On one side of them is a small hole, by which they creep into them. As there is no door or covering to it, it is always turned from the wind or rain. Of the provinces in the south of India, there are most sheep bred in that of Coimbetoor, particularly in the Aranasi district of it. There are in Bengal a few sheep with four horns, superior in size, and better proportioned than the common kind. Goats are by no means uncommon in the hilly districts of India. They resemble in size, &c. the European goat. In the year 1806 there were 694.633 in the ceded districts. Swine were common in the Mysore till they were almost extirpated by Hyder Ali. They are not numerous in any part of Hindostan, either domestic or wild.

Next to the animal which we have described, in point of use, and indeed before some of them in this respect, the elephant claims our attention. In the elephants of India there is a considerable variety, with respect not only to size, but also to colour, and the length of the tusks. They seem to be generally a blackish brown colour. Sometimes an elephant of a reddish colour is seen in the forests; but this is supposed to arise from the red earth in which it has rolled itself. White elephants are rendered so by disease. The best elephants are reckoned to be those of Chittagong, and generally such as are found near the sea. In the Tipperah district of Bengal they are very numerous, but not of the first size or quality. On the mountains in the north of Hindostan they are still smaller, seldom exceeding seven feet in height; these are frequently caught merely for their teeth. With respect to the height of this animal, it appears that of 150 elephants employed in the first war against Tippoo Sultan, there was only one which reached the height of ten feet. The height required by the British government in Bengal for the elephants which they purchase for the service of the army is nine feet. The common height of the Indian female elephant seems to be from seven to eight feet; and that of the males from eight to ten feet, measured at the shoulder. The largest ever seen in Hindostan measured 10 feet 6 inches at the shoulder. It was caught in the year 1796, and belonged to the Nabob of Oude. The largest tusks in Bengal very seldom exceed the weight of 70 or 80 pounds. See ELEPHANT.

Camels are bred in that part of the Delta of the Indus which is nearest the sea. On the sea beach and sandy slips in that part of Guzerat which is separated by the mainland by the Run, they are suffered to run wild among the jungles, the tender parts of the brushwood serving them for food; they are, however, of an inferior description. The camel is not unfrequent about Patna; they are employed by the British government in carrying military stores, &c. See CAMEL.

Notwithstanding the positive opinion of Mr. Pennant, that the lion is met with near the fort of Gwalior, in the province of Agra, it is generally believed by naturalists and travellers, that this animal is not a native of Hindostan. "The royal tiger of Bengal, however, is a far more terrible animal than the stoutest lion, and was known in classical times, as Seneca, the poet, calls it *Gangetica tigris*, or the Gangetic tiger. Such is their size and strength, that they are said to carry off bullocks; the height of some being said to be five feet, and the length in proportion. Parties of pleasure on the isles at the mouths of the Ganges have often been shockingly interrupted by the sudden appearance of the tiger, prepared for his fatal spring, which is said to extend to a hundred feet;—not improbable, when compared with that of the cat. Such is the nature of the animal, that if disappointed in his first leap, he couches his tail and retires."

In the northern district of Coimbetoor, there are a great number of black bears, which, however, are very inoffensive, living chiefly on the white ants, and the fruit of the palmyra. Near Chittagong there is a species of bear which is called there the wild dog. "His head is shaped like that of a dog, but bare and red about the muzzle; his paws are like those of the common bear, but his coat is short and smooth."—Graham's *Journal*, p. 143. This animal is very ferocious, and will not eat any kind of vegetable food. The one-horned rhinoceros is not uncommon in the islands of the Ganges. Antelopes, especially that species called the Nylgau, are numerous, and of a large size; the hunting of them by the leopard is a favourite sport among the Indian princes. Tippoo was very fond of it. Apes and monkies are common; and it is said, but not on very good authority, that the ourang-outang exists in the forests to the west of the northern Circars. The other quadrupeds are, dogs of the cur kind, with sharp, erect ears, and pointed noses; boars, wolves, foxes, jackalls, hyænas, panthers, lynxes, &c. The moschus, moschiferus, or musk-deer, is an inhabitant of the mountains which lie on the north of Hindostan; but the musk that is brought from Bengal is of an inferior kind to that which comes from China.

The birds of India are very various, and some of them uncommonly beautiful. This is the native country of the peacock, where they exist in abundance, in almost every part, in a wild state, and are much larger, and produce a greater number of eggs; proofs that in India they are in their natural climate. They lay twenty or thirty eggs in the course of the year. Near Cambay, and in different parts of the province of Malabar, they are particularly abundant. At the first mentioned place they are caught in a very simple and singular manner. A piece of canvass, on which are painted the figures of peacocks, and to which are attached two lighted candles, is affixed, during the night, to the tree on which they are perched; and the birds, being either deceived by the figures, or dazzled by the light, stretch out their necks towards the canvass, and are caught in a noose which the concealed bird-catcher holds. The historians of Alexander mention the delight and surprise with which that conqueror first beheld the peacock, and that he forbade them to be killed under very severe penalties.

There are few birds, natives of India, so remarkable, and which have excited so strongly the attention of naturalists, as the gross-beak, (*Loxia philippina*) the olomari of the Malabars. It is described in the *Asiatic Researches*, by Har Ali Khan of Delhi, as "rather larger than a sparrow, with yellow brown plumage, a yellowish head and feet, and light coloured breast, and a conical beak, very thick in proportion to its body." They chiefly frequent the cocoa-nut trees, or the palmyra and Indian fig, being evidently partial to a lofty site for its nest." This bird constructs its nest in a very curious way, with the long fibres of plants or dry grass, and suspends it by means of a kind of cord nearly half an ell in length, from the extremity of an extremely slender branch of the tree, in order that it may be inaccessible to snakes and other animals, which might destroy its eggs or its young. This hanging nest, though agitated by the wind, is so strongly secured, that it never suffers the least injury. The interior part of it consists of three neat apartments or divisions. The first, which forms the fore part, is occupied by the male; the second is destined for the female; and the third contains the young. In the first apartment, where the male always keeps watch while the female is hatching the eggs, a little tough clay is always found stuck against one side of it; and in the top of this clay is a glow-worm. Bartolomeo, from whom this account is taken, thinks that the glow-worm serves to afford light in the night time; but it seems much more probable that the bird feeds on these insects. This bird is much valued in Hindostan for its docility, and attachment to those who domesticate it. The common fowl is found in the jungles, and is called the jungle bird; and the wild cock, the feathers of which are of various colours, and shine like gold, is found in the Ghauts and the adjacent forests. The *Pelicanus onochrotalus*, or large Asiatic pelican, is found in Malabar. This province is also the native country of what are called the Malabar bat, *Vespertilio vampyrus*, or caninus, and which seem to differ from the vampyre bat of Surinam. The *Gracula religiosa*, which are common in the districts adjoining the Ghauts, is a bird held in considerable esteem by the natives on account of its song; its body is quite black, and its head is covered with a hood of a bright yellow colour. This bird is called Mina by the natives, and is often seen with the kokola and other birds of song, together with a bird as small as the humming bird, which fixes its nest to the pointed tips of the palmyra, to secure its young from the tree snake, in the gardens in the vicinity of Bombay and other towns. The Eigrus, the largest of aquatic birds, is found among the lakes in the north of Hindostan Proper, where it is kept by the natives in their gardens, for the purpose of picking up the vermin. Parrots, of almost all the varieties with respect to size and colour, abound in Hindostan.

Snakes abound: the coluber naia, cobra de capello, the most poisonous of all the species, is one of the most common in Malabar, where there is also a snake resembling, in the rings round its body, the coluber natrix of Europe, but much smaller, and very poisonous. The mountain snake of the Ghauts seems to resemble the boa constrictor, as it is represented by Bartolomeo, as being from 30 to 40 feet long, and as thick as a fed ox, and as devouring hogs, deer, cows, and other animals, which it seizes by twisting itself round their bodies. Mrs. Graham mentions the same kind of snake as common in the vicinity of Bombay, where the cobra de capello, and the cobra manilla, and a small bright speckled snake, and, in short, snakes of all sizes, are constantly gliding about.

The insects are also very numerous, and in great variety in all parts of India. The termes fatale, or white ant, which is particularly noticed by Herodotus and Arrian, is very destructive to furniture, cloths, &c.; they are eagerly devoured by the Chansu Carir, a wretched and deserted caste in the Carnatic. The meloe trianthema is found in great quantities in the Doab, and in that track which stretches along the right bank of the river Jumnah; it seems to feed on the *solanum melongena*, and makes its appearance at the commencement of the rainy season. The meloe cicorei is principally found in Bengal, Berar, and Oude; it subsists on the flowers of the cucurbitaceous plants, and also on those of the hibiscus and sida species; it is most abundant during the rainy seasons. Both these species of meloe may be used as medicine instead of the Spanish blistering fly. The fire-fly is very common in India, and is one of the most beautiful insects of that country; the trees are sometimes so completely covered with it, as to appear like "pyramids of light." The most troublesome insects are, the flies, muskettoes, and chinches, or bugs; and the small worm which deposits its eggs under the skin; this last is particularly troublesome.

In our account of the fish of India, we must be equally concise as we have been in describing some of its quadrupeds, birds, snakes, and insects. In the Ganges there is great variety and abundance of fish; but of all the kinds found either in this river, or in any other part of India, the most delicate and high flavoured is the mango fish: it receives the name, because it appears in the rivers while the mangoes are fit for use. The Europeans in India esteem them most highly, especially during the time when they are full of roe. The other kinds of fish in highest repute for their flavour, by Europeans, are, the cockup, and the sable fish. The coast of Chittagong is celebrated for oysters, particularly near the island of Cutubdia; they are here small, but of an excellent flavour, and are sent by the inhabitants to Dacca and Calcutta. Oysters are also exceedingly plenty in the rivers of Cochin, where they are fished for in the same manner as the pearl-oyster. Turtle are found in the Ganges, but small and of inferior quality. The salmon frequents the sea coast, and the rivers of Malabar; and pilchards in immense abundance are found on this coast. In the Alacananda river there are a great many fish of the cyprinus genus, particularly *C. denticulatus*, which grow to the length of four or five feet; there are some, it is said, even seven or eight feet long; these are represented as very beautiful; the scales on the back and sides, which are very large, and of a fine green colour, with a bright gold edge; the belly is white, with a slight tinge of gold colour; the tail and fins are of a dark bronze colour. This fish is very delicate and rich in its flavour; and many of them are so remarkably tame, that they take bread, &c. out of the hands of the Brahmins, by whom they are daily fed. Alligators and porpoises are common in the Ganges. The whale, which the natives call the sea elephant, is sometimes seen off Cape Comorin. The sword fish is very abundant in almost all parts of the Indian seas. Crabs are represented as poisonous, or rather very unwholesome, in the months of October and November, in consequence, it is supposed, of their feeding on poisonous aquatic plants. The sea hedge-hog; sea-star; pipe corillino; sea-nettle, &c. are common in the Indian Seas.

The mineralogy of India has not been very carefully or thoroughly explained; there are, however, some parts of it which are well ascertained, and are very important and interesting. To begin with the Ghauts: these mountains are composed of a granite, in which the felspar and quartz, both of which are remarkably white, bears more than the usual proportion to the mica, which is of a dark green colour. The particles are angular, and of a very moderate size. These are evidently strata, but in general they are so very much confused and broken, that the line cannot well be defined. In the Coimbetoor province, however, the strata of the Ghauts evidently run north and south, and are vertical; they are much intersected and broken by fissures, which renders the stone not of much use in building. Many of the masses of rocks in the Mysore country, on which the almost impregnable fortresses of Tippoo were built, are of granitic porphyry, and rise into high sharp peaks. Granite seems to form the principal mountains in Hindostan, as well as the Ghauts; it is found mixed with the soil in the neighbourhood of Rajamal, a town situated on the south-west side of the Ganges, in latitude 55° 2′, but not lower down the river. Limestone is found in many places, particularly among the hills near the bed of the rivar Palar, in the vicinity of Arcot, where it is found in the form of nodules. This species of limestone is the chunam, that is used by the natives along with the areca-nut and betel. Chunam is also met with in almost inexhaustible quantities in the Silhit district of Bengal; and from this district Calcutta, and the most remote parts of the province, are supplied with it. In the neighbourhood of Bombay a good deal of chunam is made from shells, and the natives are very particular in gathering them, and in burning each sort separately, as it is said that the chunam varies in its qualities and value, according to the kind of shell from which it is made. The Madras chunam is smooth, hard, and polished as marble. Most of the public offices in this town are built of it. There are marble quarries of considerable extent, which yield marble of excellent quality, in the province of Ajmeer, near the town of Pookshur, which is much employed in building. Other stone proper for building, particularly what is called the Theban stone, is very abundant over Hindostan Proper, and is by no means rare in the Decan and the south of India. In Bombay there are large quarries. In one of the branches of the Ganges, as well as in other rivers, a very rare stone is found, which is regarded with much veneration by the followers of Vishnou. It is described as very heavy, commonly of a black colour, and sometimes violet; round or oval in its form; a little flat, and nearly resembling a touch stone. It is hollow in the inside. There is only a small hole on the outside, but within it is almost concave, and furnished in the interior coats, above and below, with spiral lines, which terminate in a joint towards the middle, and in many these two points touch; (*Sonnerat*, i. 41.) In the province of Oude, lapis lazuli, of an excellent quality, which sells in England for nine guineas an ounce, is found.[*]

The diamond mines of India have been long known and celebrated. The most remarkable is that of Pannah, which seems to have been known to Ptolemy. The Emperor Acbar, among his other plans of improving and enriching his territories, paid great attention to this mine, from which he drew eight lacks of rupees annually. The native chiefs of Bundelcund, (in which district of Allahabad, beyond the range of mountains extending from Rhotas to Ajmeer, Pannah is situated), as well as the last Mahratta conquerors of this district, also drew considerable revenue from this mine. Subsequently, however, it seems to have declined; for in the year 1756, they yielded to the Rajah only four lacks of rupees. Of their present state, nothing accurate is known. Besides the diamond mine of Pannah, there is one other to the north of Decan, near Sumbhulpoor, in the province of Gundwana, near the junction of the Hebe with the Mahanuddy. In the year 1766, a journey was undertaken to this mine, under the direction of Lord Clive, by Mr. Motte; but he was not permitted by the Rajah to reach it. From the information which he collected, however, in Sumbhulpoor, we learn, that the "natives search in the river Hebe after rains for red earth, washed down from the mountains, in which earth the diamonds are found." This matrix was examined by Mr. Motte; it was a clay nearly as red as burnt bricks. Till the period that this district was overrun by the Mahrattas, the natives informed Mr. Motte that they used to go to the mountains and dig for diamonds; but this practice they have discontinued, as it would only increase the tribute which they were obliged to pay to their conquerors. The other diamond mines in Hindostan are to the south of the Nerbuddah. About the middle of the 17th century, the diamond mines in Sedhout, a district in the Balaghaut ceded territories, were very productive, but these, as well as all other diamond mines of Hindostan, have long ceased to be very valuable, being either exhausted or neglected. There are also mines at Raolcondah, about 40 miles N. W. from the junction of the Beehmah and the Krishnah; at Colore, on the southern bank of the latter river, not far from Condavir, in the Gentoor circar; and in Golconda. Cornelian and other opake stones are found near Cambay, and garnets near Hyderabad.

The metals found in Hindostan are, gold, iron, and lead; there are not any indications of silver; and with respect to copper, though it is enumerated by some authors among the metals of Hindostan, there seems no foundation for the statement.[†] There are no mines of gold; this metal being only found among the sand washed down by the rivers. The quantity thus obtained from the Indus and its tributary streams was probably much more in ancient times than it is at present, as Herodotus informs us, that the tribute paid by the Indian Satrapie of Persia to Darius Hystaspes was in gold; and that the sum paid was nearly one-third of the whole tribute paid by all the 20 Satrapies. In the Ayin Acbaree, we learn, that gold was found in the channels of the Ravey and Kemaoon. The nearer these and other rivers in the north of Hindostan are to their source, the more gold dust is found in their channels. In many of the rivers of Assam, that flow into the Brahmapootra, it is by no means uncommon, especially in the Dekrung, which is famous, not only for the quantity but the quality of its gold. In the eastern extremity of the Rajah of Mysore's territories, nine miles to the east of Boodicotta, an area of country, comprising 130 square miles, is said to contain gold dust. In the Fernadu district of the province of Malabar, gold dust is found in a branch of the river which falls into the sea at Parapanda.

Iron ore is not common; it seems to be chiefly bog iron ore, or particles of iron mixed with sand. Of the latter, there is a considerable quantity in the Mysore Rajah's dominions, not far from Severndroog; the sand is absolutely black with it. It is collected during the rainy season in quantities sufficient to keep a furnace employed the remainder of the year. There is also abundance of iron ore in the same part of the Mysore at Ghettepur, but of what kind we are not informed. Steel is manufactured here. Black sand, mixed with iron ore, is brought down in the rainy season by the torrents from the Eastern Ghaut, near Naiekhan Eray. The smelting is carried on during the dry season, each forge paying a certain quantity of iron for permission to carry on the work. Indeed, the Mysore seems to be more abundant in this metal than most other parts of Hindostan. At some of the iron works, 47 per cent. of malleable iron is obtained from the ore, but it is by no means in a pure state. On the western side of the south of India, the metal is in the Velater district of the province of Malabar, where there are many forges, but here also, and indeed all over India, the work is performed in a very ignorant and careless manner, pieces of charcoal being frequently enveloped in the iron after it is smelted. In the Singrowlah district of Gundwanah, this metal abounds, the price being from one and a half to two and a half rupees per 80lb. according to the quality. The high land district of Bahar is also rich in iron, which is fused for sale by the natives in large quantities. In the south-west coast of the Guzerat peninsula, there are likewise extensive works for fusing this metal. There are lead mines in the territories of the Rajah of Joudpoor, in the province of Ajmeer.

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[*] Much important information respecting the ichthyology and the mineralogy of India, may soon be expected from the pen of our distinguished countryman, Dr. Francis Buchanan. Ed.

[†] There are, however, extensive and valuable copper mines at Dhanpoor, a village belonging to the Rajah of Nepaul. Those at Nagpoor in the same part of Northern Hindostan, are not worked.

The manufacture of salt from the sea water, and of saltpetre, will be noticed afterwards; but this is the proper place to notice the mines of rock-salt in Hindostan. These lie in the district between the Indus and Ihylum, in the province of Lahore; they are uncommonly productive; and the fragments of rock-salt are sufficiently hard to be shaped into different kinds of vessels, &c. Large lumps of it are brought down to Amritsir, the capital of the Seiks, slung on each side of camels, some hundreds of which are frequently seen thus loaded following one another. In some parts of the Mysore, the ground is strongly impregnated with salt, particularly in the low, moist parts of the district of Cotlar, where, during the dry season, it is extracted, the surface of the ground having been previously scraped off, and collected into heaps. The grain of this salt is large, and the crystals well defined; it is, however, by no means pure. During the reign of Tippoo, when, in consequence of his regulations, the trade with the Lower Carnatic was declared contraband, the salt was extracted from the soil in very large quantities, but the natives entertained a strong prejudice against it. Earth similarly impregnated with muriate of soda is found in the province of Coimbetoor, to the south of the Mysore; but here the muriate seems to be mixed with the nitrate of soda. Much of the well water here has a saline taste. A thick coat of salt, as white as snow, is spread over part of the morass Calud, on the Run. Sulphur is found about 30 miles to the north of Odeypoor, in the south-eastern quarter of the province of Ajmeer, but it is neither so strong nor so pure as that which comes from Surat.

There are several mineral waters, particularly in the hilly districts of Hindostan; such as are warm are deemed sacred. Most of the wells in the vicinity of the city of Odeypoor, though they are by no means deep, are strongly impregnated with some mineral substances, probably with iron, but they have not been analised. In the Boglipoor district of the province of Bahar, about half a mile from the banks of the Ganges, in a plain nearly surrounded with rocky hills, is a celebrated hot spring, from which the flow of water is considerable: air bubbles are constantly rising on the surface of the water in great numbers. Though there are several cold springs not more than 20 yards from it, the water is so hot that the hand cannot be long kept in it. Another hot well, held in great veneration by the Hindoos, is about 20 miles to the north of Islamabad, in the Chittagong district of Bengal; it evidently contains carbonated hydrogen gas, as the surface of it may be inflamed by the application of a light. Seetacond is the common appellation for hot springs among the Hindoos. Near the south-western extremity of the peninsula of Guzerat, there is a spring, within high water mark, of a pink colour; evidently from this colour and its mineral qualities, impregnated with iron, which indeed colours the adjacent soil. On the north side of the river Villenore in the Carnatic, there are a great number of curiously petrified trees, supposed to be of the tamarind species: some of them are, like other petrifactions, extremely hard, while others are so soft, that the slightest pressure with the fingers crumbles them into dust. There is one tree which is said to be 60 feet long, with a diameter varying from 2 to 8 feet; the root of this tree, which is so hard that it strikes fire with steel, and can be polished to a great degree of smoothness and fineness, is beautifully variegated in its veins and colours, so as to resemble agate: there are parts of it also of a red colour, similar to that of the cornelian. Beads, bracelets, &c. are manufactured out of the root of this tree. These petrifactions are regarded by the natives as extremely ancient. Petrified wood, supposed to be that of the tamarind tree, is found also in the sands near Madras; it takes a beautiful polish, and is manufactured in that town into various ornaments.

In treating of the climate of India, the monsoons first claim our attention. It is generally said that the monsoons do not extend beyond the tropics; this, however, is not accurately the fact, as will be afterwards noticed. At present, however, we shall regard them as merely blowing on the coast of India, from Cape Comorin to the tropic, and point out their effects on the climate of this region. On the Malabar coast, the south-west monsoon commences about the middle of April, and continues till the months of August or September; it begins to blow first on the southern parts of this coast, and gradually advances to the north. In September it has generally lost its violence; and for the next six weeks there are light variable winds. At the latter end of October the north-east monsoon begins on this coast; this also blows first in the south, and about 15 days afterwards is felt on the northern parts of the coast: this monsoon continues till April. On the Coromandel coast the south-west monsoon begins about the end of March or early in April; but it is not regular or strong till the month of June, land and sea breezes being not uncommon in March, April, and May. In June, July, and August, this monsoon is very steady, regular, and strong, but even during these months, a land or west wind blows from the shores for 24 or 48 hours. In August and September the south-west monsoon begins to lose its steadiness and violence; and the north-east monsoon commences about the middle of October; from this period till the beginning of December it is very boisterous, and navigation is rendered extremely dangerous; but in December, January, and February, it is steady well settled weather. On both coasts, the setting in of the monsoons is generally attended by violent hurricanes.

Such is a short description of the monsoons as they appear on the western and eastern coasts of India; but before we proceed to point out their effects on the climate, it will be proper to advert to the circumstance of their extending beyond the tropics. This is decidedly the case at Tatta, which lies in 24° 44′. The monsoon, however, does not reach Corachie in latitude 24° 51′. There are indeed at this place, as well as along the coast of Mekran, from April to October, south-west and west winds; but, as they often veer round to the north and north-west, they cannot be regarded as monsoons, especially as they are seldom attended with squalls and rain,—the invariable marks of the south-west monsoon on the coast of Malabar.

The climate of that part of India (as far as respects rain) in which the monsoons prevail, and the Ghauts are situated, is uncommonly regular. It will easily be conceived, that when the south-west monsoon prevails on the coast of Malabar, this coast will be deluged with rain, in consequence of the Western Ghauts intercepting the clouds brought by this monsoon; and that the same monsoon, on the Coromandel coast, will occasion dry weather: while, on the latter coast, the rainy season will be occasioned by the north-east monsoon, which dashes the clouds, surcharged with moisture, against the Eastern Ghauts. On the Malabar coast, on the contrary, this monsoon will occasion dry weather. Hence it appears, that the rainy season on the Coromandel coast must commence with the north-east monsoon, about the middle of October, while at that time the dry weather begins on the coast of Malabar;

and that the rainy season on the Malabar coast must begin in April or May, the period of the commencement of the dry season on the Coromandel coast. The rains on this coast are not, however, so violent as those on the Malabar coast. This seems to arise from the circumstance, that the Eastern Ghauts are farther from the sea than the Western; and consequently, the clouds are not so soon broken, and have also a greater space over which they can spread themselves before they are broken. It is not improbable, too, that the greater height of the Western Ghauts may intercept a larger portion of the clouds than the Eastern, and break those which it does intercept more completely. As the Western Ghauts extend no farther than the latitude of Surat, the south-west monsoon, to the north of this latitude, as far as it blows, carries the rain without interruption over the whole country. We have already mentioned the break in these Ghauts near Paniany. In consequence of this break affording a passage to the north-east monsoon from the Coromandel coast, ships which navigate the Malabar coast commonly experience a stronger gale in the neighbourhood of Paniany than on any other part of this coast. The lower part of the province of Coimbetoor partakes of the rainy monsoon of the Malabar coast, which is probably occasioned by the same break permitting the south-west winds to blow through the Ghauts in this part.

The south-west monsoon blowing so long, and part of the time with such violence, forces a great body into the Gulph of Bengal; and, during its prevalence, the surf on the Coromandel coast is very tremendous. The north-east winds continue this surf, by impelling the waves on the shore, which is very steep, having, as was before observed, no soundings at the distance of thirty miles. As soon, however, as the north-east monsoon begins to abate, that is, in December and January, and the south-west current, which prevails in the Bay of Bengal, can operate, the surf on the Coromandel coast is by no means high or dangerous.

Having thus briefly explained the monsoons and their effects in the southern part of India, we shall now make some observations on the climate, as it respects wind, rain, and heat, in other parts of this country. In that part of Bengal which lies near the head of the bay, the wind blows alternately from north and south, during unequal portions of the year. The northerly wind prevails during the cold season, that is, during October, November, and December; and the southerly one during the hot, that is, from March to the end of May. In the eastern parts of Bengal, a north west wind begins about the middle of March. During the prevalence of this wind, there are sudden and violent squalls of wind and rain, which are often very destructive to the boats on the Ganges. These squalls are more frequent in the eastern than in the western parts of Bengal. The most settled weather is between the end of the rainy season and the beginning of the north-west wind. The seasons in Bengal are generally divided into cold, hot, and dry; but the natives are more minute in their divisions, assigning six seasons to the year. The spring and dry season occupy four months, that is, February, March, April, and May. The periodical rains commence nearly at the same time over the whole of this part of Hindostan, that is, in the beginning of June. During the first two months there is scarcely an interval of two dry days; and the rain falls in such abundance, that four and five inches have fallen in the course of a single day. In August and September the intervals are more frequent and of longer duration, and the weather becomes sultry. As the cold season approaches, fogs and dews are very common and dense. This description of the climate of the province of Bengal will apply, in almost every particular, to the climate of the whole of Hindostan Proper, except that in the mountainous parts the rainy season begins early in April. In Bahar also, and the contiguous districts, a strong parching wind blows from the west during the greatest part of the hot season,: but it is not steady, nor very regular; for it sometimes ceases altogether, and is succeeded for a few days by an easterly wind; and even after a parching wind from the west in the day time, a cool easterly breeze will set in at night. To the west of this province these parching winds are more frequent, as well as more oppressive and prejudicial to vegetation.

When the quantity of rain that not unfrequently falls in Bengal, in the course of a single day, during the rainy season, and the long continuance of that season, are considered, we shall not be surprized, that the average annual fall of rain in the lower parts of the province should be between 70 and 80 inches. During the south-west monsoon at Bombay, the quantity of rain generally exceeds 100 inches; sometimes it reaches 110 or 112 inches. At Madras, according to Mr. Cockburne, who was examined before the Select Committee on the affairs of the East India Company in the year 1813, upwards of 30 inches fall in the course of one month; and yet he estimates that only from 45 to 70 or 80 inches fall in the course of the year, according to the situation and severity of the monsoon. During the first part of the rainy monsoon on the coast of Malabar, that is, in the months of May and June, a considerable quantity of rain falls in the Table-land of Mysore; but it is uncertain whether this is the effect of the monsoon, or is merely the periodical tropical rain. In the north-western extremity of the Rajah of Mysore's territories, on the summit of the western Ghauts, there are usually nine rainy months in the year. During six of these months the rain is so violent and constant, that it is impossible to go abroad, and "it is customary to make the same preparatory arrangements for provision, (water excepted,) as are adopted in a ship proceeding on a voyage." The elevation of this part of India is so great, that the climate is a month later than it is on the sea coast. In the mountainous parts of the province of Coimbetoor, there are two rainy seasons; the first is in April, and the second in July, August, September, and October. The north-west parts of Hindostan Proper seem the driest with respect to climate. "During the greater part of the south-west monsoon, or at least in the months of July, August, and part of September, (which is the rainy season in most other parts of India,) the atmosphere is here generally clouded; but no rain falls, except very near the sea. Indeed, very few showers fall during the whole year. Captain Hamilton says, that no rain had fallen during the three years preceding his visit to Tatta. Owing to this, and the neighbourhood of the sandy deserts which bound it to the east, and are not far removed from it in the north-west, the heats are so violent, and the winds from those quarters so pernicious, that the houses are contrived so as to be occasionally ventilated, by means of apertures on the tops of them, resembling the funnels of small chimnies. When the hot winds prevail the windows are closely shut, by which the hottest part of the current of air (that nearest the surface, of course) is excluded, and a cooler part, because more elevated, descends into the house through the funnels. By this means also, vast clouds of dust are excluded, the entry of which alone would be sufficient to render the houses uninhabitable." (Raynall, p. 132.)

The general temperature of India, it is evident, must be very high, especially in those parts, which, like Sinde, are of a sandy soil, and dry climate, and in the more southern provinces. In the more elevated regions, however, a considerable degree of cold is often experienced. At Calcutta, the following is the range of the thermometer from October to April, with the prevalent winds during that period.

	Maximum.	Minimum.	Winds.
October	94	70	North
November	89	60	do.
December	88½	52	North-east
January	85	63	do.
February	92	68	do.
March	104	72	South
April	110	72	do.

In Calcutta, the heat is sometimes so intense that pigeons drop down dead at noon, while flying over the market-place. In the middle districts of the province of Bengal, there are occasional thunder storms during the hot season, which render the atmosphere cool; and in the eastern districts the same effect is produced by occasional showers of rain. In the higher parts of Bengal, the weather is sometimes very cold. Between the latitudes of 28° and 29°, in the province of Delhi, the heat during summer is very intense; but when the wind blows from the northern mountains in the winter, the thermometer falls below 30, and water freezes in the tents. The same description applies to the Shahrampore district of Delhi, which lies farther to the north, principally in the Doab. But the cold here is moderate, compared with what it is in some parts of Northern Hindostan. At the end of May in the year 1808, there were masses of snow, about 70 feet in thickness, lying undisturbed on the road to Bhadrinah, in latitude 30°. Even in the Benares district of Allahabad, the cold of the winter is so severe, as to render fires necessary, while in April, May, and June, the heat is very oppressive. The winters in the Decan, which contains a large portion of high land, are cold. At Hyderabad, and the provinces to the north of it, the thermometer during three months is often as low as 45°, and sometimes down to 35°.

The climate of Sinde, on the north-west coast of India, has been generally described. It may be added, that in the months of June and July, the thermometer ranges from 90° to 100°. At Surat, the variations are in the course of the year from 59° to 96°. At Bombay from 64° to 98°; the former about the end of the year. The hottest months in the Malabar coast are April and May. In the former month, the maximum height of the thermometer at Cochin is 105.

The temperature of the coast of Coromandel is in general much higher than that of the provinces on the coast of Malabar; and the Carnatic and the north-west extremity of the northern Circars are deemed the hottest, not only on the Coromandel coast, but in all India. In the latter district, the French, in the year 1757, lost seven European soldiers in the course of a single day by *coups de soleil.* The Circars, generally, have certain varieties in their climate, pointed out by Mr. Grant, in his Political Survey of them, printed in the Fifth Report of the Committee of the House of Commons, on the affairs of the East India Company, which deserve to be noticed. To the north of the Godavery, a westerly wind, with moderate showers, begins about the middle of June: about the middle or end of August, the rain becomes more violent and regular; and it continues so till the beginning of November, when stormy weather takes place, and the wind shifts to the north-east. The weather continues moderate, with respect to temperature and rain, till the middle of March, when the hot season commences. To the south of the Godavery, the climate of the Circars is different in some respects. During January and February the wind blows along the shore strong from the south; and as the sea breezes set in regularly every day, the temperature is moderate. In March, the hot season commences; and as the wind blows from the west over a loose, parched soil, and along the sandy and almost dry bed of the Krishnah, the temperature is most oppressive; the thermometer being sometimes raised, near the mouth of that river, to 110° for several days, even in the house, and seldom falling under 105°. In the low country of the Arcot district of the Carnatic, during the hot season, the thermometer, under the corner of a tent, rises to 100°, and, when exposed to the sun, to 120°. If the annual heat at London be considered as represented by 1000, that of Madras will be 1565, and in July 1349; and if the cold in January in London be considered as represented by 1000, that at Madras, during the same month, will be 491. Taking the average of the whole year, the heat of Madras is less than that of Calcutta. In January the thermometer is about 70°; this is the lowest temperature: the highest is in July, when the thermometer is about 91°.

The soil of Hindostan exhibits fewer varieties than might be expected in such a vast tract of country. In the whole of that district which is watered by the Ganges, the most prevalent soil is a rich black mould, evidently of alluvial origin. No other soil appears between the Tipporah hills on the east, and the district of Burdwana on the west, nor below Dacca and Borleah to the north; nor is there any substance so coarse as gravel, either in the Delta, or nearer the sea than 400 miles along the course of the Ganges at Oudanulla. At this place, a rocky point, evidently stretching from the base of the neighbouring hills, projects into the river. In other parts of Bengal and the adjacent provinces, there is a considerable extent of clayey soil; and that this was the original soil, where the black mould is now found, is proved by the appearance of the beds of the rivers, which are of clay. The substratum of the soil in this part of Hindostan Proper is in many places calcareous; in others clay; and in a few instances rocky. The soil of the Punjab resembles that which chiefly prevails in Bengal, and is equally fertile. As we approach to the south-west into Sinde and Guzerat, the soil becomes more sandy. In Malwah, it is a deep, black, rich mould. Of this kind of soil there is one variety, named by the natives *eyrey*, which is deemed very unhealthy. The whole of the plains of Chitteldroog, in the Mysore, which is 10 miles from north to south, and 4 from east to west, consists of this kind of black mould to a great depth. The provinces of Gundwana and Orissa contain the largest proportion of poor unproductive soil, perhaps, in all Hindostan. To the south of these provinces, the soil near the coasts both of Malabar and Coromandel is sandy, and generally of a poor quality. It is more fertile, however, as the mountains are approached. In the province of Malabar, the soil at the foot of the low hills which intervene between the sea and the Ghauts, is a red clay, or brick earth. On the Coromandel side, the sandy soil continues nearly to the foot of the eastern Ghauts. The soil on the Table-land, and also in the extreme southern provinces of India, is of various quality; but, in general, a loam, on rock, very fertile.

CHAP. IV.

Different Tenures of Landed Property—Agriculture—Wet and Dry Lands—Produce—Wheat, &c —Rice—Sugar—Cotton—Indigo—Poppy—Tobacco—Mode of Harvesting—Implements—Pasture—Cattle—Milk, Butter—Sheep—State of the Agricultural Classes.

It is foreign to the nature and object of this article, and would extend it far beyond its proper limits, to enter fully into the subject of the landed tenure in Hindostan, especially as, with respect to some points of it, there is considerable difference of opinion among the best informed authors. We allude particularly to the dispute which was for a long time carried on regarding the rights and original character of the zemindars. There can be no doubt, that, in the most ancient time of Hindoo history, the property of the land was vested in the sovereign; and the opinion, that the zemindars were merely collectors of the revenue, seems the more probable. Indeed, there is a common saying among the Mahrattas, "that the daughter belongs to her parents, but the land to the king."

Our most accurate source of information on the subject of the tenure of land in Hindostan, before the arrival of the Mahomedan conquerors, is derived from the Institutes of Menou: these were drawn up about 1300 years before Christ. In these Institutes there are very minute and particular regulations on the subject of the rent of land, from which it appears, that the sovereign in most parts was the proprietor. The medium rent was estimated at a sixth part of its produce; but it varied considerably, according to the degree and quantity of labour which the nature of the soil and other circumstances required. If the lands were very unfertile, and necessarily required a very considerable degree of labour, only an eighth or a twelfth of the produce was taken. Under the pressure of great difficulty or danger in the state, as in the case of invasion or war, the fourth part of the produce was collected as rent. In every instance, the Institutes expressly enacted, that what remained should belong to the Ryot, or cultivator. This rent was, in the most ancient times, paid in kind, but afterwards it was paid in kind or money.

The produce of the crop was ascertained as nearly as possible before the harvest commenced, in the presence of the inhabitants of the village, by skilful and impartial persons, who, in the adjustment of their business, were materially aided by a reference to the produce of former years, as recorded by the accountant of the village. As these persons were appointed by the collectors of the rent for government, it was in the power of the Ryots, if they were not satisfied with the estimate of the crop, to make another survey by people of their own choice; and if the estimates differed much, a third survey was made under the direction of the village officers. The share of the cultivator was greatest on the plantation or garden culture, on account of the very great labour in the management, and the distance and hazard of carrying the produce to market. The rent of this land, as well as that levied on the small grains, was always paid in money, and was fixed. Those lands which required artificial means to water them paid a smaller portion of rent than those which were fertilized by the periodical rains.

There were, however, certain portions of land attached to each village, which paid no rent to the sovereign, or only a very low rent. These were small allotments for the support of the Pagoda Establishment and their priests; for charitable uses, such as keeping up the choultries; for the accommodation of travellers; and for the support of the Brahmins and bards. After the Mahomedan conquest, allotments of land were also for the support of their temples, burying places, and monks, and for furnishing the lights which it is customary to burn at Mahomedan tombs. The local officers of government had also allotments of rent-free lands. But the allotment to the different village servants was most characteristic of the ancient Hindoo constitution, and therefore requires to be particularly noticed. It is thus described in the Fifth Report on the Affairs of the East India Company, already referred to: "A village, geographically considered, is a tract of country comprising some hundreds or thousands of acres of arable and waste land. Politically viewed, it resembles a corporation or township. Its proper establishment of officers and servants consists of the following descriptions: The Potail, or head inhabitant, who has the general superintendence of the affairs of the village, settles the disputes of the inhabitants, attends to the police, and performs the duty of collecting the duties within his village. The Curnam, who keeps the accounts of cultivation, and registers every thing connected with it. The Talliar and Totic; the duty of the former appearing to consist in gaining information of crimes and offences, and in escorting and protecting persons travelling from one village to another; the province of the latter appearing to be more immediately confined to the village, consisting, among other duties, in guarding the crops and assisting in measuring them. The boundary-man, who preserves the limits of the village, or gives evidence respecting them in cases of dispute. The superintendant of the tanks and water-course distributes the water for the purposes of agriculture. The Brahmin, who performs the village worship. The schoolmaster, who is seen teaching the children in the villages to read and write in the sand. The Calendar Brahmin, or astrologer, who proclaims the lucky or unpropitious periods for sowing or threshing. The smith and the carpenter, who manufacture the implements of agriculture, and build the dwelling of the Ryot. The potman, or potter. The washer-man. The barber. The cow-keeper, who looks after the cattle. The doctor. The dancing-girl, who attends at rejoicings. The musician and the poet."—Such was the establishment of a village in all parts of Hindostan during the independence of the native Hindoo governments, and such it is at present in some parts. To all the members of this establishment a certain portion of land was allotted, according to their rank and the importance of their duties. Besides these allotments to them, the Pagoda establishment, the choultries, the local officers of government, &c. they were each entitled to certain small shares of the crops of the village, which were set apart for them previously to the division of the produce between the sovereign and the cultivator. The Mahomedans also made large grants of land, under the name of Saghires, to such officers as were high in civil and military rank.

The most probable opinion, as we have before stated, is, that the zemindars were only the collectors of the revenue; but in process of time, taking advantage of the weak and unsettled state of the Hindoo governments, they claimed and exercised all the rights of absolute property over the land. In this character, the British government have deemed it prudent, and a matter of policy, to recognise them.

One of the principal and favourite objects with the Emperor Acbar was, to make a survey of the whole lands of his empire. After this was done, he fixed the land rent at a fourth part of the valued produce, which they deemed equal to a half of the produce, if taken in kind. Only one-fourth was taken from garden produce. For the purpose of carrying this plan of revenue into effect, an officer was appointed to reside in every village, whose duty it was to inquire into the receipts and disbursements of the Ryot, and another officer who was bound to protect the Ryot against the injustice of the zemindars or collectors. In order to understand the reason of the appointment of the first officer, it is proper to remark, that, in the time of Acbar, as well as at present, in most parts of Hindostan, a system similar to that of the *métayer* system of France prevailed. The Emperor also caused regular rent-rolls to be made out and kept by the officer whose duty it was to protect the interests of the Ryot. In short, he revived the ancient system of the Hindoos with regard to landed property. It deserves to be noticed, that the term zemindar occurs only twice in the institutes of Acbar.

Having thus given a general account of the nature of the tenure of landed property as it existed during the most early periods of Hindoo history, and as it was revived by the Emperor Acbar, it may be proper to describe it as it exists at present in different parts of Hindostan. In Bengal a large portion of the landed property is held by the zemindars, and the zemindaries are very extensive. The zemindary of Barduan comprises nearly 3280 miles, being about 73 miles long, and 45 broad. This, however, is in fact the property of government, as the Rajah who holds it pays a very high rent for it. The zemindary of Raugeshy comprehends 12,909 square miles. In Bahar the zemindaries are comparatively small, there being but three principal zemindars. The most ancient zemindary in this part of Hindostan is that of Bissunpoor, in the Burdwan district of Bengal. It appears from good authority to have been in possession of the present proprietor's family for upwards of 1100 years, the present zemindar having a list of 56 successive Rajahs who held it in regular succession. Its area comprises 1256 square miles.

When the Northern Circars were acquired by the British, they consisted of zemindary lands and havellie lands. The former were situated in the hill country, and in the plains between the hills and the sea. The zemindars who possessed them were surrounded by military tenants, who held their lands on the feudal tenure of personal service. The latter, not being so well secured by the nature of the country, seem to have been more quiet, and more disposed to encourage agriculture; accordingly they farmed their lands to the Ryots, on annual or longer leases, for rent paid either in kind or money; one or more villages or districts, and sometimes entire zemindaries, were thus leased out. The havellie lands consisted of the demesne lands of the Circar or government; they constituted a large portion of the northern Circars. After the usual deductions were made from the crops of these lands for the Pagodas, &c. the government possessed the right to certain proportions of the remainder. But in order to obtain this proportion with the least trouble, a whole Circar was rented to one individual; the more ancient custom, however, was to let the land in smaller portions.

In the Jaghire, there were lands held as inheritance from father to son, called meerass lands, and lands held by the pyacarries, or subtenants. For some time, it was matter of doubt whether the meerassadars had a proprietary right in the soil or not; but this question was set to rest by Mr. Place in the year 1799, who proved that they possessed this right, originally derived from the sovereign, to whom they paid a certain proportion of the produce, as the tenure on which they held their land; that they could sell, mortgage, and bequeath their land; and that, till the period of the Mahomedan conquest, they were described, in the Malabar language, by the term *Caniatchy*, compounded of *cani*, land, and *atchy*, heritage. The pyacarries, who were called strangers by the meerassadars, under whom they held their lands, seem to have had a life property in them, receiving, however, only about 45 per cent. of the produce. Such were the resident pyacarries; but there were other pyacarries, who seem to have had meerass lands in one village, and to have taken lands on life rent, or sometimes only from year to year, in another. These pyacarries were allowed 50 per cent. of the produce.

In the provinces of Canara and Malabar, the tenure of lands is very ancient, and is clearly pointed out by a series of regular deeds, which have a very striking resemblance in both these provinces. Land formed a clear private property, more independent and perfect in its tenure than even in England, and it still remains so. It is possessed either by a single individual, or by a number in partnership, each of whom possesses an equally inalienable right in the estate. In Canara there are three kinds of occupiers: those who hold under the nair mul guerry tenure; under the shud mul guerry tenure; and the chalic guerries. The land held under the first tenure descends to the heirs at law, and is inalienable. In cases of the non-payment of taxes, or of mortgage, it reverts to the owner as soon as he satisfies government, or the Mutgolle. Under this tenure, land is not even forfeited where the owner's life is taken away by the laws of the country, but passes immediately to the heir at law. On the failure of heirs it reverts to government; but is always granted to individuals on the payment of a few years' rent. In some instances the proprietors hold immediately of the government; but their proprietary rights are not in the smallest degree lessened by this circumstance. The shud mul guerries, or tenants for ever, are in fact lesser proprietors, holding under those just described; they can, however, give up their lands to the latter, who are bound to reimburse them for the improvements they have made; and in case the tenants for ever die without heirs, their lands revert to the superior landlord. Chalic guerries are tenants at will, who hold under the lesser proprietors. The tenants for ever, as well as the tenants at will, pay a fixed rent, either in money or in grain; and never by a share of the crop, as in the other parts of the British possessions in India, where fixed rents exist.

Private property in land in Malabar, where it has rested, from the most remote times, on a tenure as well defined, extensive, and secure, as in Canara, is called *jummum*, a word which signifies birthright. In one respect, indeed, these lands differ from the lands of the greater proprietors in this latter province; for in Malabar they may become forfeited by acts of treason to the sovereign. In the event of the proprietor having no legal heirs, he possesses the right of adoption, which prevents his land from escheating to the government. In mortgaging lands in Malabar, there are some peculiarities. The proprietor receives from the mortgagee two thirds of the produce or rent of the estate, and retaining an interest in the land itself; when he loses this interest, he ceases to be a proprietor. There are two other modes of transferring land, which, however, are very little different from that just described. In all cases the mortgagee accounts to the proprietor for the surplus of rent above the interest to which he is entitled. If the proprietor is under the necessity of raising further sums on his land, there are other forms of deeds established by the custom and laws of the country, by which he alienates so much more of his proprietary right; and, in many instances, the money advanced on mortgage bears a value so nearly equal to that of the estate, that the proprietor at length "has nothing left him but a handful of rice, or a measure of grain," as an acknowledgment of his title. In some parts of Malabar the option of redemption is in the mortgagee; in others, in the proprietor. Where the former has a right to refuse the redemption, and has long been in possession, there is another species of contract, by which the land is transferred to the mortgagee as a kind of freehold. All these kinds of contract must be executed previously to the execution of the deed called *oltiper*, by which the proprietor absolutely transfers his property. There are several descriptions of tenure by which lands are granted in lease

According to one of them, the proprietor receives a sum of money in addition to his rent; the tenant retaining so much of the latter as will cover the interest of the money advanced. Under another kind of lease-hold tenure, the interest of the money and the rent are considered security for each other. Lands are also let for a number of years for a gross sum advanced by the tenant on his entry to the farm. In those cases in which the land requires improvement, the tenant binds himself to improve it, particularly to inclose it with mud-walls, and plant it with productive trees, and erect the necessary buildings upon it; and the proprietor, in consideration of those improvements, grants a lease for a certain number of years, which, however, is generally extended, if the tenant has fulfilled his contract The buildings and plantations are so far the property of the tenant that he can mortgage them. There is also a simple lease, when the rent is annual or for a definite term. The general price of land is 20 years' purchase. As the Hindoo law requires that property should descend to all the male children of a family, and admits adoption, it is evident that land would be, in the course of time, divided and subdivided into portions not worth possessing, were not some measure adopted to elude the law. Accordingly, it is the general practice through the Peninsula to preserve the original property nominally entire as long as possible, by letting it stand in the names of those who have the greatest shares in it. They manage it for the rest, each receiving his portion of the grain it yields. The various tenures which we have described exist in the greatest purity in the southern provinces of the Peninsula, situated below the Ghauts, which were last invaded; and it is on this account, as exhibiting the most genuine view of the tenure of landed property among the Hindoos, that we have dwelt thus long on the state of landed property in Canara and Malabar. There is no evidence in the history of the Hindoos, from the reign of their first princes till the downfall of the Hindoo sovereignty, that any of the landed rights which have been enumerated and described were ever, in the smallest degree, impaired, or ever questioned.

Besides, however, these tenures in this part of India, which, it will be observed, are entirely exempt from the claims or control of zemindars, there were lands held by Polygars, who, in many respects, resemble the zemindars of the Northern Circars. The Polygars' territory, as it is called, is situated principally between the 10th and 11th degrees of latitude, and is bounded on the east by Tanjore and the sea, and on the west by Dindigul. The origin of the proprietary rights and power of the Polygars may be traced to the same causes which produced the zemindars of the Northern Circars. They were, in fact, military chieftains, who obtained their power and landed property by force, and preserved it by the numbers and strength of their vassals. Of these there were, in the Polygar countries of Mysore, three descriptions: the first consisted of those who were paid entirely in money; the second of those who possessed lands on service-tenure, but who, being also farmers of other lands, seldom regarded their service-lands as of much consequence; the third description consisted of such as confined themselves to the cultivation of their service-lands. These vassals were called peons; and the common allowance of a common peon was a field valued at the rent of 6 pagodas. The head peon, who could bring in 10, 50, or 100 common peons, had a piece of land of from 9 to 24 pagodas rent.

In the Tinnevelly district, there are three kinds of tenure, viz. villages, of which the absolute proprietary right is chiefly held by Brahmins; villages, of which the absolute proprietary right is chiefly held by soodra inhabitants; and thirdly, villages, which having gone to waste, soodra inhabitants were invited to occupy and cultivate them. The lands under the first tenure, though nominally vested in the Brahmins, in fact belong to all the inhabitants of the village; and no transfer is rated that is not approved, and sanctioned by every one of them. At stated periods, a new division of these lands takes place by a kind of lottery; the object of which seems to be, in the first place, to prevent any proprietor's right being established to any particular spot; and, secondly, to afford every inhabitant the chance of occupying the fertile as well as the less fertile parts of the land. The villages under the second kind of tenure, resemble those under the first, except that in the former, the influence of the Brahmin predominates, who will not permit the soodra to interfere in his village. The last kind of tenure comprises all those lands which the inhabitants are not considered at liberty to sell; they form a large proportion of the district, and are generally occupied by the soodras. The land of each individual is fixed, there being no new distribution of it at any time. Each Ryot cultivates his own land as long as he possesses the means; if these fail him, he mortgages his right of cultivation till he regains the means. When the supply of water is deficient, all the inhabitants assemble, and having determined the extent of land that may be cultivated, according to the quantity of water in the tanks, &c. apportion it out to each, with reference to the extent of land he holds.

In Tanjore, there are also three descriptions of tenure; first, individual possession; when villages belong to a single individual, who either cultivates them himself by his slaves, or entrusts them to labourers, who receive part of the produce as their wages. The second description relates to lands possessed by two or more individuals, each of whom has the same rights in his individual share as those who hold under the first tenure, have in entire villages. The third tenure is possession in copartnery, under which the partners may cultivate their shares themselves, cultivate the whole jointly, employ labourers, or commit their management to one of themselves. In all these cases the produce is divided in proportion to the shares held.

We have thus given a rapid sketch of the various tenures by which landed property is held in most parts of Hindostan: they are all comprized under the term *pottah* tenure, or tenure of hereditary possession. There are other lands, however, denominated *coss* and *comar* lands. The former are very extensive in some parts of India, consisting of such lands, as having been neglected, or entirely depopulated, in consequence of the oppression of the collectors, are under the immediate superintendence of government. The *comar* lands are also very common; they consist of such as having no native tenants, are cultivated by contract; the zemindar ordaining to the cultivator the necessary capital, and receiving an equal share of the crop as well as interest for the money advanced.

By the act of perpetual settlement, as it is called, the East India Company not only confirmed the zemindars in their proprietary right to the land, on condition of paying the value of a certain part of the produce, but they also fixed the rent to be paid in kind by the Ryots. In no other respect have they interfered with the landed tenure of India.

In the preceding illustrations, the rent of land has been stated generally to be a certain part of the produce, paid either in kind or in money. In those parts of Hindostan where agriculture flourishes most, the average rent of wheat land, calculated by the stipulated portion of the average produce, taken at an average price, is about 19s. the

English acre. The rent of sandy loams, which can be irrigated with little trouble or expense, reckoned the most favourable for the cultivation of rice, let, in the Coimbetoor district, for three or four guineas per acre; if they are of inferior quality, the rent does not amount to *l.* 1 per acre. In other parts of this province, good rice land lets for *l.* 2, 7s. per acre; the worst for 11s. 4d.; and dry field land from 5s. 10d. to 1s. 6d. per acre. Land in Bengal which produces two crops, one of rice, and the other of mustard, or pulse, lets for about a rupee and a half per begah, or about 11s. 3d. per acre. That which produces one crop, at three-fourths of a rupee per begah. Good soil fit for kitchen gardens, pays a rent of from 12s. to 21s. per acre, in some parts of the Mysore.

These statements of the rent of different kinds of lands, though few, and applying, for the most part, only to particular districts, are sufficient to point out the extreme difference in the quantity and value of the produce of land, as well as in the labour necessary to render it fertile, in various parts of India; for the rent is varied according to these circumstances, considered jointly or separately.

The agriculture of Hindostan, generally speaking, is in a very rude and imperfect state. There are, however, districts in which this art has reached a state of improvement, not inferior to that in which it exists in many parts of Europe. Perhaps the Burdwan district of Bengal deserves the first place in the scale of agricultural excellence, and the province of Tanjore the second. Many parts of the province of Allahabad, and especially the district of Benares, rank nearly on a level with Burdwan and Tanjore. In the neighbourhood of the city of Patna, the capital of Bahar, also, the husbandry is excellent; the fields in many places being cultivated with such nice and minute attention as to resemble gardens. Travancore is distinguished for its excellence in what is called the wet cultivation, which is carried to such a degree of successful perfection, that the whole of the government expenses, civil, military, and religious, are defrayed from it alone, without drawing any thing from the produce of the dry-land cultivation. The agriculture of the Circars is also good. From this province and Tanjore, the Carnatic is frequently supplied with grain; the Circars being esteemed its granary during the north-easterly monsoon, and Tanjore during the south west monsoon. Formerly the Punjab exhibited undoubted proofs of good husbandry, and its crops, owing to this and the natural fertility of its soil, were abundant; but in consequence of the devastation it has sustained, and the number of petty hostile states into which it is divided, it is now but very imperfectly cultivated, and contains a large proportion of land absolutely waste and neglected. That part of Agra which is called the Doab was formerly, like the Punjab, cultivated with skill and success, especially during the latter part of the Nabob of Oude's government. While it was under the management of Almas Ali Khan, and at present, its cultivation is improving, as indeed is the case with all those parts of India which are placed under the British authority. In the Midnapoor district of the province of Orissa, improvements have lately taken place in agriculture; but they arise rather from the extreme ease with which they may be made, than from the superior information or activity of the inhabitants. The other parts of the Decan in which the agriculture rises above the level of that generally practised in Hindostan are, the low districts of Aurungabad, some parts of Berar, and the Circars, already mentioned. In the south of India, besides Tanjore and Travancore, which rank in the highest class, the industry of the husbandman in the ceded districts has raised the agriculture of this province to a considerable degree of perfection; and they are likely still farther to improve it, in consequence of the excellent regulations introduced by the British. In no part of India has the husbandman been obliged to struggle with greater difficulties in the improvement of his land, and nowhere has he surmounted them more completely than in Canara. The largest portion of the surface of this province is so rocky and uneven that nearly all the agricultural labour, and especially the indispensable previous operation of levelling the ground, must be performed without the aid of cattle; which, indeed, are by no means common. And even after the land is brought into a state of cultivation, it would soon revert to its original character, and be broken up by the torrents from the mountains, were not the husbandman constantly alert and active. Notwithstanding these difficulties, there every where appears undoubted proofs of good husbandry, not merely in the quantity produced, but also in the neatness of the culture, and the regularity and method with which it is carried on. This may in a great degree arise from the circumstance, that each man cultivates his own land, however small; all the land here, as has been already remarked, being private property, and the subdivisions of that property being very minute. The same character applies to the husbandry of the province of Malabar; each proprietor bestowing on his little spot "all that minute labour and attention which is so important to Indian husbandry." In no province of the south of India was the husbandry worse than in Barramahal, previously to the introduction of the permanent settlement, but at present it is very respectable, and will probably improve. The tract of land in North Coimbetoor, which lies near Mutu and Coleagala, and that part of South Coimbetoor which stretches along the banks of the Amarawati, are remarkably well cultivated, particularly the first district, in which the management of rice is equal to that of any other part of India. The same character applies to the rice cultivation in the vallies of Cochin. From this sketch of the general state of agriculture in Hindostan, it will be seen that, with a few exceptions, that of the south of India is superior to that of Hindostan Proper; that it is more generally good; and that the husbandry of the Decan is inferior both to that of Hindostan Proper and the south of India.

Over all Hindostan, as in every country that lies within the tropics, or only a little beyond them, the general mode of cultivation, as well as the particular crops cultivated, must depend in a great measure, on the more or less abundant and regular supply of water. Hence arise two distinct modes of cultivation in Hindostan, besides subdivisions of these modes. The two leading species of cultivation are denominated *nunjah* and *punjah*; the first being the wet-grain culture, and the other the dry-grain culture. The first is more attended to than the second, and is deemed more valuable and beneficial. The grain cultivated on nunjah lands is generally only of one kind, or at most of two, and is consequently cut down at one season or two; hence the produce of this land can be stored, watched, and sold, with much greater facility, and at much less expence, than the other kinds of grain. In the south of India, the produce of nunjah land was always divided between the government and the cultivator. Punjah land is in almost every respect the reverse of this. The grains sown on this land are very numerous, and are put into the ground at various periods: the produce is uncertain, depending on the rain that falls. The gathering of the crop must be performed at different times. That part of it which carries the grain in the ears must be reaped at one season, and that which carries it in the pod at another. It frequently happens that several kinds are sown together in the same field, each ripening at a different period; and if one of these be cotton, which is often the case, it must be gathered every day after the plant arrives at full growth. Hence the produce being uncertain, and the labour great, the revenue exacted by government from punjah land was uniformly paid in money. This kind of land appears to have been brought into cultivation after the nungah land, as it generally lies at a considerable distance from the village.

Nungah mail pungah is a species of nungah cultivation, carried on either in the stubble of paddy or nungah land, or when, from an accidental deficiency of water, land which is usually cultivated with rice becomes unfit for that grain; in these cases, the cultivator, availing himself of the moisture remaining in the ground, or of the water that may be drawn by *picotahs* to the field, sows the best kinds of dry grain. *Vanpyer*, or *totical lands*, are lands managed according to the garden culture, in which the more valuable articles, such as sugar cane, tobacco, *chillies*, &c. are grown. These lands are generally secured against a failure of water by artificial means.

The nungah lands are rendered fit for wet-grain cultivation, by the overflowing of the rivers—by canals and water courses cut from the rivers and streams, for the purpose of irrigating them—or by water drawn from tanks and wells.

1. The Ganges and its branches are the great sources of fertility to that vast tract of country which lies near their banks, in Hindostan Proper. In consequence of the rains which fall in the mountains whence it springs, this river begins to overflow its banks in the low country in the month of April. Its rise is at first gradual; but as soon as the rainy season has reached the low country, and becomes general, it rises with great rapidity. "By the latter end of July, all the lower parts of Bengal are overflowed contiguous to the Ganges and Brahmapootra, and form an inundation of more than 100 miles in width." By the middle of August, the river has increased upwards of 14 feet at Dada, and 32 feet at Jellinghy, in common years. As soon as the rainy season ceases in the mountains, which is about the middle or end of August, the Ganges begins to decrease in Bengal, slowly at first, like its rise, till the rains cease also in this province. It is easy to perceive, that this periodical increase of the Ganges must not only have formed the rich alluvial soil of this part of Hindostan, and must every year deposit on it materials which will serve to keep up its fertility, but must also prepare the ground for those crops which require on it cultivation, and even for those which would not thrive and repay the husbandman in a climate so hot, and at other seasons so very dry, if these inundations did not take place. Accordingly, the rise of the Ganges is watched with great attention and anxiety by all the inhabitants of the country through which it flows, since scarcity or famine are the consequences of a failure or a great deficiency of its inundation. If, on the other hand, its inundation is unusually great, the corn may be swept away and destroyed; but this evil is generally light and partial, compared with the calamity which results from a deficient inundation. The Ganges, without the assistance of art, waters immense tracts of land, and renders them fit for the wet cultivation. In former times, as we have already noticed, canals were made for the purpose of conveying the waters of the Indus to irrigate the lands, as well as for the purpose of internal communication; and a canal was made from Jumnah to Delhi, which was probably used, though not principally constructed, for the benefit of agriculture. But neither in those times, nor at present, has all that advantage been taken of either of these rivers, particularly of the Ganges, which agriculture might derive from them.

The Punjab, or that extensive tract of country which is watered by the eastern branches of the Indus, is not entirely inundated and enriched by this river: The lower part only, towards Mulpan, which is very flat, deriving this benefit to its agriculture from the periodical rains which fall between the months of May and October. The lower part of the province of Sinde is also inundated by the Indus. Every where also this river and its branches do not, unassisted by art, greatly or extensively benefit agriculture.

2. Though artificial inundation from the Ganges is not carried to such extent, nor conducted with so much skill as it might be, it is not entirely neglected. In the Rohilcund territory especially, the waters of this river, or rather of the Ramgunja, the Goggra, and other smaller streams, which flow into it, and intersect this district, are distributed over its surface by means of canals. But as the soil in almost every part of the country through which the Ganges flows is naturally rich and loamy, the inhabitants are not placed under such an absolute necessity of having recourse to irrigation, as those who live on the sandy and parched soil of the lower parts of the province of Sinde. Accordingly, in this province, considerable attention is paid to irrigation by means of canals and water-courses. A regular system is pursued, and a fixed tax levied by government for the construction and repair of these water-courses. Every biggah of land, (one-third of an acre,) pays a revenue of $1\frac{1}{4}$ to $3\frac{1}{2}$ rupees for the water with which it is supplied by a canal or wheel. One wheel is capable of watering 16 biggahs. It is in the south of India, however, that the practice of rendering land fit for the wet cultivation, by means of canals and water-courses, is carried on to the greatest extent, and with the most industry, skill, and success. In the province of Coimbetoor, there is a canal from the river Bhawani, constructed on the best principles, as well as executed with considerable judgment, which waters a narrow space of ground, 15 Malabar hours journey in length, and has raised the rent, and increased the produce of the land adjacent very much. In the vicinity of Seringapatam there are many excellent canals, which are drawn from the river Cavery along the windings of the hills; the intermediate spaces between these canals is watered by branches. The water of the Cavery is forced into the main branches by means of dams thrown across it, which are formed of large blocks of granite. The whole must have been executed at great expence, and is a work of very great labour and strength. The river, whence these canals are drawn, is made nearer the sea, to answer still more important and beneficial purposes to agriculture; for it is in consequence of the water-courses sent off from it through the Tanjore, that this province is entitled to the second rank, among all the provinces of Hindostan, for agriculture. It has already been stated, in our account of that river, that, opposite to Trichinopoly in the Carnatic, the Cavery divides into two branches; which, about 13 miles to the eastward of the point of separation, again approach; the northern branch, however, being at this place 20 feet lower than the southern; and that an immense mound is formed, to prevent the waters of the one branch from descending into those of the other. The higher, or southern, branch retains the name of the Cavery. From it canals are conducted in all directions; "which, by means of embankments and reservoirs, are directed into every field, and fertilize a tract of country, from Dericotta to Point Calymere, (a distance of nearly 70 miles,) which would otherwise remain a barren sand." In most parts of the Carnatic, the water necessary for the purposes of wet cultivation is supplied from tanks. In the Vallore district of this province, however, the system of canals is followed.

These are dug, during the dry season, across the channel of the rivers, below which, even at this period, moisture is always met with; or they are drawn from subterranean streams, many of which exist in this tract, and contribute not a little to the greater degree of verdure which prevails here than is usually seen in the Carnatic.

3. Tanks, or reservoirs of water, are of two kinds in Hindostan. They are constructed either by digging, or by shutting up, by an artificial bank, an opening between two natural sides of hills. The former mode is practised in Bengal, and in other parts where the surface is level, and the soil loose, and free of rocks; the latter, in the more hilly districts of the Decan and the south of India, where natural situations, proper for this kind, are met with in abundance, and where the former kind could not be constructed without almost infinite labour and expense. Considerable insecurity, as well as great labour, are requisite in the formation of the tanks in the hilly districts; in the selection and damming up of the outlets of the narrow vallies; and in making the surrounding rocks answer effectually the purposes of walls. In Bengal, and the other flat districts, the tanks are generally lined with stone, and their bottoms rendered hard, and impervious to the water, by a mixture of chunum and clay. In these parts of Hindostan they frequently cover 100 acres of land. Tanks are constructed either by government, or by rich individuals. In the former case, a tax is levied on the land for their repairs; in the latter, they are kept in repair by the person who constructs them, but, as a compensation, one-fourth part of the lands which receive water from the tanks is given up to him in full proprietary right.

Tanks are very numerous, and some of them very extensive in the Carnatic; where, indeed, from the extreme aridness of the soil, and the want of water from other sources, they are indispensably necessary to cultivation. Some of them occupy an area of eight miles in length, and three in breadth, and contain water enough to supply the lands of 32 villages for 18 months. In the villages watered by one tank, there are 5000 persons employed in agriculture; and at another place, there is a tank which waters 2500 acres. These tanks are made either in the manner already described, or by inclosing deep and low situations with a strong mound of earth. Tanks upon a less extensive scale, for the use of gardens, &c. are lined with stone, and of a quadrangular form. In Malabar, Congo, Wynaad, and in the vicinity of Surat and Bassein, irrigation by means of tanks is carried to great perfection. In the vicinity of Surat, some of the lands watered by tanks are worth about seven or ten times as much in gross produce as the best of those that are only watered by the monsoon.

Wells are also constructed in many parts of Hindostan, at great labour and expense, not only for domestic purposes, but also for irrigating the land. In the elevated and sandy districts of Ajmeer, the wells are from 100 to 200 feet deep, made of brick. In Guzerat, there are a greater number of wells. One is said to have cost nine lacks of rupees; and another is remarkable for its antiquity; appearing, from the inscription, to have been erected in the year 1482. In the sandy soil of this province, which lies to the north of the river Mahy, the wells are from 80 to 100 feet deep; but in the adjoining province of Malwah they are still deeper; the inhabitants being frequently under the necessity of digging to the depth of 300 feet before they obtain a sufficient supply of water.

The machine used to draw water from the wells to irrigate the fields is called a picotah, and is thus described by Sonnerat: "It is a swipe erected on the side of a well, or reservoir for the rain water, to draw up the water, and afterwards to conduct it at pleasure. This machine, equally simple and convenient, is constructed in the following manner: near the well a piece of wood is fixed, forked at the top; in this fork another piece of wood is fixed to form a swipe, which is formed by a peg; and steps cut at the bottom, that the person who works the machine may easily get up and down. Commonly the lower part of the swipe is the trunk of a large tree. To the upper part is fixed a pole, at the end of which hangs a leathern bucket. A man gets up the steps to the top of the swipe, in supporting himself by a bamboo screen, erected by the side of the machine; he plunges the bucket into the well, after which he descends, and by his weight draws up the bucket. Another man attends to pour into the basin, from whence the water flows into the furrow, and is distributed over the whole field. The person who empties the bucket sings, to encourage himself, one, two, three, according to the number he has emptied. When the water in the tank is on a level with the surface of the earth, they use a basket for watering, which is made impenetrable by cow-dung and clay; and is suspended by four cords. Two men hold a cord in each hand, draw up the water, and empty it in balancing the basket." (ii. 132)

Land under water-courses is more productive than land under tanks or wells, in the proportion, in land of the first quality, of 146 to 97; in land of the second quality, of 119 to 86; and in land of the third quality, of 97 to 75.

The dreadful consequences which follow a deficiency of moisture have often been experienced in Hindostan; and the apprehension of these consequences induces the inhabitants to be so extremely anxious respecting the overflowing of the rivers, and the erection of tanks and wells. In Surat, and the neighbouring counties, there was a dreadful famine in the year 1630. In the year 1661, the famine was almost general throughout the Mogul empire; but the most destructive was that which occurred in Bengal in the year 1770. The crops of December 1768, and August 1769, were both scanty, and hardly a drop of rain fell in October 1769, which caused an almost total failure of the third crop of rice. The refreshing showers which usually fall between January and May, and on which the intermediate crops of inferior grain depend, also failed: the heat was insufferable. Upper India suffered nearly in an equal degree with Bengal, and consequently could not send any supply of rice. Famine began to appear in November 1769, and before the end of April 1770, rice rose to ten prices, and even then could scarcely be had: the roads and streets were filled with the dead and dying; the inhabitants fed on forbidden and abhorred animals; the child on its dead parent, the mother on her child. The number who died in Bengal at this period may be estimated at three millions. In the same year, nearly one half of the Midnapoor district of Orissa were swept away by famine. The coast of Coromandel, perhaps, suffers more frequently under this calamity than most other parts of India; and in an especial manner the Carnatic, in consequence of its sultry climate, sandy soil, and irregular and inadequate supply of water.

In India, the ground under the wet cultivation brings forth crops almost all the year round; the first crop of rice is gathered in about the end of August, the second, which is the greatest, early in the end of April. Even on land which is not under the wet cultivation, there are two harvests. Kheerisf, in September and October, and Rubbeef, in March and April. In the province of Agra, the following are the principal articles produced in the spring harvest. Wheat, vetches, barley, adess, a species of lentil, linseed, maaseer, arzewara, a kind of millet, mustard, peas, fenugreck, shaly-kour, a particular kind of rice; pot herbs, ayewain, an inferior kind of onion-seed, onions, carrots. In the autumn harvest, common sugar-cane, shaly muskur, common rice, mash, mowng javar, a kind of pea, shamath, a grain resembling poppy seed; gall, a grain resembling mustard; hederissa, sesame, a grain of which oil is made; tureyah, a small grain resembling mustard; turmeric, water melons, pot-herbs, moroth, lisderah, arzan, a kind of millet, koree, indigo, cotton. The average produce of the spring harvest is about three maunds one seer; a maund is about 74 lbs. and a half; and a seer nearly 2 lbs.; and the average produce of the autumn harvest is about 3 maunds 6 seer per begah. This is about the common produce of land in the Company's service. Hence it appears that the produce of the two harvests is about 25 maunds 24 seers per acre, or nearly four quarters. Besides the grain, &c. above enumerated, there are cultivated on those lands which have a regular spring and autumn harvest, bhootsh, which flowers in July, and is reaped in August and September; congree, panicum italicum, which flowers the end of July; murhua, the raggy of Mysore, natcheny in the Carnatic, and maud or mal, in the upper provinces; cynosurus coracanus; bagira, holcus spicatus, this is reaped in both harvests; beertia, a species of panicum; these belong to the autumn harvest. In the spring harvest, channah, cicer arietinum; torr, or arber, cytysus cajan; this is sown during the rains mixed with the javar; and when that crop is reaped, it stands till the wheat harvest.

It will be seen from this account of the different kinds of produce in the spring and autumn harvests, that in the latter are reaped most of the European grains. As it would carry us far beyond our limits, we shall, in our further notice of the agriculture of Hindostan, confine ourselves to such articles as are known in Europe, beginning with those which are most generally cultivated in that quarter of the world.

Wheat is principally cultivated in Hindostan Proper, and in one or two provinces of the Decan; but the climate to the south of the Decan is much too hot for it; nor indeed is there much demand for it, in consequence of rice being the favourite and almost universal food of all classes in Hindostan. From Allahabad to the frontiers on the north, wheat is the principal object of the farmer's attention. It is sown on the sandy loams, which are ploughed once, about the commencement of the rainy season in June. After the rain ceases, it is ploughed repeatedly again, sometimes fifteen times. In September or Octotober it is sown. When the dry season begins, it must be watered: it requires four bullocks and three men to water an acre in nine days. The average crop is estimated at fifteen maunds per begah, or seven quarters per acre. In the Benares district of Allahabad, the Ryots, or husbandmen, are very industrious in the labour they bestow on their wheat and other crops. It is not unusual for them to plough by moonlight, and for some crops they plough the land forty times. Barley, peas, oil cakes, and a plant affording a yellow dye, are often mixed with the wheat in Allahabad: the last is generally planted at the distance of six or ten feet. The wheat of the province of Bahar, especially that part of it which is watered by the Ganges, Soane, &c. is of a superior quality to that which is usually grown in India: that perhaps of the worst quality is grown in the Dinagepoor district of Bengal. The flour produced from it is very dark, and scarcely saleable among Europeans. Guzerat is famous not only for the quantity, but also the quality of the wheat it produces, especially on the rich black soil near Wurgaum. From this province the Europeans in Bombay are principally supplied with wheat. Barley is a most abundant crop in all the upper districts of India, where it is made into thin cakes by the natives. March and April are the harvest months for wheat, barley, and the grains, &c. which are almost always sown in the same field with them. As there is a very great and almost universal demand for vegetable oil among the natives of Hindostan, such plants as produce it are cultivated most abundantly in both harvests, mixed with other crops. Flax and mustard are generally sown along with wheat and barley for this purpose; and as they ripen first, they are pulled from among the wheat and barley. The latter are reaped together; but are necessarily much injured by pulling out the flax and mustard, and still more so when the plant affording the yellow dye is also sown in the same field. The produce of these grains is also diminished by their being often permitted to stand till they are over-ripe. In some parts of Hindostan Proper, where pasture for cattle is scarce and bad, the wheat and barley straw will sell for as much as will pay the rent.

Rice is cultivated much more extensively than any other crop in India: indeed there are very few provinces in which it is not the most prevalent crop. There seem to be three kinds of it in the south of India: the first is reaped in September; the second in December and January; and the third in March or April. But in most parts of India there are only two kinds; the common rice, and that kind of which the grains are very white and small, with an excellent aromatic taste. There are three modes of sowing this grain practised throughout India generally. According to one mode, the seed is sown dry on the fields which are to bring it to maturity: this is called the dry seed cultivation. By the second mode, the seed is steeped in water till it vegetates, and the field in which it is to be sown is watered till it becomes a kind of puddle; this is the sprouted cultivation. The last mode is by transplantation. A piece of rich ground is selected, in which the seed is sown; and as soon as the plants have attained the height of a foot they are transplanted. The means used to sink it to the bottom of the field, which is covered with water, are very simple and effectual. "A small ball of clay is formed around the root of each stalk, to carry it perpendicularly to the bottom, and to secure it nourishment, till the roots, by spreading, procure a more liberal supply." Tennant, xi. 126. The first mode is necessarily confined to the higher grounds; the other modes are followed on such lands as lie low, and can be easily watered. The Ryot is determined with respect to his time of sowing rice, by observing its natural seasons. In a wild state, it sows itself in the first month of winter, and at the approach of spring begins to appear above the ground: it ripens during the rainy season, and drops its seed at the beginning of winter. But, in order that he may have two crops of this necessary and valuable grain, the Ryot sows it not only at its natural period of vegetation, but also during the second month of the rainy season, that he may reap a second harvest at the beginning of winter. In those parts of Hindostan Proper, where rice is cultivated on good land, well managed, five quarters per acre are deemed a large produce, or a return of fifteen for one on the seed. In some parts of Mysore, the first quality of land will produce from 47 to 49 bushels; the second from 35 to 42; and the third from 17 to 24 bushels of rice. Two crops of this grain are very seldom grown on the same field in one year. In the northern parts of the province of Cochin, however, the rice grounds, which lie in narrow vallies extremely well watered, enable the cultivators to raise two crops annually on them. This is also the case upon land of the best quality in the Rungpoor district of Bengal; two crops of rice being obtained in the year, besides an intermediate one of mustard seed. In the Vellater district of the province of Malabar, there are a few remarkable spots of land watered by perennial streams, which produce three crops of rice annually. Where it is necessary to use artificial means to water the rice, the rice fields are divided into squares of 100 or 120 yards, round the sides of which there are borders so high and firmly constructed as to keep in a sufficient quantity of water: furrows are made from one square to another, by which the water is, without much labour, carried all over the rice field. At harvest, it is cut with a sickle; nearly four feet of the straw is left on the ground, in order that it may rot and serve as manure. It is made into sheaves, which are beat on the ground as a substitute for threshing; but as all the grain cannot thus be got out, the sheaves are again beaten with a bamboo to obtain the remainder. Rice is cleaned with a wooden pestle and mortar; and this operation, like all the other operations connected with husbandry, is paid for in produce; the person performing it binding himself to deliver back five-eighths of the weight, in clean rice, receiving three-eighths with the husks for his labour. It is afterwards scalded in hot water; spread out on mats to dry in the sun; and afterwards deposited in *patagas*, or granaries built of teak wood. As it is of the utmost importance to preserve rice in cases of scarcity or famine, the East India Company several years ago erected a very large granary at Patna for this purpose. "It is a building of stone, in the shape of a bee hive, with two winding stair-cases on the outside, which have been ascended on horsback: by those stairs the grain is poured in at the top, there being a single door at the bottom to take it out; the walls at the bottom, though 21 feet thick, have given way. It cost 120,000 rupees; but notwithstanding the expense of erection, and the size of the building, it would not be of much use even if it were kept constantly filled, as it would not contain one day's consumption for the inhabitants of the province of Bahar, in which it stands. The district of Dacca Jellallpoor is deemed, from the immense quantity of rice which it produces, the natural granary of that grain for all the rest of the province of Bengal.

Maize is little grown, except in the western provinces of Hindostan Proper, on the poorer soils and hilly grounds. Millet is much more extensively cultivated; there are several varieties of it; though a small eared grain, it furnishes a great quantity of straw, 10 feet long, which is used as provender for the cattle. The Doab is particularly distinguished for its culture of millet. Some of the oil plants have already been mentioned; but besides mustard and flax, there are sesamum, &c. some of which occupy the cold season, and others ripen soon after the rains. The crop of raggy, in the south of India, is by far the most important of any raised in the dry field, and supplies all the lower classes with common food.

Flax is not cultivated in any part of India for the purpose of manufacturing into linen, but only for its oil; and the common hemp is grown only, that an intoxicating liquor called *bang*, may be made from it. But *sunn*, hemp, has lately been cultivated at Luckipoor, Chittagong, Commercolly, Buddaut, Dacca, Malda, Cuttorah, &c.; the best and finest is that of Luckipoor, which by experiments has been proved to be considerably superior in point of strength to Petersburgh hemp; all the rest, except the Cuttorah, are also superior in this respect to Petersburgh. The Concan district of the province of Bajapoor is also noted for the excellence of its hemp.

Sugar has probably been cultivated to a considerable extent in Hindostan from time immemorial: the name of Gaur, the ancient capital of Bengal, a city highly celebrated in Hindostan antiquity, is apparently derived from *gur*, which, both in the ancient and modern languages of India, signifies *raw sugar*; and that the inhabitants of India have long understood the mode of manufacturing it, seems evident, from the circumstance, that the name given to the manufactured produce, in all the European languages without exception, as well as in the Persian, Greek, and Latin, is derived from the Sanscrit term for manufactured sugar, *Sarcara*. It is at present cultivated to a great extent in almost every part of India; in Hindostan Proper, it thrives best in the districts of Benares, Bahar, Rungpoor, Berbpoom, Burdwan, and Midnapoor; in fact there is scarcely a tract of land under the Bengal presidency, from Benares to Rungpoor, and from the borders of Assam to Cuttack, in which it is not cultivated to a considerable extent, and with great success. If we proceed farther south, we shall find it an object of great attention, and the source of much profit in the Delta of the Godavery, and in the Zemindaries of Peddapoor and Pettipoor, along the banks of the Elyseram river, in the northern Circars. In the neighbourhood of Cudapah, in the ceded districts, the sugar cane is also grown to a great extent. In short, wherever the soil is fit for this crop, and agriculture has made any advances, it is cultivated more or less in Hindostan. As it requires a soil of great fertility, it is not cultivated on the same ground a second time, till after the intervention of two or three other crops; and such soils as are fit for it let at a very high rate. One acre of sugar cane will yield on an average about ten candy of sugar, each candy weighing 500 lib.: but the sugar cane, especially that of an inferior quality, is also made into the inspissated juice called jagary, and of this an acre will produce more. The annual produce of 1100 acres in the Zemindaries of Peddapoor and Pettipoor is 44 cwt. per acre; consequently their whole produce will be 27 hogsheads of 18 cwt. each, which is about one fourth part of the produce of Jamaica. The cane is planted in January, on land which has been either manured, or prepared by a fallow, or the growth of leguminous plants: it must be watered repeatedly before the rains set in: in about ten months from the time of their planting, the canes are ready to cut. The apparatus for making the manufacturer's sugar is very simple, consisting of a mill erected in the field, or earthen or stone mortar, and wooden pestle, turned by two bullocks, boiling pots of common earthen ware, and boilers of country iron plates rivetted. Six pounds of juice will yield one pound of sugar from good canes. The refuse is given to cattle, or carried away by the labourers: the sugar harvest in Hindostan, as in the West Indies, is a joyous and busy season.

Cotton is another of the agricultural productions for which India has been celebrated from the most remote times: its manufactures of cotton of extraordinary whiteness are expressly mentioned by Arrian, &c. It is cultivated very extensively, but of a better quality, as well as in greater abundance, in some parts of Guzerat, Bengal, the Mahratta districts, the district of Tinnevelly, the vicinity of Surat, and on the coast of Coromandel, the soil and climate of which particularly suit it, than elsewhere in Hindostan. The cotton grown near Ahmood in the province of Guzerat is perhaps the finest of all; the fibre is extremely delicate, but the staple, as is the case with almost all Indian cotton, very short. The cotton grown near Nagpoor, in the province of Gundwana, is also in great repute; considerable quantities of it are brought for the supply of the Bengal manufacture to Midnapoor, which is the great depot in this part of India for cotton. In those districts of Guzerat, which lie near the Gulf of Cambay, the cotton is of good quality, but perhaps not equal to the Ahmood cotton: it is sown here on fallowed spots, along with rice, the latter being reaped at the beginning of the rainy season, while the cotton stands. It is a precarious crop, as either too much or too little rain destroys it. On the banks of the Jumna its cultivation is an object of great attention; indeed the demand of the Bengal market is so extensive and regular, that the growth of this shrub must always be profitable in every district, with a proper soil, within the reach of that market, especially as Bengal itself, with the exception of its more eastern tracts, in which a fine sort of cotton is grown for the most delicate manufactures, does not supply nearly enough of fine cotton, nor even a sufficiency of the coarser kind, though they are cultivated in every part of the province, interspersed in fields of pulse. Cotton, as it is disposed of by the cultivator, is called *kopass;* when divested of its seed, which is on an average full three-fourths of its weight, it is named *rooee.*

As there can be little doubt that indigo is the same as the indicum of the ancients, we may reckon this plant as another of the agricultural productions of Hindostan, cultivated from time immemorial. The great demand for indigo from Hindostan, in consequence of the devastation of the plantations in the island of St. Domingo, which formerly yielded a produce nearly equal to that of all the other West India islands, has of late years very much increased the cultivation of it, especially in the British provinces under the Bengal presidency; but the culture of it by the natives has not improved, notwithstanding the increased demand, and, at first, the consequent increased price. The quality and quantity of the produce depend nearly as much on the nature of the soil, as on the mode of cultivation. In the Dooab the soil is so favourable to this plant, that what grows there in a wild state is of superior quality to that produced by cultivation. The soil and cultivation of the Benares district are also extremely favourable to indigo; but perhaps there are few spots of equal extent, in which it is grown to a greater extent, than in the vicinity of Mowdy Ghaut in the province of Agra; from this place there was sent to Europe, from one manufacture alone, in the year 1798, 800 maunds of 80 lib. each of manufactured indigo. We have already adverted to the stimulus which was given to the cultivation of this plant by the state of St. Domingo: As a proof of this, we may mention, that at the sales of the East India Company, in the year 1786, only 245,011 pounds of manufactured indigo were sold: in 1807-8, the total manufacture of indigo in the Bengal presidency amounted to 8 800.000 libs.; and in the year 1810, the total quantity of indigo, British property, which was sold at the East India Company sales, amounted to upwards of five million pounds weight. See INDIGO.

The poppy, *papaver somniferum*, is chiefly cultivated in Bengal, Allahabad, and Bahar. It is a very uncertain crop—the produce of an acre varying from 20 lbs. to 40 lbs. It also requires much labour in the cultivation, and in the gathering of the juice, which is afterwards evaporated into opium. Besides between 20 lbs. and 30 lbs. of the opium itself from an acre of land, the cultivator obtains about 40 lbs. of poppy seed, and frequently from the same land a crop of pot herbs, or some other early vegetables or grain. In Bahar, the cultivation of the poppy, and the manufacture of opium, are carried on so extensively, that 4000 chests of the latter may be exported annually; but it is a general complaint in Europe, that in this, as well as other provinces of Hindostan, the opium is frequently adulterated by a mixture of cow-dung, an extract from the leaves and stalk of the poppy, the gum of the mimosa, and other substances. It is said, that opium of an excellent quality is made from the poppy's gum in some parts of Northern Hindostan. In the ceded districts of Mysore, poppies are cultivated not only for the purpose of making opium, but also for the sake of their seed, from which, when ripe, an intoxicating liquor, called *post*, is made, that is much drunk for inebriation both by the Mahomedans and Hindoos. The opium made from the poppies grown in Malwah is deemed much inferior to that of Bengal, and is almost always adulterated with oil and other substances. In some of the provinces in the south of India, the poppy is cultivated almost entirely on account of its seed, which is mixed with the sweet cakes that are eaten by the higher ranks of the natives.

Till lately, it was rather supposed that the tobacco plant was indigenous in India; but Major Rennell has shewn that this notion is erroneous, as there are in existence proclamations issued by the Mogul emperors, especially one by the Emperor Jehangire, in the beginning of the 17th century, in which tobacco is mentioned as "a pernicious plant, introduced by Europeans." Besides the names by which it is known in Hindostan, even the Sanscrit names do not occur in old writings, and are evidently corruptions from the European term. Tobacco is now cultivated in almost every part of Hindostan, especially in the northern and western provinces of the presidency of Bengal, in Malwah, the northern circars, &c. In the southern provinces of India it is not so commonly grown. The district round Bilsah, in the province of Malwah, belonging to Scindiah, is highly celebrated all over India for the excellent quality of its tobacco, which is in great demand, not only for home consumption, but for exportation. Such, however, is the indifference and indolence of the natives, that this high character and great demand does not appear to have stimulated them to extend the cultivation of this plant; they prefer the risk of injuring their trade, by mixing inferior tobacco with genuine British, or substituting the former entirely in the room of the latter. The tobacco grown in the Rungpoor district of Bengal, though by no means equal to that of Bilsah, is of good quality, and remarkably cheap: the southern and eastern districts of this province are principally supplied from Rungpoor. In the vicinity of Baroach, in Guzerat, tobacco must be a productive crop, as a biggah of land planted with it yielded a nett revenue to the government of 20 rupees; whereas, according to Mr. Tennant, in the northern and eastern provinces of the presidency of Bengal, "between 16 and 20 maunds of tobacco are reckoned a medium produce from three biggahs," and the value of each maund is only a rupee.

While the crops are growing, such as require it are watered, and they are generally hoed, but by an implement which would be of little service, even if it were more industriously and skilfully used than it is by the Hindoos. In order to protect such of them as are liable to the depredations of the birds, watchmen are placed at the different corners of the fields. During the dry season they stand upon a pillar of clay, about ten feet high, which they exchange for a scaffolding of wood, with a roof of straw, as soon as the rainy season commences. These watchmen are provided with a sling; but in consequence of the abhorrence which the Hindoos feel to the shedding of blood, they seldom or never use it, contenting themselves with bellowing, that they may terrify without hurting the birds. Maize, and some sorts of millet, when nearly ripe, require to be watched, not only during the day, but also at night, from the large kinds of bats, which would otherwise destroy the crops.

Harvest operations are performed in India in a very slovenly and imperfect manner. This arises in part from the practice already adverted to, of intermixing a great variety of crops, which ripen at different periods in the same field; and partly from the indolent habits and the ignorance of the natives. The Hindoo peasant, in Hindostan Proper, is little able, with his body almost naked, to bear the inclemency of the morning air, at the period of the spring harvest; and he is as little willing, when the weather is more favourable, to exert himself. They also want method and regularity in conducting this business; and their sickle, like all their other agricultural implements, is very rude, and very small; with this he picks out the ripest plants. In his other hand he holds a rope, with which he ties up and carries home all that he cuts down in the course of the day. His wages consist of the tenth of the coarser kinds of grain, and the twentieth of the finer kinds. The sheaves by which he is to be paid are selected alternately by the reaper himself and the Ryot. When the season is far advanced, an ultimate and positive order to the Ryots for reaping the harvest is issued in the northern circars, which is called *dumbalah deron*, literally, taking or seizing by the tail. Corn is very seldom put up in stacks; indeed, the greater part of it is thrashed in the fields, either by the cattle treading it out, or, with respect to the smaller seeds, simply by the staff of the peasant. It is winnowed by being thrown into the air, when there happens to be a little wind; and after this rude and imperfect dressing, is stored up, in Benares, the western provinces, and the south of India, in subterraneous granaries, and in Bengal and other parts, in jars of unbaked earth, or in baskets made of large twigs. If the quantity is very considerable, it is deposited in round huts, the floor of which is raised about a foot or two above the ground. Kilns of a small size, and a very simple construction, are used, in the damper climates of Hindostan, to dry the grain before it is ground. "They are large earthen pots, sunk deep in the earth, and under them is a furnace for fuel. These pots are filled with sand, which are heated almost to redness, when it is taken out, and in this state mixed with the grain. A few minutes in this mixture fits it for grinding, when it is cleared of the sand by means of a sieve." Tennant, xi. 393.

Having thus given an account of the most important parts of the arable husbandry of Hindostan, so far as it is conducted on the nungah and pungah lands, we shall briefly advert to the garden cultivation, and the principal implements by which all the three kinds are carried on, before we notice the pasture husbandry of this country.

The proper garden cultivation is most common, and carried on with the most attention, skill, and success, in the south of India. Near the town of Coimbetoor all kinds of soil are under this cultivation, and the rent varies according to the depth below the surface at which the water stands. In some garden grounds it is within eight cubits; in others, it is not met with nearer the surface than 18 cubits. Such gardens as are watered by machines are called bagait, and are in great request, and pay a high rent; since, from such gardens, a very large produce may be raised with more certainty than from those which are not thus watered. It is calculated, that a garden of 300 acres requires the labour of six people if it be watered from a well, but only three if it be watered from a tank. Many of the crops, which in other parts of Hindostan are grown in the fields, such as sugar cane, tobacco, &c. are cultivated in the south of India in gardens, as are also betel nut, black pepper, cardamons, plantains, &c. In the western part of the district of Soonda, where the garden cultivation is the chief and favourite object of the farmers, these are the common produce; and it is remarked, both here and in the neighbourhood of Bednore, that the garden pippins are of better quality than those which grow spontaneously, in the proportion of ten to nine. In the neighbourhood of Bangalore, in the Rajah of Mysore's territories, the gardens are very fertile, possessing a soil in some places 20 feet deep. Here a gardener is a separate profession from that of a farmer, and is considered of inferior caste.

The vegetable fields, which are common in the vicinity of most large towns, nearly resemble the gardens which we have been just describing. In the south of India, they are in their greatest luxuriance and beauty in the month of November, after the rainy season has ceased. In them are cultivated, among other vegetables, the brinjaal, a species of solaman, which bears a fruit as large as a pear; it is eaten by the natives either baked or made into curry; a plant resembling the holyoak, the seeds of which are soft and mucilaginous, and are much used in soups, &c.; various species of cucumbers, water melons, &c. Such vegetables as are common in Europe are seldom met with in the south of India, where the climate is too hot for them. The potatoe, however, both the common and sweet kind, are grown of an excellent quality near Bombay. Guzerat and Bengal also supply this vegetable in great profusion. The onion of Bombay is famous throughout the East. Orchards of mango, palmira, and other trees, are favourite objects with the Hindoos, who, besides being sheltered by them during the hot weather, and deriving profit from their fruit, regard, with a feeling of veneration and respect, the trees planted by their ancestors.

In the gardens belonging to the Mahomedan princes, which in some parts of India were made at a very great expence, a separate piece of ground was usually allotted for each kind of plant, the whole being divided into square plots, separated by walks. Thus one plot was filled with rose trees, another with pomegranates, &c. The gardens of this sort most celebrated in India were those of Bangalore and Delhi. The former belonged to Tippoo, and were made by him and his father, Hyder Ali. As Bangalore is very much elevated above the sea, it enjoys a temperate climate; and in the royal gardens were seen, not only the trees already mentioned, but also the cypress, vine, and the apple, and peach: both the latter produced fruit. Strawberries were likewise raised; and oak and pine plants, brought from the Cape of Good Hope, flourished. The gardens of Shalimar near Delhi, which were made in the beginning of the 17th century by the Emperor Shahjehan, are said to have cost one million sterling, and seem to have occupied about one mile in circumference. They were surrounded by a high brick wall; but they are now entirely in ruins.

The plough used throughout all India is as rude and imperfect an instrument as can well be conceived. It consists simply of two or three pieces of wood, most clumsily united, or even of a piece of crooked stick, with nothing resembling or serving the purposes of a coulter or mould-board. It is so extremely light, that a Hindoo, a man of no muscular strength, can easily carry it on his shoulder to the field. In Bengal, and generally in Hindostan Proper, it is drawn by a yoke of oxen guided by the ploughman himself. These, however, work only part of the day, as there are always two or three pair of oxen assigned to each plough. In some parts of Orissa, the women are seen holding the plough, and the female children driving the oxen. Where the same person performs both operations, he generally holds the plough with one hand, (for it has but one stilt or handle,) and occasionally pulls the tails of the oxen with the other. A pair of oxen may be purchased for 6 or 8 rupees, a plough for $\frac{5}{16}$ths of a rupee, and a yoke for $\frac{1}{4}$th. In Hindostan Proper, it is calculated that a man and two oxen can plough a bejah of land several times in the course of the day; and in the south of India, that 12½ acres of watered land, and 25 acres of dry land, require five ploughs. In the Zemindary near

Benares, of which Mr. Tennant gives an account, 400 working cattle were kept for 300 acres under the plough. This is a larger allowance per acre than Mr. Grant, in his *Analysis of the Finances of Bengal*, states; for, according to him, ten yoke of oxen are sufficient for the ordinary yearly threefold cultivation of 100 bejahs of ground. Where it is necessary to plough the ground to a considerable depth, several ploughs follow one another; but even then, unless the soil is very loose and friable, they do not penetrate far, and the field remains full of dirt and rubbish. Nor is it rendered much more fit for the seed by the repeated ploughings which are given it; in Bengal, to the number of three or four; in the Mysore, of seven or eight; and in the Benares, sometimes to the number of 30 or 40. Indeed, the grass roots are in general of such great length and strength, and so extremely difficult to kill, even in land that has been long arable, that a much more perfect implement than the Hindoo plough would produce very little effect. In the Mysore, it is not uncommon to see small bushes as firmly and erectly fixed in the soil, after six or eight ploughings, as they were before, and the mould not moved to the depth of three inches. The second ploughing, where only three or four are given, is generally across, and the third in a diagonal direction. The harrow is, if possible, a more imperfect implement than the plough: it is simply a bough broken from the nearest tree. The roller is described by Mr. Tennant to resemble a ladder about 18 feet in length, drawn by two bullocks, and guided by two men, who stand upon it, to increase its weight. When a plough with its yoke and oxen is hired, about 4d. a day is the sum commonly given. In most parts of Hindostan there are two *hulwaries*, or ploughing seasons, namely, after the setting in of the rains in June, and after they cease in October. The wages of a ploughman are five seers of the grain which is in cultivation, and two rupees for each ploughing season. The wages of the other country labourers are five seers of grain, and a 25th sheaf during harvest. The *hackery*, an ill-constructed and clumsy two-wheeled cart, is used by the Ryots of Bengal for some purposes on their farms, where they have not an opportunity of water carriage; but for heavy burdens, to be carried to any considerable distance, oxen and bullocks are most commonly used.

The imperfect cultivation which the arable land in India receives from the plough and other agricultural implements is by no means compensated by the application of manure. The use of it is entirely unknown in most districts, except occasionally for sugar. In the Mysore it seems to be the most attended to. Every farmer in that province forms a dung-hill from the litter, &c. of his cattle, mixed with the ashes and soil of his house; the soil of the town, however, is not used. In other parts of the south of India, if the rice straw left on the field be not sufficient for the purposes of manure, small pits are dug in different parts of the field, which are filled with leaves and the tender twigs of trees, and covered with earth. These, when sufficiently rotten, are applied as manure.

The pasture land of India is in fact nothing else but the wastes, forests, and coarse jungle. Artificial grasses would not thrive, nor even exist, during the hot weather. Even the coarse and natural grass of the country disappears in some places during the prevalence of the hot winds so completely, that the farmers are obliged to feed their cattle on the roots cut from under the ground and washed. The grass cutters, a class of people who are employed by Europeans to procure food for their horses, will bring provender from a field where there is no appearance of verdure, by means of a sharp instrument which they use. During the rainy season, indeed, the grass lands look green, and are covered with various kinds of pasture; but, for the most part, it consists of a hard grass, very similar to what is called *bent* in some parts of England, which is neither relished by the cattle, nor nourishing for them. There are, however, some districts in India, where the pastures are abundant and nutritious. In the north-west quarter of the province of Delhi, and partly in the northern extremity of the province of Ajmeer, there is a jungle called the Lacky Jungle, which is celebrated all over Hindostan Proper for the fertility of its pasture lands, as well as for its excellent breed of horses, which, originally good, have been much improved by Persian horses introduced at the invasion of Nadir Shah and Abdalli. This jungle, which forms a circle 40 miles in diameter, is bounded on the north by the country of Roy Kellaun, on the east by Hurianeh, on the south by Batneer, and on the west by the Sandy Desart. The Poorneah district of Bengal is also distinguished by the extent and fertility of its pasture land. The excellence of the bullocks of Guzerat, which has already been adverted to, is in some measure owing to the richness of its grass in those parts of the province particularly which lie near the Run, one tract of land in this district being emphatically called Wuddyar, which term, in the language of Guzerat, signifies a herdsman, and designated the original inhabitants of the borders of the Run. Immense herds of cattle are sent to pasture here. The table land of India, especially the Mysore, from its elevation and consequent coolness, is favourable to the production of those grasses which are most nourishing to cattle; and its pasture lands are accordingly extensive and rich.

The pasture lands of India, such as we have described them, are used for the grazing of the cattle that are kept for labour, subsistence, breeding, and the dairy, and for the feeding of sheep. Such cattle as are for labour are confined to the patches of grass that are intermixed with the arable land: the other cattle, as well as the sheep, are allowed to wander in the forests, &c. In either case, it is necessary that they should be watched, and prevented either from injuring the arable land, or going astray. For, in many parts of India, the only fences consist of a low bank. In some parts of Delhi and the adjoining provinces, indeed, the strong jungle grass is plaited into a kind of basket work, which is carried along the sides of the field to protect the grain from the cattle. In Guzerat, the fields are divided and protected by dry stone walls; and in the south of India, fences of the milk bush are not uncommon. Besides the shepherds who have fixed residences, there are found in many districts of Hindostan Proper, shepherds who come from the country of the Batties in search of employment. They are scattered all over the Punjab and the high grounds to the east of the Indus. The herdsman is in every case a person attached to the farm on which he is employed.

Milk, ghee, and cheese, are the produce of the cows and female buffaloes. In various parts of Guzerat, Cutch, and the Decan, there is a particular tribe, whose chief employment is selling milk and day-labouring. In the provinces of Hindostan Proper, it is calculated that the produce of each cow, annually, is nearly 1500 maunds of milk; and that one maund will produce 2½ seer of ghee or clarified butter. Ghee is made of butter which is kept for two or three days; in this time it becomes rancid, after which it is melted in an earthen pot, and boiled till all the water has evaporated; it is then poured into pots, or leathern jars, and kept for use. Some cheese is made in Guzerat, and other provinces in Hindostan Proper, but it is of very inferior quality. The wool of the sheep is of little value, except in those districts where the climate requires clothing warmer than that which cotton will supply; in those districts the sheep are generally shorn twice a year, once in the cold, and once in the rainy season; it is calculated that 12 sheep will furnish wool sufficient to make a blanket six cubits long and three wide.

In discussing the nature of the landed tenure in India, we incidentally noticed some particulars relative to the condition and circumstances of the Ryot or husbandman; it will be proper, however, before we close this chapter, to attend to this subject more directly, and rather more fully.

In Hindostan Proper, the Ryots hold their lands either directly from the zemindars, or from the talookdans; the latter are of two sects; some of them pay the rent, and account for the collections they make from the Ryots to the zemindars; others to government: the latter are called independent talookdans, and are in fact only petty zemindars. The poorest Ryots are, by the custom of the country, considered as a sort of proprietors, entitled to a perpetual lease; they are attached in the strongest manner to the soil, and never migrate but in cases of absolute necessity. Waste and jungle land, if low and fit for rice, can be brought into cultivation in one season, and the poorest Ryot can undertake it; he can with ease cultivate 16 begars of rice, and supposing the half to go for rent, the remainder will afford food for four or five persons. Such was the state of the poorer Ryots before the British acquired a permanent and extensive footing in Hindostan Proper, under such zemindars as were just and equitable landlords, and regulated their conduct toward their tenants by the customs of the country; but the condition of those who rented their land under the generality of zemindars was quite the reverse: agreements, indeed, did pass between the landlords and their tenants at the beginning of the year; but they were commonly broken by the zemindar.

The condition and circumstances of those Ryots, who occupy more land than they can cultivate by themselves and families, and who, of course, are obliged to hire servants, do not appear so favourable. From the produce of their crops they are obliged to give, not only the necessary servants of the farm, high grain wages, as well as money, but also the poet, Brahmin, blacksmith, &c. so that, after deducting from the produce of his land that part of it which they require, and that part which is paid to the zemindar for rent, the share of the Ryot himself will be but small. It should be observed, however, that his whole stock is small; in the district about Allahabad, it does not amount to eight rupees, exclusive of the value of his cattle. The cultivation of the province of Bengal, according to Mr. Grant, does not require a greater agricultural stock than a crore and a half of rupees.

The preceding observations apply to the cultivators in Hindostan Proper: those in the south of India, especially in those provinces which were least affected by the Mahomedan conquest, are in a better condition. The Ryots here hold directly under the government, or rather pay rent as revenue to government. Districts are divided into villages, and each village is under the management of a Potail, or head farmer, in what are called the sixteenth villages, from the land and rent being divided into sixteenth shares. All the Ryots assemble to fix their respective rents, a little before the season when cultivation commences: the amount of the agricultural stock possessed by each individual, the quantity of land, its probable produce, are ascertained, and the rent is then fixed; and such a portion of land assigned to each person as he has the means of properly cultivating. In other parts the custom is different, and the rent is fixed by the agents of government; these set out on their circuit in September or October, when the early crops begin to be reaped, and the late ones to be sown: if the cultivation is the same as last year, and no failure occur among the Ryots, there is no alteration in the soil: if waste land has been brought in, the full rent is not exacted for three or four years, according to its previous state: if it appears that some of the Ryots, from the failure of their crops, cannot pay their rent, the loss, or a part of it, is sometimes assessed upon the others; but this is seldom done. When the land is in cultivation, and its rent has been ascertained, the collector gives every ryot a *puttah*, with his signature, in which every field he holds, and its rent for the year, are inserted. In most villages the greatest part of the ryots hold the same fields several years. During the intervals of the rents of the collectors, the agricultural concerns of the village are regulated and overlooked by a complete establishment of hereditary revenue servants. A district paying a rent or revenue of 50,000 pagodas usually contains about 100 villages, some of which pay not more than 100, and others as much as 5000 pagodas, annual rent. The general direction of the cultivation, and the collecting of the rent, is the duty of the Potail, or head farmer; the accounts are kept by the Curnum. As soon as the season for ploughing begins, the Potail ascertains what land each Ryot can cultivate; and if any are desirous to relinquish part of their farms, he gives it to another. In the early part of the season, the Tehsildar goes round the district; his duty is to regulate cultivation in those villages which are mismanaged, through the neglect or incapacity of the Potail, and to make advances to the poorer Ryots for the purchase of seed, ploughs, or cattle: he goes round again when the crops are ripening, to see their condition, and to ascertain whether the quantity of land actually cultivated is more or less than that which the Ryots had engaged to take. None of these, however, have power to fix the rent; this is done exclusively by the collector; but the Potail assures the Ryots that the rents will remain the same, unless some alteration should appear to be indispensably necessary; they are satisfied with this assurance, receive betel from him as a confirmation of it, and yoke their ploughs.

Among the Mahrattas, when a Ryot once rents a piece of land, he can never leave it, nor even relinquish a part of it. If he were to be deprived of the assistance of his children, or such relations as cultivated it with him, he must still continue to hold it, and pay his rent as usual. Even the widows are obliged, after the death of their husbands, to engage for the usual quantity of ground.

The Brahmins have been already noticed as the proprietors of villages in the south of India. In the Carnatic they also rent a considerable quantity of land; but they will not hold the plough, nor perform any other part of the labour necessary for its cultivation. The inferior castes, particularly the Sudras, are obliged to cultivate them, and are in fact their slaves. There are, however, some Sudras who rent farms on their own account, which they cultivate, either by their own labour, or by slaves. The Mahomedan farmers in this part of Hindostan are not numerous: their agricultural labour, in general, is performed by slaves. The Haiga Brahmins, who live in the province of North Canara, above the Ghauts, differ from the Brahmins in most other parts of India; for they are very industrious, and perform all agricultural operations with their own hands.

The agricultural labourers in Hindostan are either such as work for hire, or slaves. The condition of the former, as has been already remarked, is by no means unfavourable. His money wages, indeed, are low. In Bengal, where a ploughman is hired by the month, he receives one rupee, in some parts only half a rupee for that period; but, in addition to this, he has an allowance of grain, and at his leisure hours cultivates some land, which he rents from his master at a payment in kind. A herdsman receives, in food, money and clothing, about one rupee and a half per month. The wages of the other labourers are chiefly in kind. In the neighbourhood of Seringapatam, the hire of farm labourers is six rupees per month; but in the country, at a distance from any large town, it is much less. On the Malabar coast, agricultural labour varies from two rupees to six rupees a month. Such a comparatively high rate, however, it should be observed, includes the value of all that the labourer receives in kind. The average price of agricultural labour in the ceded districts is about two rupees a month; and this, indeed, seems to be about the average of Hindostan, independent of allowances in kind. If, therefore, the very low price of all commodities in Hindostan be considered, and it be further taken into account, that the agricultural labour requires very few of them, we shall be disposed to regard their situation as by no means uncomfortable.

The slaves who labour the farms in the south of India are the absolute property of their lords; but they are not like the slaves in Russia, &c. attached to the soil: they may be sold or transferred to any person their master may think fit. Children may be separated from their parents, but a husband and wife cannot be sold separately. In the district of Palighaut, in the province of Malabar, where the greater part of the labour of the field is performed by slaves of different castes, a young man and his wife will sell from *6l. 4s.* to *7l. 8s.*; if there be children, the value will be increased according to their number and ages. They live in temporary huts, formed of the bamboo and other wood, something like large baskets, which they erect for themselves. The personal labour of the wife is always at the disposal of the master of the husband; the master of the girl having no authority over her, so long as she lives with the slave of another man.

The women and children of the free labourers, as well as of the slaves engaged in agriculture, are principally employed in protecting the seed and crop from the birds, in those districts where this is not performed by men.

CHAP. V.

Manufactures—Cotton—Silk—Woollen—Leather, &c.—Saltpetre, &c.—Trade and commerce.

Of all the various manufactures carried on in India, that of cotton claims our first and most extended notice, on account of its antiquity, of its being the staple and most common manufacture of the country, and of the variety of the fabrics which it produces. The perfection to which the natives are known, from the most remote times, to have carried the cotton manufacture, must be mainly attributed to the circumstance, that every distinct kind of cloth is the produce of a particular district, in which the mode of manufacturing it has been transmitted for centuries from father to son.

The province of Bengal, and the eastern side of the Peninsula, are the principal seats of the cotton manufacture. The vicinity of Simoga, a town in the Mysore Rajah's dominions, 122 miles to the north-west of Seringapatam, is the limit of the manufacture of cotton to the westward, in this part of India; and, with the exception of a particular kind of chintz made at Poonah, and painted with gold and silver, there are as *fine* cotton cloths made on the western side of the Peninsula. On the eastern side, the Madras investment of cotton piece goods for the East India Company is provided from Cape Comorin and Ganjam, in the Northern Circars, a distance of about 1500 miles. The principal part of this investment is provided in the Northern Circars In Bengal, this manufacture, in almost all its branches, flourishes very extensively. It also extends into the provinces of Oude, Allahabad, particularly the Benares district, Bahar, and Orissa.

There are such varieties in the fineness and other qualities of the cotton goods, especially of the calicoes manufactured in India, that it would carry us beyond our proper limits to particularise each kind; and, indeed, most of them are scarcely known in Europe, or merely known by their Indian appellations. Coarse cotton cloth is manufactured in different parts of the province of Agra. In the centre of the Doab, there is a kind very coarse and common, which is dyed red with cheap materials. The coarsest sort of blue handkerchiefs are manufactured near Calcutta. The greater part of the return cargo carried annually from the northern parts of Bengal to Bootan consists of coarse cotton goods, which are the staple commodity of Rungpoor. The cotton goods made in the more southern parts of India, in general, are not coarse, though there are goods of this description manufactured in the Northern Circars, both to the north and south of the Godavery: these are either plain or coloured with chay root, which grows in most perfection on the pure sands annually overflowed by the Krishna. There is also a manufacture of coarse cotton cloths at Arcot.

Dacca, in the eastern quarter of the province of Bengal, has long been celebrated for the manufacture of the finest muslins. In this district there is grown a kind of cotton, called Banga, which, though not of a very superior quality, is necessary to form the stripes of such muslins; and this circumstance may have contributed to the perfection of the fabric at Dacca. The manufacture, however, is in a declining state, owing to several causes. Before the fall of the imperial government, those delicate and beautiful fabrics were held in such estimation, not only at the court of the emperor, but amongst all the higher orders of nobility in India, as to render it a matter of difficulty to supply the demand for them. The almost entire cessation of this demand must have greatly contributed to injure this manufacture. But, besides this cause, another must be sought for the perfection to which the muslin manufacture of Britain has recently been brought. In consequence of the falling off in the demand, many of the families who possessed the hereditary knowledge of manufacturing these very fine muslins have given up the business. So minute is the labour bestowed upon them, that a weaver will require five or six months to execute a piece. Besides those very fine muslins, plain muslins of an inferior quality, as well as flowered, striped, and checkered muslins, are manufactured in the district of Dacca, and in the northern parts of Benares. The manufacture of muslins in pieces, chiefly for turbans, is carried on to a great extent in the Cuttack district of Orissa. Dimities of various kinds and patterns, and cloths resembling diaper and damask linen, are made at Dacca, Patna, Taunda, and other places. Chintzes are manufactured principally in the district of Benares, and in the country around Patna and Calcutta; in Hindostan Proper, and at Masulipatam in the south of India. This last place has long been famous for this kind of manufacture, which is in great demand at Bombay and in Persia. Masulipatam and Madras are also celebrated for their palampores, the ground-work of which is formed of the plain long cloth, chiefly wrought in the island of Nagur and its vicinity.

The first process necessary to prepare the cotton for being manufactured is, to separate the wool from the seed;

the cotton encircles a black seed, and advances perhaps half an inch upon it. To separate them, the natives of Hindostan make use of three cylinders that go different ways. As these move closely together, when the cotton is introduced between them, the wool is drawn out, and the seed is left behind. This simple machine is found in every house, and is worked either by the spinner, or even by children. The second process is performed by a sort of bow, something like what the hatters use in Europe to prepare the wool for making hats. One end of this is fastened to the ceiling; the workman holds it by the middle, while, at the same time, with a piece of wood that has a pad at the end of it, he stretches the cat-gut string of the bow. This, by its elasticity, beats the cotton, separates the dust and seeds that may remain after the first process, swells it out, and, in short, answers the purpose of carding, and puts it in a state to be spun. It is remarkable, that this process is performed, in a country where there are so many species of Hindoos, by Mahomedans, called Choulias, of the sect of Ali. They are of Arabian descent. There are one or two such persons in every village of the Northern Circars, who performs two operations, that of cleaning cotton, and of spinning the warp.

The spinning of the cotton thread which is to serve for the weft is the occupation of the females of almost all the castes, except the Brahmins: but particularly of the cultivating caste, and of such families as are in decayed circumstances, and, having few means of employing themselves, from the secluded nature of their mode of life, derive from this occupation the supply of their few and humble wants. The spinners purchase the cotton which they may require weekly, at the market; and "this is done in so simple a style, and with so much attention to economy, that the weaver, perfectly well acquainted with the price of the raw material, seldom affords to the spinner more than he thinks a just return for the labour of the week: and that matter is so well understood among the weavers generally, that no weaver, for the sake of getting a larger quantity of thread, will outbid his neighbours in the purchase of it."—*Evidence before the Select Committee as to the affairs of the East India Company.*

The weavers live entirely in villages; and on the coast of Coromandel, and in the province of Bengal, which, as we have seen, are the chief seats of the cotton manufacture, there is scarcely a village, at a short distance from the high road, or a principal town, in which every man, woman, and child, is not employed in making a piece of cloth. As the thread is laid the whole length of the piece, the weaver is under the necessity of working in the open air. In the morning he fixes his loom under a tree before his house, and in the evening he takes it home. It consists merely of two rollers, placed on four pieces of wood, which are fixed in the ground, and two sticks which traverse the warp. One of these is supported by two strings tied to the tree under which the loom is placed, and the other by two strings fastened to the foot of the weaver. By means of these he can easily remove the threads of the warp when he is throwing the woof.

The weavers are of a respectable caste, and many of them are cultivators of land. The demand for their work has greatly increased since the British gained possession of Hindostan, in consequence of the large investments of the East India Company. As soon as an order for the investment from the Court of Directors arrives in India, the Board of Trade there makes a calculation of the sums required for the providing of the goods allotted to each factory. Under the Madras presidency there are eleven factories, most of which provide distinct kinds of goods. It is calculated that all these factories are capable of producing goods to the amount of 24 lacks of pagodas, or one million sterling. The actual demand varies from 5 lacks to 24. If the weavers do not live near a factory, native agents are employed to engage them, convey the money to be advanced to them, bring the goods in, and save the Company from all risk. Where the weavers live near a factory, the contract is made with them directly; and it is not uncommon for all the weavers inhabiting a village, perhaps to the number of 100, to become security, conjointly, for the due performance of the contract which is entered into by each. An advance in goods or money is always made to the weaver, and this he retains in his hand till three-fourths of his contract are completed; the original advance, if in cotton, is then worked up. There are four kinds of goods, for each of which there is a standard price; and if, on inspection, any are found, from deficiencies in length or breadth, or inferiority of quality, not equal to the first class, they are reduced to the second, third, or fourth, with the difference of 5 per cent. between each number. It frequently happens, that a weaver, after getting his advance in money, resorts to the weekly markets all over the country to procure materials for his web, and after having procured what will suffice for one piece of cloth, he spends the rest of the money in a cock-fight, or any other species of gambling that is going on in the market. The practice of making advances to the weaver has existed ever since the establishment of the East India Company. If the weaver does not deliver in his goods at the periods specified in the contracts, a peon is placed in his house, who receives subsistence-money, at the rate of one *ana* per day from him; it was a prevalent practice under the native governments to place peons. The monthly profits of the weaver vary from three to five rupees, according to the price of thread, the quality of the cloth manufactured, and his own industry, experience, and skill.

The goods are generally bleached at the station where they are manufactured. The waters of the Nerbuddah are said to possess a peculiar property of bleaching cloths to a pure white. Most of the pieces are twice bleached. Others are not bleached at all, but are dipped in cocoa-nut oil, in order that they may be the longer preserved. They are also sometimes washed, or rather rinced, in rice water, with a view to give them smoothness, and the appearance and feel of closeness and strength.

The coloured cotton stuffs are prepared in different ways, all of which are as simple and rude as the previous processes. The most common method, formerly, was for the dyer and his family to wear next their skin, for a week or more, the cotton cloths as they came from the bleachfield. The next steps were to macerate them in water, impregnated with goats' dung; to wash them frequently in pure water; and to expose them to the noon-day sun. They were next soaked in buffalo's milk, curdled by some astringent plant, and were again exposed to the sun. After these preparations, and having been rendered smooth by presure and friction, they were ready for the mordaunts. These consisted chiefly of a liquor, made by dissolving iron in sour palm wine, and of rice-water. Such parts of the cotton cloth as were intended to be figured or spotted black were washed with these mordaunts. The next mordaunt was alum-water, applied to the places which were to be red, generally by children. The pieces were then exposed to the hottest sunshine, in order that the parts in which these mordaunts had been used might be rendered thoroughly dry. Before the dying process was performed, they were freed from all the impurities that the buffalo's milk, &c. might have left in them, by being soaked in pits of water.

The following is an account of the modern practice, as it was communicated to Mr. Parkes by a gentleman who had spent some time in India. "The finest chintz counterpanes, which the natives call palampons, are manufactured at Madras. These are woven in one piece, from two to four yards square; and are printed, or rather painted, with various designs, and in various colours. Their method is, to draw their pattern first on sheets of paper sewn together, of the size of the intended palampon, and then to prick out the same in the paper with a sharp instrument. This done, the paper pattern is smoothly fixed upon the cloth, which is previously damped, and a small muslin bag, containing some kind of black powder, is rubbed over the whole, in order to force a part of the powder through the pin holes, and completely mark out the pattern.

"The pattern being thus sketched upon the cloth, the paper is removed; and when the outline of the various figures is drawn with a pencil, the piece is considered to be ready for receiving the colours.

"One colour is then laid on with a brush, made with a tough root of a particular kind of tree, or with the husk of the cocoa-nut; and when this dries, the piece of cotton is given to a woman to wear, or to use in the family, till it be very much dirtied, in order that it might necessarily undergo a thorough washing, which is thought requisite to prove the goodness and permanency of the colour. Another colour is then laid on in the same manner, and the piece is again submitted to the same trial of wearing and washing. This is repeated for every colour that is employed; and when any one of these colours is found to be deteriorated by this treatment, it is printed afresh, and so are all the rest, till the workman is satisfied that all the colours are actually permanent.

"This tedious process is adopted, however, only when the manufacturer means to warrant the article; but in all cases, even in those pieces which will not bear washing, the colours are laid on by a brush, as before mentioned."—Parkes' *Chemical Essays*, vol. ii. p. 94—98.

In some cases, children are employed, after the outline is drawn, in putting on the principal colours; but the shades and more delicate parts are executed by the most skilful workmen, the cloth being extended on a small narrow table. The brushes and pencils employed, and mentioned in the extract from Mr. Parkes, are made either of the fibres of the rhind of the cocoa-nut, beaten so as to give it the appearance of horse hair; (this is very elastic, and therefore answers the purpose very well,) or they are made, in those cases which require a firmer and finer point, of a piece of bamboo split. A little cotton-wool is fixed about an inch above the extremity to retain the colour, and this the workman presses to make the colour descend to the pencil.

We are not acquainted with the nature of all the dyes which the Indians employ; but some of them are well known. The indigo is the principal. The Romans were acquainted with the deep blue colour of this dye, and gave it the name of Indicum. By them it was held in high estimation. It is mentioned, under the name of Indicum nigrum, among the articles of importation from India, in the Periplus of the Erythrean Sea. The red and the blue are the colours of most conspicuous lustre and beauty in the cotton and silk stuffs received from India at present; and this seems to have been the case in the time of the ancients, for Indian dyers was the ancient name of those who dyed either of these colours with great perfection and delicacy. The source of the blue colour has been just mentioned. The red is dyed principally by means of gum lac. This also was known to the ancients. Ctesias appears to have learnt pretty accurately the nature of the insect which produces it; and he expresses his admiration at the beauty of the colour which it produces. The insect which supplies the gum lac is found on a tree called bihar in Assam, a country to the north-east of Bengal; on a tree called jala, growing on many of the hills in the Rajah of Mysore's terrritories; and in other parts of India. There are also some flowers, roots, and fruits, which are employed to dye red; but the red of the gum lac is the most delicate and beautiful. The semecarpus anacardium, or marking nut, which is a native of all the mountainous regions of India, is used for giving a durable black stain to the cotton cloth; and a yellow dye is supplied by the curcuma, or Indian saffron.

Of the capital employed in the cotton manufacture of India generally, it is impossible to form even the slightest conjecture. The materials for the following estimate of the capital employed in this manufacture in Bengal are supplied by Mr. Grant, in his Analysis of the Finances of that Province, printed in the *Fifth Report on the Affairs of the East India Company*. He supposes, that the produce of cotton in Bengal is equal to four lacks of maunds; which, after losing three-fourths of its gross weight, by the operations of cleaning and dressing, will sell for about twelve lacks of rupees. There is, besides, imported into Bengal, for the use of the cotton manufacturers, cotton from Surat and Mirzapore, in the district of Benares, of the value of six lacks of rupees; so that the total value of the rude materials used in the cotton manufactures of Bengal may be estimated at 18 lacks of rupees. The price of fine thread is enhanced to 16 times the value of the raw material; yet it is a remarkable fact that the labour which thus enhances the value of it scarcely yields a subsistence of nine anas, or about 18 pence per month, being no more than three farthings a day to each spinner,—perhaps 18,000 in all. They could not labour so cheaply, were it not that they are principally the wives and daughters of the husbandmen and manufacturers, who could not otherwise be so usefully employed, at least during the hot and rainy seasons. The number of weavers, masters and journeymen, Mr. Grant estimates at 300,000, who are generally employed in making three million of pieces of cloth annually, the prime cost of which is about 2 crore and 65 lacks of rupees; yet, as the amount of thread is not above half the price of the finished manufacture, and as the capital laid out in the purchase of such materials seldom or ever can equal the consumption of two months labour, so the whole productive stock at any time required, or actually in use, for completing all those beautiful fabrics, so much the object of our admiration, after allowing a loom, of six rupees, to be renewed once in 20 years for every workman, will not exceed 25 lacks of rupees.

The manufacture of silk next claims our notice. Though the Romans procured their silk from China, and were obliged to depend upon the Persians for a supply of it, there is little doubt that, at this period, it was manufactured in Hindostan. In the Sanscrit there are names for the silk worm and manufactured silk; and what is more decisive on this point, there are, and appears to have been from the remotest times, two castes of Hindoos, whose respective employments were the feeding of silk worms and the spinning of silk. In the year 1762, when the power of the East India Company was pretty firmly established in Hindostan Proper, they sent over some natives of Italy to introduce the Italian mode of spinning. The first attempt to establish a silk manufacture was a little below Calcutta; this, however, did not succeed. In the year 1773, buildings for that purpose were erected at Jungeypoor, in the Raujeshy district of Bengal; and in the year 1803, about 3000 people were employed here. This is the greatest silk station of the East India Company: The others are at Cossimbazar, Mauldah, Bauleah, Commercolly, Radnagoor, and Rungpoor. It is calculated, that the district of Raujeshy, in which these places are situated, supplies four-fifths of all the silk, raw or manufactured, used in or exported from Hindostan. The raising of silk worms is principally confined to a part of the district of Burdwan, and to the vicinity of the Bhagirathi and Great Ganges, from the fork of these rivers, for about 100 miles down their streams. The introduction of the silk worm has not yet succeeded in the warmer districts of Hindostan, but it is probable that the country above the Ghauts, where the climate is temperate, will be found suitable.

The mulberry tree used for feeding the worms is the Oriental; the dryness of the soil, it is supposed, is prejudicial to the China mulberry. The expense of planting this tree on a biggah of land is about 14 rupees; and the annual expenses afterwards, 9 rupees. Twenty rupees are generally given by the feeders, for the leaves of a biggah. From one biggah, two maunds of cocoons may be produced; and two seer of reeled silk is the produce of one maund. Four crops of mulberry leaves are obtained from the same field in the course of the year.

Wild silk worms are common in the forests of Silhit, Assam, and the Decan; from them a kind of coarse silk, called tisser, is procured, which is very far inferior in colour and lustre to the other silk. In Silhit, it is manufactured into a kind of goods called muggadooties; but it is principally manufactured, mixed with wool or cotton, into an article in considerable request in India, and by no means destitute of beauty or elegance. Much of it is also exported, wrought or unwrought, into the western parts of India.

The best cocoons of the domesticated silk worms are sold by the natives to the Company; from the rest they wind off the silk. But, previous to this, the cocoons are immersed in a mixture of water and the excretions of the worms, till a fermentation commences, when they are boiled in an earthen vessel. "The women wind off the silk from the pod of the worm. A single pod of raw silk is divided into twenty different degrees of fineness; and so exquisite is the feeling of these women, that whilst the thread is running through their fingers so swiftly that their eye can be of no assistance, they will break it off exactly as the assortments change, at once from the first to the twentieth, from the nineteenth to the second." Corme's *Fragments*, 412. A hand reel is employed for this purpose, which resembles, in its simplicity and cheapness, all the other implements used by the natives.

The most extensive and flourishing manufacture of wove silks is at Monshedabad and its neighbourhood; here are also made various kinds of taffetas, plain and flowered, and other sorts of silk goods, both for home consumption and exportation. In the district of Benares, tissues, brocades, and ornamented gauses, are manufactured: in the western and southern parts of Bengal, plain gauzes, principally for home consumption, and mixed goods of silk and cotton at Mauldah, Boglipoor, and in some parts of the district of Burdwan. Silk stockings are knit with wire in the neighbourhood of Cossimbazar; they are esteemed the best in Bengal: here are also made satins, silks, carpets, &c. Though the silk worm has not yet been introduced into the Carnatic, and probably would not thrive there, yet in this province the silk weavers make goods of a very strong fabric. Mr. Grant calculates that the trading stock constantly employed in the whole of this species of manufacture, in Bengal and Benares, the chief seats of it, may reasonably be estimated at 10 lacks of rupees, while the prime cost of the raw silk produced in the country, chiefly for foreign exportation, he estimates at 50 lacks; the largest portion of which is advanced by the great foreign exporter; the sum paid to the warders he calculates at one lack.

The other manufactures of Hindostan are not of great extent or value, and may therefore be noticed in a more cursory manner. In all the colder parts of Hindostan, particularly in the elevated districts of the Mysore, the natives wear woollen cloths, called comelies; they are worn as they come from the loom, and are of different lengths; some being six or seven feet long by four or five broad; these are of coarser quality; such as are of a finer texture are about ten feet long by six or seven broad; these resemble English camlets. Neither of the kinds are dyed, but are of the natural colour of the wool, which, in the fine ones, is almost always a good black; the price of the coarser kind is from eighteen pence to two shillings, and the finer from twelve to fifteen shillings. The Chitteldroog district of Mysore is celebrated for the manufacture of excellent comelies, that is, of such as keep the natives warm, and protect them from the rain. Flannels well wove, but fulled in a very imperfect manner, are manufactured at Patna. Carpeting, of a very durable fabric, is made in the Churrar district of Allahabad; and Ellore, the capital of one of the Northern Circars of the same name, is famous for carpets of a rich and beautiful texture. The best coir cables are made at Anjengo and Cochin, of the fibres of the laccadine cocoa nut. Canvass is manufactured from cotton and from the sun hemp; the former in the neighbourhood of Chittagong, Patna, and some other places, and the latter at Calcutta. In this city there are upwards of 70 looms at work, which can make 150 bolh monthly at least; the workmen are paid at the rate of four rupees for every bolh; one man, if commonly industrious, is capable of weaving one bolh in ten days, and at that rate might earn 12 rupees a month; but he seldom finishes his bolh under 15 days; some take 17 days. As soon as a native workman is paid his four rupees, he quits his loom, and seldom returns till his money is spent. About 200 people are employed in this manufactory. The canvass is of the same length, breadth, and weight as the English canvass: it has a dross upon it, which is removed by bleaching and washing. Pack thread is wove into sackcloth in many places, particularly in the northern parts of Bengal, where it is used as clothing by the mountaineers. A coarse, but very strong sackcloth is also made at Bangalore, in the Mysore, from the Indian hemp.

Saddles, harness, military accoutrements, and other articles of leather, are manufactured by the natives in Bengal. Leather pantaloons for the artillery, and gloves, are made at Madras, and shoes all over India. The Bombay shoes are reckoned the best. Hyderabad, the capital of Sinde, is noted for its artificers who embroider on leather. Great numbers of brazen water-pots are manufactured at Bareilly, in the province of Delhi. Articles of cutlery, and even brass instruments, are made in some parts in tolerable perfection. The swords made in the Decan, and in the north part of India, are equal in temper, &c. to the best swords made in any other part of the world. The armourers of Hyderabad, in Sinde, are celebrated for the excellence of their workmanship; and at Poloonshah, in the territories of the Nizam, there is a large manufactory of matchlocks, spears, and other weapons. At Muteodon, in the Mysore Rajah's dominions, the glass is manufactured which is used for making the rings which are worn by the Hindoo women round their wrists. The quality of this glass is not good, the materials of which it is formed not being well sorted, mixed in due proportion, nor fused sufficiently.—

in consequence of which it is coarse and opaque. It is made of five colours, black, green, red, blue, and yellow. The black is in the most request, and bears the highest price. The natives obtain the soda that they use in the manufacture in the fields, where it forms during the hot season. The same fields supply them with sand. The ring makers on the western side of India purchase the greater part of this glass. Vizagapatam is celebrated for its beautiful cabinet work, which is painted and inlaid with ivory and black wood with great elegance and art.

The manufactures of opium and indigo have already been mentioned. About twenty years ago, the cochineal insect was introduced into India; and cochineal, though of an inferior kind, is now produced in different parts of India. The insect is found to thrive best on the indigenous opuntia, which is abundant in Bengal, and in most parts of India. Near Bailura, in the Mysore Rajah's territories, the husbandmen keep the insect on the opuntias, which serve as a fence to their gardens, and make from it annually about 1500 pounds of cochineal. Tar is extracted from teak wood in most of the places where ships are built of it. Rose-water is distilled in many parts. Gazapoor, in the Benares district, has long been celebrated for it. Paper is manufactured in some parts of Northern Hindostan from the bark of a tree named *deah*. It is very strong, and capable of being woven, when gilt, by way of ornament, into the texture of silks and satins. Saltpetre is manufactured to a great extent in the provinces of Bengal and Bahar, particularly in the latter. The export of it is principally confined to the Company's investment, the greater part of which is made in the districts of Hajypoor and Sanur, in Bahar. The climate and soil are extremely favourable to its spontaneous production. It is sent to Europe in an impure state, but crystallized, put up in bags, each bag containing two bazar maunds, or about 164 lbs. As the Company are obliged to supply the British Government with a certain quantity of it, each Bengal ship of 800 tons, in time of war, generally brings home about 5000 bags. Salt is made from sea water along nearly the whole of the eastern coast, as far as the mouth of the Ganges, in great abundance. Tumlock and Hiljellee, which lie to the south-west of Calcutta, near the Hooghly, are the principal places where salt is manufactured for the Bengal presidency. The land at these places is regularly overflowed by the tide; and, in order to retain the saline particles, mounds of earth are formed, from which the salt is extracted by filtration and boiling: each mound will yield, on an average, 18,640 lbs. of salt, and requires the labour of seven men. The working months are from November to June, during the dry season. On the west coast of India, salt is made in large quantities, on the coast of the island of Salsette. The process is similar to that which is followed in Europe; but when salt of a superior quality is wished for, it is obtained "by fixing a jagged piece of stick in the water, when first let into the reservoirs, to which, as the water evaporates, saline particles adhere, to the weight of three or four ounces." Salt made from sea water is in high repute among the natives of India, principally from religious considerations, especially that made from the waters of the Ganges: but European tables at Bombay, and other places on the western coast, are supplied with a remarkably fine salt from Arabia, "in pieces not unlike a cheese in shape, and sparkling like a sugar loaf."

The mechanism of the Hindoos is very rude and imperfect, and probably has been stationary for at least 2000 years. The rice mill consists of two round flat stones, in the lower one there is a hollow, into which the middle of the upper one is inserted; it is turned round by means of a wooden peg, and the flour comes out through a groove in the under stone; in fact, it resembles the quern of Scotland. Two Indians with their hand corn mill can grind only 60 lbs. of flour in a day. On several of the streams, however, in Hindostan Proper, particularly on the Ravey, there are water-mills for grinding corn. The mill that is used to extract the oil from the cocoa-nut is very simple in its construction, and, at the same time, answers its purpose extremely well. It is thus described by Sonnerat:

"The pieces of this machine are, first, the trunk of a large tree sunk in the earth, and strongly fixed, the top in the form of a vase; secondly, a mortar placed in the middle of the trunk, and which, not being very large, goes widening to the bottom; thirdly, a pestle placed in the mortar; fourthly, a cross pole, adapted to the top of the pestle, and which turns it; this cross pole is composed of equal pieces, tied together with ropes, which, being flexible, are not subject to break; fifthly, a large bar of wood, flat, placed horizontally at the bottom of the machine, and to which the cross pole is fixed. This bar, widening and increasing towards the extremity, which is fitted to the trunk of the tree, turns on a slope made at the bottom of the trunk, and regulates the machine. Two bullocks, tied to this bar, turn it, and the people along with it. At the top of the trunk is a ledge to prevent the oil from running out. A man stands on the horizontal bar, and turns along with it,—puts back the grains that are falling out,—collects the oil as soon as it rises to the top, and puts it into vases." *Sonnerat's Voyage to the East Indies*, vol. ii. p. 133.

The same author thus describes the arts of the carpenter, sawyer, blacksmith, goldsmith, and shoemaker, as they are carried on in India:

"The Indian carpenter knows no other tools than the plane, chissel, the wimbol, a hammer, and a kind of hatchet. The earth serves him for a shop-board, and his foot for a hold-fast; but they are a month in performing what our workmen will do in three days. It is to no purpose shewing them the most expeditious and easy way of sawing wood; they had rather keep to the imperfect manner they received from their fathers, than adopt a new one more commodious.

"The sawyer places his wood between two joists fixed in the ground; and, sitting carefully on a little bench, employs three days, with one saw, to make a plank, which would take our people an hour's work.

"The blacksmith always carries his tools with him, his forge, and his little furnace; working wherever he is employed. He sets up his forge before the house of the person who calls him, and, with the dirt of the place, makes a little wall, before which he places his hearth. Behind the wall are two leather bellows, which the apprentice keeps going, by alternately pressing the top. In this manner the fire is kept up. A stone serves for an anvil, and his whole apparatus consists of a pair of pincers, a hammer, a mallet, and a file.

"The productions of the goldsmith announce, in every shape, the want of tools. Like the Chinese, they have not as yet arrived at the art of polishing gold or silver, or to work the gold in different colours. Yet we have their filigree work in esteem; that is, indeed, only a work of patience. The Indian goldsmith carries his workshop with him wherever he is sent for. His furnace is an earthen pot, an iron pipe serves him for a bellows, and a pair of pincers, a hammer, a file, and a small mallet, are all his tools. He makes his crucible on the spot with clay, mixed with charcoal and cow-dung; which gives a solidity to the crucible that prevents its breaking in the fire. One shilling are the wages of the master and his servant for a whole day.

" The shoemaker is of the most despicable caste, and is also the poorest of all the artisans. He has no other tools than an awl and a knife ; no shop for leather, or lasts. When a pair of shoes are wanted, the money must be advanced, and with this money he buys a sheep's skin, which he prepares on the same day, and on the morrow brings the shoes. From the shoemakers working in leather, and eating meat, they are held in the greatest contempt by the other Indians, who esteem them the lowest order of men. Their huts are in separate quarters, out of the towns and villages; and in the European settlements they perform the office of executioners." *Sonnerat*, xi. 126–8.

Fishing, as a source of trade, is little followed in Hindostan; there is, however, an extensive fishery on the Gulf of Cutch; the fish are dried, and exported on camels and bullocks to the interior. The natives here are also employed in the pearl fishery; but this kind of fishery is carried on to the greatest extent on the shores of the south-eastern extremity of India, particularly at Tuticorin, and six other villages in the district of Tinnevelly. There are two fishing seasons in the year; one in March and April, and the other in August and September. The pearls are disposed of at a fair that is held immediately after the termination of each fishing season; they are much inferior to those procured in Ceylon, being disfigured by a blue or greenish tinge. Near Bombay, fishing stakes, formed of the trunks of the cocoa-nut tree, are laid down at the beginning of the fair season, in eight or nine fathoms water; they are taken up before the south-west monsoon commences. They are fixed by means of boats filled with water, attached to them when the tide is low; thus, of course, they are sunk to the bottom: and they are raised by a similar process, empty boats being attached to them, by means of which they are lifted up at the flowing of the tide.

The internal trade of India is conducted by boats, land carriers, travelling merchants, and at fairs. The boats which are used on the Ganges, and its tributary streams, are of various sizes and constructions; from Patna to Calcutta, where the navigation resembles that of the sea, both from the width of the river, and the storms which frequently arise, it is necessary to employ large and strong boats, or rather ships of upwards of 100 tons; in the higher parts of the river, the boats are made either low and deep, or flat, and *clinker built*. Between Calcutta and the sea, among the shallows, the boats are made without keel. Those which are used in the Indus are flat-bottomed, with square heads and sterns, low forward, high abaft, and drawing only a few inches water; oars are seldom employed, but they are either dragged by men, or pushed along with poles; when the wind admits it, sails are used. The materials of which these boats are constructed are very few, simple, and cheap; and the boatmen scarcely receive any wages, except what will purchase them a little salt, tobacco, and clothing; grain is supplied them for food. The average rate of travelling, with and against the current, may be reckoned 25 miles a-day. By the inland navigation in Hindostan Proper, salt, grain, cotton, and manufactured articles, are interchanged. It is said that the whole number of boatmen employed in the rivers of Bengal and Bahar are nearly 300,000; most of these are also labourers in husbandry, or fishermen.

Land carriage is performed by oxen, buffaloes, and sometimes by horses; no carriages are used, there being no roads adapted for them. The owners of the cattle are generally the owners also of the merchandise they carry, as well as the drivers. One driver is allowed to four oxen. Their food is generally obtained without expense on the road side; but where buffaloes are employed, it is necessary to give them grain. The articles of merchandise which are thus transported are, grain, salt, cotton, sugar, tobacco, betel nut, &c. In the Decan there is a wandering tribe of carriers, called Lomballies, or Burgarahs, who interchange the commodities of this part of Hindostan for those of Bengal and the adjacent provinces. They are said to be the descendants of those camp-followers who accompanied the emperors Shah Jehan and Allum Geer, in their wars in the Decan. There are also in the Mahretta countries, and other parts of India, vanjaries, or itinerant grain dealers—a singular race of people. Formerly they were never molested in the most disturbed state of the country, being regarded as sacred; this reverence for them, however, is now nearly at an end. They travel in large parties, with their grain on bullocks, brought from a great distance; but they do not depend entirely on their profits as grain dealers, nor on their returns of merchandise from the Decan to Hindostan Proper; for they occasionally become stationary, and apply themselves to husbandry. This, however, seldom happens, except when they are unable to dispose of their grain. They also employ their leisure in weaving a stuff from hemp, of great strength and good quality; this is made into bags to carry grain in, and into large cloths to cover camels. The travelling merchants or banyans resemble the chapmen in Britain; they come in great numbers from Guzerat to Bombay, selling muslins, cotton cloths, &c. They are chiefly Hindoos; though some Mahomedans adopt the name and the profession; they are distinguished by a red turban, shaped in front like the horn of a rhinoceros. The banyans are generally rich, and carry on a stationary as well as an itinerant business. When travelling they are attended by *coolies*, porters, to carry their merchandize. Besides these, there are the borahs, or petty chapmen, who are Mahomedans, very poor, and not distinguished by their honesty. They travel about the country with an almost infinite variety of small and cheap articles in their boxes.

There are weekly markets over most part of Hindostan Proper, but they are not common in other parts of India. At these there is a considerable interchange of commodities, but, of course, confined to the vicinity of the place where the market is held. The fairs of Hindostan are of infinitely greater importance. The most celebrated are those of Cooloo, Hurdwar, and Nolucky Hant. The fair of Cooloo, in the province of Orissa, is attended by the traders of the inland parts of Hindostan, particularly those of Berar, and the traders in salt and European commodities from the sea coast. During the months of January, February, and March, the former arrange their caravans, and bring their merchandise, which consists chiefly of cotton, on bullocks to Cooloo. Here they are met by the traders from the sea coast. Factors are employed to transact the business among them; and they also supply them with huts, food, and other necessaries, during their abode. The commission of the factors is one per cent. Nearly all the business is carried on by factors. The fair breaks up about a month before the commencement of the rainy season. The traders then depart; but the factors are stationary.

The common fair at Hurdwar, the place where the Ganges enters Hindostan, is held annually; but every twelve years there is a fair here, at which are assembled a much greater number of people than at any other fair in the world. Many of these, indeed, perhaps the largest portion of them, visit Hurdwar from motives of superstition, and as a place of pilgrimage, which will be afterwards noticed; but great numbers are also led hither from commercial motives. At the annual fairs, it is computed that between 200,000 and 300,000 people are collected. At the fair every twelve years, there are often a million; and in April 1809, it is supposed there were assembled at Hurdwar, from every part of Hindostan, from the confines of China to those of Persia, Hindoos of every description, amounting to two millions of persons. An immense variety of articles are sold at this fair. Caubul, Candahar, Multan, and the Punjab, supply horses, mules, camels, tobacco, antimony, assafœtida, and dried fruits of all kinds. Cashmere, and the country of the Seiks, send shawls, and other goods of that description. Spotted turbans, looking glasses, toys, with various manufactures in brass and ivory, are supplied from Jeypoor. Shields from Rochilcund, Lucknow, and Silhit; bows and arrows from Multan and the Dooab; rock-salt from Lahore; baftas and piece goods from the Punjab; and cotton and woollen goods, cocoa-nuts, &c. from the provinces of the East India Company. The most frequented place in the fair is the bed of the river, for at this season of the year it is almost dry. The bargains are conducted and settled without a single word being spoken: a cloth being thrown over the hands of the parties, they communicate with each other by touching the different joints of the fingers, and thus effectually prevent those near them from gaining any information. Before the British gained possession of this part of Hindostan, heavy duties were levied on the cattle brought to this fair; but these are now taken off; neither are there any of those scenes of tumult and bloodshed, which formerly always disgraced it. The fair at Nolucky Hant, in the pergunnah of Bowal, in the Dacca district of Bengal, is held annually for the space of nine days. Here the weavers assemble to purchase their annual stock of trade; and it is computed, that the business carried on there frequently amounts in value to three lacks of rupees.

The following list of the principal articles exported from the under-mentioned places to India, and imported into those places from India, is taken from papers printed by order of the House of Commons:

Exports from	Imports into
Great Britain.	
Malt liquors, wines, spirits, apparel, metals, cutlery, ironmongery, perfumery, books, carriages, glass-ware, jewellery and plated ware, oilman's stores, provisions, saddlery, naval stores, stationary, woollens, cochineal, coral, cordage, quicksilver.	Piece goods, indigo, saltpetre, opium, cassia, lynia, raw silk, cotton, gum lac, pepper, rice, sugar, turmeric, precious stones, elephants' teeth, drugs, gum, ginger.
Denmark.	
Brandy, cordage, canvass, claret, cider, copper, nails, coffee, gin, iron, steel, spices, wine.	Piece goods, sundries.
Lisbon.	
Lisbon wine, Madeira, port, Goa paper, sundries.	Piece goods, indigo, grain, cassia buds, drugs, cotton.
America.	
Arrack, rum, brandy, cherry brandy, claret, port, Madeira, Cape wine, gin, cyder, coffee, cordage, metals, timber and planks, spices, oilman's stores, broad cloth.	Piece goods, sugar, indigo, cotton, camphire, ginger, seeds, hemp, flax, canvass, gunnies.
Coast of Malabar to and from the other parts of India.	
Piece goods, betel nuts, horses, drugs, tobacco, fruit, coir and coir cables, liquors, grain, timber, tea, lamatta, nankeen, coral, spice, naval stores.	Piece goods, sugar, raw silk, indigo, grain, Bengal rum, canvass and gunnies, cardamons, long pepper, seeds, carriages, betel nuts, ginger.
Northern parts of Guzerat.	
Cotton, piece goods, grain, cornelians, oils, ghee, putchuck seed, sandal oil, gingelly seed, shawls, drugs, morva, tobacco, hemp, horses, hides.	Piece goods, sugar and jaghery, raw silk, cocoa-nuts, pepper, drugs, elephants' teeth, cochineal, woollens, copper, iron, steel, betel nuts, liquors, dates, grain, embroidery, copra, gunnies, ghee, spices.
Surat.	
Cotton, piece goods, hemp, red and white lead, tin, horses.	Raw silk, piece goods, sugar, betel nuts, cochineal, copper, tin, iron, woollens, elephants' teeth, liquors, pepper.
Bombay.	
Piece goods, cotton, sugar, sugar candy, cochineal, betel nuts, spices, salt, woollens, liquors, elephants' teeth, cocoa nuts, grain.	Cotton, piece goods, pepper, grain, fruits, betel nuts, provisions, spill, naval stores, sandal wood, chillies, tin.

	Exports from	Imports into
Coromandel Coast.	Piece goods, chanks, copper, nails, spice, brandy, woollens, metals, drugs, naval stores, timber, sandal wood and oil, red wood.	Grain, piece goods, raw silk, sugar and jaghery, opium, seeds, ginger, courass and gunnies, long pepper.
Northern Circars.	Grain, piece goods, indigo, rum.	Piece goods, sugar, silk, opium, canvass.
Carnatic.	Grain, piece goods, tobacco, woollens.	Grain, tobacco, blue cloths, rum, indigo.
Fort St. George.	Metals, grain, liquors, drugs, spices, timber, naval stores, piece goods, fruits.	Grain, piece goods, tobacco, cotton, pepper, jaghery, fruits.
Tanjore.	Grain, liquors, metals, drugs, cotton, fruit, spice.	Piece goods, indigo.
Tinnevelly and Ramnad.	Piece goods, grain, jaghery, cotton.	Pepper, piece goods.
Canara.	Piece goods, sugar, jaghery, betel nuts.	Grain, piece goods, tobacco, fruits.
Malabar province.	Copra, cocoa nuts, pepper, sandal wood, betel nuts, piece goods, coir, cardamoms, ghee, grain, timber.	Cotton, piece goods, wines, horses, liquors, iron, brass, copper, tin, woollens, sugar, drugs.
Cochin.	Pepper, cardamoms, teak wood, sandal wood, cocoa nuts, coir cordage, cassia, fish maws.	Piece goods, wine, liquors, cassia buds, gum, opium, fruit.
Bengal.	Grain, raw silk, piece goods, sugar, opium, drugs, liquors, gunnies, ginger, spice, ghee, indigo.	Piece goods, salt, chauks, copper, horses, fruit, spice, coir cables and cordage.
Ceylon.	Arrack, betel, coir and coir cables, copper, spice, timber, naval stores, elephants' teeth, cinnamon.	Grain, piece goods, metals, horses, provisions, sugar.
Sumatra.	Pepper, spices.	Opium, piece goods, canvass.
Arabian and Persian Gulfs.	Horses, cowries, copper nails, drugs, galls, gums, coffee, dates, raisins, myrrh, olibanum, grain, shark fins, tortoise shells, lamettor, hing, coral, almonds, rose water, elephants' teeth.	Piece goods, indigo, sugar, raw silk, grain, pepper, iron, lead, coloured silk, drugs, tobacco, shawls, cotton, Japan wood.
Cashmere.	Cowries, piece goods, shawls.	Piece goods.
Cutch and Sinde.	Cotton, ghee, grain, oil, piece goods, seeds, drugs.	Sugar and jaghery, piece goods, raw silk, pepper, iron, drugs, grain, steel, cocoa nuts, betel nuts, coir.

	Exports from	Imports into
Bassein.	Grain, ivory ware, oil, hemp, timber, piece goods, betel nuts.	Piece goods, grain, iron, sugar, cocoa nuts, copra, betel nuts, dates, pepper, turmeric.
Goa and Concan.	Grain, piece goods, betel nuts, hemp, sandal wood, drugs, copper wares.	Grain, piece goods, raw silk, sugar, woollens, hing, drugs, seeds, wine, dates, spices, iron, tin, liquors, cochineal, horses, pepper.
Mahratta Dominions.	Piece goods, cottons, woollens.	Grain, pepper, betel.
Travancore.	Betel, skins, fruit, timber, drugs, pepper, grain, chauks.	Piece goods, salt, cotton
Tranquebar.	Liquors, naval stores, metals, grain, piece goods, spices, dyes, mother-of-pearl.	Piece goods, grain, opium, sugar
Pegu.	Timber and plank, hartal, horses, pepper, coir and coir cables, wax, cardamoms, stick lac.	Piece goods, opium, woollens, tin, wine, grain, rum, canvass.
Penang.	Pepper, betel nuts, benjamin, metals, spices, tutenague, ajia wood, piece goods, sugar, elephants' teeth, cochineal.	Opium, piece goods, raw silk, grain, cotton, wine, metals, iron, carpets, blankets.
Manilla.	Nankeens, Japan wood, tutenague.	Piece goods, opium, silk, iron and nails, glass ware.
China.	Sugar candy, tutenague, piece goods, camphor, nankeens, tea, vermilion, China ware, raw silk, cassia buds, spices, red and white lead, pepper, alum, tin, drugs.	Cotton, opium, piece goods, pearls, sandal wood, shark fins, grain, saltpetre, cornelians, pulchuck, corals, rice.
Isle of France.	Brandy, &c.	Piece goods.
Maldive Islands.	Coir and coir cables, cocoa nut shells, cowries, saltpetre, turtle shell.	Grain, sugar, piece goods, tobacco.
Coast of Africa.	Elephants' teeth, tortoise shells, grain.	Piece goods, glass beads.

The commerce of India is generally considered under two grand heads; viz. that which is carried on with Europe and America, and the "coasting trade," or that which is carried on from one part of India to another; and from India to the ports of the Indian islands, China, the Arabian and Persian Gulfs, and the east coast of Africa.

The Indian commerce to Europe is almost entirely carried on by Great Britain; and, till within these two years, it consisted of the commerce of the East India Company. That which is called the "privilege trade," established by an act of Parliament in the year 1793, by which the Company were empowered to grant licences to individuals to trade to India; and, lastly, the private trade, or that enjoyed by the commanders and officers of the Company's ships. Since the trade to India was thrown open, a considerable capital and amount of tonnage have been embarked on it by individuals; but the only particular respecting this branch of the trade officially known at present is, that there are employed in it upwards of 180 vessels, most of which belong to London.

The only foreign nation which partakes largely in the trade to India is the United States of America. The vessels of the American states first appeared in the Indian seas about the year 1785. In 1794, Britain granted to them, by treaty, a right to a direct trade between their own ports, and through British India; this grant, the troubles in which Europe was involved, and the capture of the settlements of the Dutch, Danes, and French, in India, by the British, contributed to extend and confirm the American commerce to this country. According to accounts laid before Congress, the amount of Indian goods landed in the United States, for re-exportation, was, in 1790, 2,000,000 dollars; and in the year 1800, 39,000,000 dollars. In ten years, ending 1804–5, the Americans exported from Bengal goods to the amount of 4,643,575*l.* or, on an average, 464,357*l.* per annum; and imported to the amount of 3,906,068*l.* or 390,606*l.* per annum. The following Table will farther illustrate the trade between America and India.

	Insix years from 1802 *to* 1807–8.			*In three years from* 1808–9 *to* 1810–11.		
	Goods.	Bullion.	Total.	Goods.	Bullion.	Total.
Imports into all India	*L* 957,224	6,528,250	7,487,524	351,602	4,531,233	4,882,836
Exports Do.	6,901,269	25,696	6,926,965	5,107,818	9,625	5,117,443

The following table exhibits the sole amount of privilege and private trade goods, sold at the East Company's sales, from 1793-4 to 1809-10.

Years.	Privilege Trade.	Private trade.	Total.
1793-4	*L*.181,710	441,929	623.639
1794-5	469,879	373,868	843,747
1795 6	409,787	458.541	868.328
1796 7	678.749	274.812	953.561
1797-8	646,747	293,160	939 907
1798-9	881,662	448,051	1,329,723
1799-1800	1,747,139	370,808	2,117,947
1800-1	1,566,972	546,419	2,113,391
1801-2	1.724.217	268,427	1,992.644
1802-3	2.586,581	456,052	3,042 633
1803 4	1.860 734	315.303	2,176 037
1804 5	1.853.050	570,986	2,424,036
1805-6	1,722,972	728.110	2,451,082
1806 7	1,028.762	424.846	1,453.608
1807-8	1,931.685	617,876	2 549,561
1808-9	797.229	520,603	1,317,832
1809-10	1,129.408	433,275	1,562,683
Total	*L*.21,217,283	7,543,076	28,760,359

Account of the Investments of goods received from India, particularising the amount received from each presidency in each year, from the year 1792-3, to 1808-9 inclusive.

Years.	Bengal.	Madras.	Bombay.
1792-3	*L*.765,188	264,799	71.235
1793-4	967.388	195.108	97,185
1794-5	1,011,165	247.260	197.059
1795-6	1,073.637	591,798	146.917
1796-7	1,081.045	411.096	171,930
1797-8	1,036 667	621.940	319.384
1798-9	1,598.884	414 626	111,329
1799-1800	537.568	572,792	261,342
1800-1	943.217	384,687	172,615
1801-2	714,403	400,387	153,961
1802-3	380,163	236.337	259,868
1803-4	825.433	481,184	197,445
1804-5	953,084	341.615	160,180
1805-6	807,752	747,712	183.527
1806-7	272,420	386,639	146,322
1807-8	522,152	398,001	126,775
1808-9	754,005	429,792	146,196

The following is a statement of the amount in value of the principal articles exported from India, from 1793-4 to 1809-10 inclusive, consisting of the company's, the private and privilege trade, and the neutral and prize goods

	Company's Goods.	Private Goods.	Neutral Goods.
Bengal piece goods	*L*.14,490,378	6.980,505	108.921
Coast and Surat do.	11,563.923		
Saltpetre . .	3,060,956	320,777	18,469
Indigo, Sugar, Drugs, &c.	5,031,516	20,191,183	1,484,235
Silk	7.014.986	1,211,081	6,455
Pepper . . .	3,322 835	320,777	18.469

The two following Tables will further illustrate the commerce of India, in its two great divisions of the trade to and from Europe and America, and the coasting trade.

Statement of the Commerce of British India with London, America, and Foreign Europe, from 1802-3 *to* 1810-11, *both inclusive.*

Imports into India.

	1802-3.			1803-4.		
	Merchandise.	Bullion.	Total.	Merchandise.	Bullion.	Total.
From London, on account of the East India Company	*L.*1,121,838	*L.*458,791	*L.*1,580,629	*L.*898.799	*L.*1,253,682	*L.*2,152,481
Do. on account of Commanders and Officers	330,000	14,616	344,616	475,000	28,540	503,540
Do. on account of Private Merchants	475,566	252,322	727.888	168,778	268,566	437,344
Total from London	1,927,404	725,799	2,653,133	1,542,577	1,550,788	3,093,365
From America . . .	60,658	631,933	692.591	34.832	650.068	684.900
From Foreign Europe . .	191,814	276,504	468,318	147,738	507.887	655,625
From Foreign Europe and America	252,472	908,437	1,160,909	182,570	1,157,955	1.340.525
Total . . .	2,179,876	1,634,166	3,814.042	1.725,147	2.708,743	4.433.890

	1804-5.			1805-6		
	Merchandise.	Bullion.	Total.	Merchandise.	Bullion.	Total.
From London, on account of the East India Company	*L.*779,538	*L.*788,705	*L.*1,568,243	*L* 579,111	*L.*1,502,905	*L.*2,082,016
Do. on account of Commanders and officers	445,000	49,622	494,622	505 000	15,539	520,539
Do. on account of Private Merchants . .	203,703	185,299	389,002	275,740	283,052	558,792
Total from London .	1,428,241	1,023,626	2,451,867	1,359,851	1,801,496	3,161,347
From America . . .	81,312	531,756	613,068	198,010	888,035	1,086,045
From Foreign Europe . .	212,725	420.942	633 667	156,182	415,321	571,503
From Foreign Europe and America	294.037	952,698	1,246,735	354,192	1,303 356	1,657,548
Total . . .	1,722,278	1,976.324	3,698,602	1,714,043	3,104,852	4.818,895

Statement of the Commerce of British India, &c.—Continued.

IMPORTS INTO INDIA.

	1806-7.			1807-8.		
	Merchandise.	Bullion.	Total.	Merchandise.	Bullion.	Total.
From London, on account of the East India Company	L.848,944	L.1,318,254	L.2,167,198	L.1,206,235	- -	L.1,206,235
Do. on account of Commanders and Officers	405,000	27,894	432,894	480,000	43,545	523,545
Do. on account of Private Merchants	736,996	158,511	895,507	319,653	124,236	443,889
Total from London	1,990,940	1,504,659	3,495,599	2 005,888	167,781	2,173,669
From America	242,308	1,222,898	1,465,206	102.335	971,498	1,073.833
From Foreign Europe	190,533	302,268	492,801	257,215	287,308	544.523
From Foreign Europe and America	432,841	1,525,166	1,958,007	359 550	1,258.806	1,618.356
Total	2,423.781	3,029,825	5,453,606	2,365,438	1,426.587	3,792,025
	1808-9.			1809-10.		
From London, on account of the East India Company	L.884.807	L.229,597	L.1,114,404	L.869,743	- -	L.869,743
Do. on account of Commanders and Officers	400,000	28,087	428,078	470,000	8,218	478,218
Do. on account of Private Merchants	390.167	114,353	504 520	360,453	11,448	371.901
Total from London	1,674,974	372,037	2,047,011	1,700,196	19,666	1,719,862
From America	15,075	16,466	31,541	65,065	827,084	892,149
From Foreign Europe	40,270	-	40.270	65.114	135,924	201,038
From Foreign Europe and America	55,345	16,466	71,811	130.179	963.008	1,093.187
Total	1,730,319	388.503	2,118.822	1,830,375	982.674	2.813.049

Statement of the Commerce of British India, &c.—Continued.

IMPORTS INTO INDIA.

	1810-11.			General Totals.		
	Merchandize	Bullion.	Total.	Merchandise	Bullion.	Total.
From London, on account of the East India Company	L 835,778	– –	L 835,778	L 8,024 793	L 5,551,934	L13,576,727
Do. on account of Commanders and Officers	385,000	9,001	394 001	3,895,000	225,062	4,120,062
Do. on account of Private Merchants . . .	653.098	27,487	680 585	3,584,154	1,425 274	5.009,428
Total from London . .	1,873,876	36,488	1,910.364	15.503.947	7,202,270	22,706,217
From America	51.711	855,662	907,373	851,306	6.595,400	7,446,706
From Foreign Europe	65,913	280,688	346,601	1,327,504	2,626,842	3.954,346
From Foreign Europe and America	117,624	1,136,350	1,253,974	2,178,810	9,222,242	11,401,052
Total	1,991,500	1,172,838	3,164.338	17,682.757	16.424,512	34,107.269

EXPORTS FROM INDIA.

	1802-3.			1803-4.		
	Merchandise.	Bullion.	Total.	Merchandise.	Bullion.	Total.
To London, on account of the East India Company	L 1,679,755	– –	L 1,679,755	L 1,543,156	– –	L 1,543,156
Do. on account of the Commanders and Officers	242,530	– –	242,530	419,135	– –	419,135
Do. on account of Private Merchants . . .	1,431,276	L 124	1,431,400	1,360,244	– –	1,360,244
Total to London . . .	3,353.561	124	3,353,685	3,322,535	– –	3 322,535
To America	655,905	5,406	661.311	865,171	L 11,157	876,328
To Foreign Europe	507,286	787	508,073	440,397	– –	440,397
To Foreign Europe and America	1,163,191	6,193	1,169,384	1,305,568	11,157	1,316,725
Total	4,516,752	6,317	4,523,069	4,628,103	11,157	4 639.260

	1804-5.			1805-6.		
To London, on account of the East India Company	L 1,803,036	– –	L 1,803,036	L 1,046,131	L 48	L 1,046,179
Do. on account of the Commanders and Officers	390,656	– –	390,656	269,464	– –	269,464
Do. on account of Private Merchants . . .	924,434	– –	924,434	652,507	– –	652.507
Total to London . . .	3.118.126	– –	3,118 126	1,968,102	48	1,968 150
To America	462,349	– –	462 349	964,402	– –	964 402
To Foreign Europe	622.736	– –	622,736	346.300	– –	346 300
To Foreign Europe and America	1.085,085	– –	1,085 085	1.310,702	– –	1,310,702
Total	4,203,211	– –	4,203,211	3 278 804	48	3 278 852

Statement of the Commerce of British India, &c.—Continued.

EXPORTS FROM INDIA.

	1806–7.			1807–8.		
	Merchandise.	Bullion.	Total.	Merchandise	Bullion.	Total.
To London, on account of the East India Company	*L* 1,048,469	*L* 102	*L* 1,048,571	*L* 1,617,490	– –	*L* 1,617,490
Do. on account of the Commanders and Officers	307,767	– –	308,767	460,749	– –	460,749
Do. on account of Private Merchants . . .	965,308	– –	965,308	718,348	1,580	719,928
Total to London . . .	2,322,544	102	2,322,646	2,796,587	1,580	2 798,167
To America	1,265 124	2,709	1,267,833	963,002	– –	963,002
To Foreign Europe	302,723	– –	302,723	407,445	– –	407,445
To Foreign Europe and America	1,567,847	2,709	1,570,556	1,370,447	– –	1,370,447
Total	3,890,391	2,811	3,893,202	4,167,034	1,580	4,160,614

	1808–9.			1809–10.		
To London, on account of the East India Company	*L* 1,313,569	– –	*L* 1,313,569	*L* 1,170,494	– –	*L* 1,170,494
Do. on account of the Commanders and Officers	318,835	– –	318,835	329,752	– –	329,752
Do. on account of Private Merchants . . .	831,103	875	831,978	1,050,463	5,177	1,055,640
Total to London . .	2,463,507	875	2,464,382	2,550,709	5,177	2,555,886
To America	138,918	– –	138,918	879,140	3,609	882,749
To Foreign Europe	51,511	– –	51,511	138,906	– –	138,906
To Foreign Europe and America	190,429	–	190,429	1,018,046	3,609	1,021,655
Total	2,653,936	875	2,654,811	3,568,755	8,786	3,577,541

	1810–11.			General Totals.		
To London, on account of the East India Company	*L* 1,098,542	– –	*L* 1,098,542	*L*12,320,642	*L* 150	*L*12,320,792
Do. on account of the Commanders and Officers	250,979	– –	250,979	2,990,867	– –	2,990,867
Do. on account of Private Merchants . . .	947,782	– –	947,782	8,881,465	7,756	8,889 221
Total to London . . .	2,297,303	– –	2,297,303	24,192,974	7,906	24,200,880
To America	897,373	– –	897,373	7,091,384	22,881	7,114,265
To Foreign Europe	290,446	– –	290,446	3,107,750	787	3,108,537
To Foreign Europe and America	1,187,819	– –	1,187,819	10,199,134	23,668	10,222,802
Total	3,485,122	– –	3,485,122	34,392,108	31,574	34,423,682

Coasting Trade of British India, including the Country Trade to China.

	IMPORTS			EXPORTS.		
	An Account, shewing the Value of Goods and Treasure entered Inwards at the Custom Houses of the following Ports, on an Average of Six Years; commencing in 1802-3, and ending in 1806-7, from the Districts and Places named in the Margin.			An Account, shewing the Value of Goods and Treasure entered Outwards at the Custom Houses of the following Ports, on an Average of Six Years; commencing in 1802-3, and ending in 1806-7, to the Districts and Places named in the Margin.		
	Total Value of Imports entered at the Custom House at Calcutta, from the Places named in the Margin.	Total Value of Imports entered at the Custom Houses in the Territory under the Presidency of Fort St. George, from the Places named in the Margin.	Total Value of Imports entered at the Custom Houses of Bombay and Surat, from the Places named in the Margin.	Total Value of Exports entered at the Custom House at Calcutta, to the Places named in the Margin.	Total Value of Exports entered at the Custom Houses in the Territory under the Presidency of Fort St. George, to the Places named in the Margin.	Total Value of Exports entered at the Custom Houses of Bombay and Surat, to the Places named in the Margin.
	Sicca Rupees.	Sicca Rupees.	Sicca Rupees.	Sicca Rupees	Sicca Rupees.	Sicca Rupees.
Coast of Malabar . . .	4,49,037	5,28,308	. . . .	45,42,156	4,76,912	. . . .
Northern parts of Guzerat .	. . . .	43,438	71.77 578	. . . .	59,650	64,65.831
Surat and adjacent villages	. . . .	27,811	17,02,512	. . . .	12.525	28,64 123
Bombay	. . . .	7,10,850	12.98,075	. . . .	16,78,076	15.34,670
Coast of Coromandel . .	9,56,520	. . . .	2,37,315	31,13,144	. . . .	1,52,238
Northern Circars . . .	. . . .	22,42.779	. . . .	. . . .	9,19.466	. . . .
Northern Division of Carnatic	. . . .	5,39,252	. . . .	. . . .	42.574	. . . .
Madras	. . . .	11,87.343	. . . .	. . . .	29,10,067	. . . .
Southern Division of Carnatic	. . . .	5,96.366	. . . .	. . . .	2,77,769	. . . .
Tanjore	. . . .	5,45.833	. . . .	. . . .	2,19,729	. . . .
Tinnevelly and Ramnad .	. . . .	5,11.576	. . . .	. . . .	1,81.521	. . . .
{ Malabar (province of) .	. . . .	3,73,479	21,14,418	. . . .	3,56,106	8,10,807
{ Canara	. . . .	1,82,225		. . . .	1,41,286	
Cochin	. . . .	23.442	. . . .	. . . .	7,966	. . . .
Bengal	. . . .	33,01.830	64.91 411	. . . .	5.22.288	4,60,311
Ceylon	80,278	6,78 981	90,069	2,42.868	8,08,679	63,101
Coast of Sumatra . . .	4,06,827	35,064	. . . .	4 53,542	19	. . . .
Arabian Gulf . . . . . }	11,90,223	1,28 811	25 83.042	18,59,964	2,85.334	15.44.662
Persian Gulf . . . . . }		75.671	25 60.939		3.85 855	17.20.760
Cutch and Sinde	. . . .	23,170	22 22.874	. . . .	57,413	14.51 787
Bassein and Villages . .	. . . .	. . . .	4.31.439	. . . .	. . . .	4.59.576
Goa and Concan	. . . .	2,29,039	15,93,955	. . . .	5,50,795	45,62.281
Mahratta Dominions . .	. . . .	1,48,710	. . . .	. . . .	1,63,434	. . . .
Travancore	. . . .	73.502	. . . .	. . . .	15,264	. . . .
Tranquebar	. . . .	4.86 365	. . . .	. . . .	5,62.224	. . . .
Pegu	3.91,118	1.80.744	1.940	1.32.148	1.35,575	2,045
Penang and Eastward . .	21,15,153	13,00,373	5.91.199	25.78,257	11,68.340	2,94,494
Batavia	34,345	1.65,406	1,84.936	1.35,147	47.701	14,097
Manilla	3,01.709	7,31,003	. . . .	3,30.474	2,41.490	. . . .
China	37,71,296	8.90,153	59,67.931	55 42.892	6 97,148	69,55.601
Various Places	2,77.446	2.45.341	4,93,450	4 16.961	2,35,975	3.03.445
Grand Total	100,73,952	162 06.168	357,43,083	193 47.553	131,61,181	2[illegible]00 929

We shall conclude this chapter with a statement of ships and tonnage arrived at, and departed from, the port of Calcutta; the ports under the presidencies of Madras; and the ports of Bombay and Surat. The statement, as it respects Calcutta, is made up from the 1st of June 1811 to the 30th of April 1812; that respecting the other ports, from the 1st of May 1811 to the 30th of April 1812.

CALCUTTA.

	Arrived.		Departed.	
	Ships.	Tonnage.	Ships.	Tonnage.
Under English colours	193	78 504	194	77,072
Portuguese	11	4,180	10	4,020
Spanish			1	650
American	8	2,313	8	2.369
Indian	389	66,227	386	65,650
Total . . .	601	151,224	599	149,161

MADRAS PRESIDENCY.

In the district of Vizagapatam, there arrived 223 vessels, tonnage, 25,740: of which 178, tonnage 15,076, were under Asiatic colours; 12, tonnage 1078, under Burmah colours; 33, tonnage 9595, under English colours. And there departed 305 vessels, tonnage 33,847; of which 257, tonnage 22,644, were under Asiatic colours; 13, tonnage 1218, under Burmah; and 35, tonnage 9985, under English.

In the district of Ingeram, containing the ports of Coringa, and Coconada, there arrived 131 vessels, tonnage 12,876, of which one, tonnage 80, was under Arab colours; 124, tonnage 11,961, under Asiatic; 6, tonnage 835, under English. And there departed 235, tonnage 26,714, of which 2, tonnage 400, were under Arab colours; 227, tonnage 25,694, under Asiatic; and 6, tonnage 620, under English colours.

In the district of Madepollam, there arrived 4 ships, tonnage 505, under Asiatic colours; and there departed 2, tonnage 219, of which 1, tonnage 37, was under Asiatic, and 1, tonnage 89, was under English colours.

In the district of Masulipatam, there arrived 755 vessels, tonnage 31 277, of which 1, tonnage 600, was under Arab colours; 721, tonnage 22,308, under Asiatic; 33, tonnage 8369, under English. And there departed 727, tonnage 31,048, of which 2, tonnage 175, were under American colours; 1, tonnage 600, under Arab; 689, tonnage 21,589, under Asiatic; and 37, tonnage 8859, under English colours.

In the district of Nellore and Ongole, there arrived 739 vessels, tonnage 24 948, of which 727, tonnage 21,990, were under Asiatic; and 12, tonnage 2958, under English colours. And there departed 137, tonnage 1909, all of which were under Asiatic colours.

In the district of Cuddalore, there arrived 33 vessels, tonnage 3329, of which 20, tonnage 1718, were under Asiatic colours; and 13, tonnage 1611, under English. And there departed 41, tonnage 4066, of which 21, tonnage 1967, were under Asiatic; and 20, tonnage 2099, were under British colours.

In the district of Tranquebar, there arrived 3 vessels, tonnage 236, of which 1, tonnage 65, was under Asiatic colours; and 2, tonnage 171, under English. And there departed 5, tonnage 600, all of which were under English colours.

In the district of Nagore, there arrived 1223 vessels, tonnage 38,868, of which 1, tonnage 240, was under Arab colours; 358, tonnage 18,114, under Asiatic; 1, tonnage 800, under Burmah; 863, tonnage 19,714, under English. And there departed 1798, tonnage 50,245, of which 1, tonnage 269, was under American; 167, tonnage 9561, under Asiatic; and 1613, tonnage 40,415, under English colours.

In the district of Ramnad, there arrived 107 vessels, tonnage 1792, all of which were under Asiatic colours. And there departed 119, tonnage 2952, all likewise under Asiatic colours.

In the district of Tinnevelly, there arrived 406 vessels, tonnage 10,100, of which 308, tonnage 5913, were under Asiatic colours; and 128, tonnage 4187, under English. And there departed 366, tonnage 8103, of which 246, tonnage 4162, were under Asiatic; and 120, tonnage 3941, were under English colours.

In the district of Malabar, there arrived 1146 vessels, tonnage 71,796, of which 3, tonnage 520, were under American; 1, tonnage 250, under Arab; 1141, tonnage 68,576, were under English colours; and 1, tonnage 200, under Portuguese colours. And there departed 469, tonnage 55,268, of which 4, tonnage 770, were under American; 1, tonnage 100, under Arab; and 464, tonnage 54,398, were under English colours.

In the district of Canara, there arrived 943 vessels, tonnage 36,951, of which 16, tonnage 13,292, were under Arab; 882, tonnage 23,409, under English; and 1, tonnage 250, were under Portuguese colours. And there departed 882, tonnage 24,576, of which 7, tonnage 2335, were under Arab; 874, tonnage 22,228, under English; and 1, tonnage 13, were under Portuguese colours.

In the district of Ganjam, there arrived 83 vessels, tonnage 9470, of which 80, tonnage 9311, were under Asiatic; and 3, tonnage 159, were under English colours. And there departed 206, tonnage 25,802, of which 197, tonnage 21,009, were under Asiatic; and 9, tonnage 4793, were under English colours.

The grand total of arrivals was 5826 vessels, tonnage 267,888; and of departures 5292, tonnage 265,249.

BOMBAY.

	Arrived.		Departed.	
	Ships.	Tonnage.	Ships.	Tonnage.
Under English colours	62	25,601	93	38.337
Spanish	2	950	2	950
Portuguese	3	1950	1	750
Arab	12	3660	14	4551
	79	32.161	110	44,588

SURAT.

	Arrived.		Departed.	
	Ships.	Tonnage.	Ships.	Tonnage.
Under English colours	9	1106	9	1030
Portuguese	4	2300	4	2300
Arab	19	1988	19	1988
	32	5394	32	5318

CHAP. VI.

Inhabitants—Hindoos—Their Persons &c. Religion—Castes — Superstitions — Pilgrimages — Marriages — Births — Education—Funerals—Manners and Customs—Food—Dress—Houses—Mode and Expence of Living—Laws—Government—Languages—Literature—Fine Arts—Sciences — Moors — Parsees — Christians — Jews — Population.

The Hindoos constitute the great mass of the population of India. Their features and persons seem to mark them out as a peculiar race. Their hair is long, deep black, and by no means coarse. Their nose and lips resemble those of the European. Their eye-brows are full, especially in the men. The eye itself discovers a tinge of yellow in the white of it, while the iris is black; but it possesses little animation or intelligence. The form of the face is oval. In the northern provinces of Hindostan the men are strong and muscular. To the south of Lahore they are generally delicate, and comparatively weak in the structure of their frames: even these, however, can undergo great fatigue. In the north their stature approaches that which is most common in the middle and south of Europe. In the south of Hindostan it diminishes sensibly, and in some parts it is very low. The Banians of Guzerat are reckoned the handsomest people in Hindostan; and some of the lowest castes, especially those whose business it is to remove all kinds of filth, and to bury and burn the dead, are deemed the most ugly. The female Hindoos of the higher castes are distinguished by the polish and softness of their skins, and by their fine long hair, black eyes, extended ears, and straight delicate persons. Those of the inferior castes, however, are generally of small stature, and by no means handsome

The most singular and striking feature in the character of the Hindoos is the permanency of their religion and customs. In almost every respect, these are the same now as they were in the most ancient periods of the history of India, of which we possess the most faint knowledge. It is supposed, however, by many authors, that the religion of Boodha, which still prevails in the Birman empire, Ceylon, &c. was in very remote times the prevalent religion of Hindostan. At present it is the Brahminical. Brahma, the creating power; Vishnu, the preserver; and Siva, the destroyer; are their three greatest deities. Since the creation of the world, however, Brahma interests himself little with mundane affairs. He is regarded as the father of legislators; since from his ten sons all science and laws proceeded, while he himself was the author of the vedas. Of his sons, Menou is the most celebrated. From him the Hindoos derive the institutes which bear his name. Brahma is represented with four hands, and with a crown on his head. The image of the flamingo, on the wings of which he is supposed to fly, is constantly placed near the statue in the temple. His wife, whose name is Seraswatee, is regarded as the patroness of learning. Vishnu, whose province it is to preserve and protect mankind, is represented as constantly attended by an eagle, or large brown kite, and as having four hands and a number of heads, emblematical of his omniscience and omnipotence. He is said to have passed through ten different incarnations, in all of which he destroyed the enemies of the human race. His wife, or female favourite, is Sree, the goddess of fortune and plenty. Siva is worshipped, not only as a destroyer, but also as a reproducer. His principal characters are Budra, Iswara, and Mahadeo. As the first, he is cruel; as the second, he is worshipped as the lord of all; and under the third name, he is known in the mountainous parts of India. He is a great favourite with the common people. He is generally represented with only one head; the number of his hands varies from four to thirty-two. Round his neck there are strung a number of human skulls. His hat is the skin of the tyger or elephant. His wife, Parvaty, is the goddess of time, and the punisher of evil doers. Besides these great deities, there is a number of inferior ones, the principal of whom are those who preside over death and hell. The gods of fire, of medicine, of the wind, and of the atmosphere. Ganesa, whom Sir William Jones justly compares to Janus, is invoked the first, by the Brahmins, in all sacrifices. His name, and that of Seraswatee, appear at the beginning of all writings; and his statue is placed on roads, and at the boundaries of villages, &c. There are two great sects among the Hindoos; the worshippers of Vishnu, and those of Siva. Formerly the worship of the former appears to have predominated on the Coromandel coast, while, on the opposite coast, especially in the neighbourhood of Bombay, that of Siva prevailed. The followers of Vishnu distinguished themselves by painting their faces with a horizontal line; the followers of Siva draw a perpendicular line. The gopee chundun, a white clay, taken from a holy tank near Positra in Guzerat, and chalk from the vicinity of the celebrated temple of Dwaraca in the same province, are used for this purpose, as well as distinguishing the different castes. There is, however very little difference in point of religion between these or any other Hindoo sects.

Vishnu is believed to have undergone nine avatars, or incarnations; the most celebrated is the eighth, when he appeared as Krishna, and, by his victories, obliged the Hindoos to substitute the offering of images instead of human sacrifices, and milk for blood. The tenth incarnation of Vishnu has not yet taken place. The religion of the Hindoos is contained in their sacred books, called Vedas, the divine authority of which, however, is rejected by the Jains in the south of India,—a sect who differ in some important tenets from those who follow the Brahminical religion. All the Hindoo sects believe in the immortality of the soul, transmigration, and a future state of rewards and punishments; but their faith in these important points is intermixed and debased by the most absurd legendary tales and mystical allegories.

The most ancient accounts which we possess respecting Hindostan, represent the inhabitants as divided into four castes, which still subsist. 1st, The Brahmins, who proceeded from the mouth of Brahma at the same time that he produced the Vedas; hence their province is to pray, read, and instruct. 2nd, The Chepteree, from the arms of Brahma, whose province it is, by strength and military prowess, to protect from ill: The Vaissya, or Brice, from the belly or thighs, whose province it is to supply the necessaries, comforts, and luxuries of life, by agriculture and commerce; and, 4th, The Sudras, from the feet, who are doomed to labour. Besides these, there are the Pascars or Chaudolas, who, having lost their caste, are held in the utmost abhorrence, and treated with the utmost indignity by all the other castes.

The Brahminsare subdivided into ten great classes, and these are further subdivided according to the districts they are born in and the families from which they are sprung. The Brahmins of Malabar will neither eat nor drink with Brahmins of the other parts of India; whereas the Brahmins of the north, especially the Haiga Brahmins, do not scruple to cultivate the ground, to trade as merchants, and to eat fish. Although the Brahmins are not permitted to exercise the sovereignty, yet they are of a higher rank than princes. The laws, religion and prejudices of the Hindoos, alike invest them with very great privileges and immunities: no greater crime can be committed than that of murdering a Brahmin. He pays only one per cent. per month interest for money, whereas the second caste pays one and a half; the third two; and the fourth five: if he finds what belongs to a stranger, he keeps the whole, or five-sixths of it; whereas another person finding his own, is obliged to give up a part of it. All the priests are chosen from this order; they may also become secretaries and accountants. Some of the divisions of the Brahmins deem it unlawful to destroy animal life, or even to eat eggs; others feed on fish or fowl, but not on animal food. The following extracts from the ancient Hindoo laws will further illustrate the comparative state of the Brahmins and the lowest castes. "If a Sudra reads the Vedas to any of the other three castes, or listens to them, heated oil, wax and melted tin, shall be poured into his ears: if he gets them by heart he shall be put to death: if he spits on a Brahmin, his lips shall be cut off. A Sudra, Brice, or Chepteree, guilty with a woman of the Brahmin caste, who has a master, shall suffer death, by mutilation and burning. A Brahmin guilty with a woman of any of the castes, who has a master, to be fined from 8 to 16 rupees. The shadow of a Parian passing over victuals, milk, or even water, defiles it." The institutes of Menou expressly declare that the abode of a Parian must be out of the town: he must not have the use of entire vessels; his clothes must be the mantles of the deceased; he must continually roam from place to place, carry out the corpse of every one who dies without kindred, be the common executioner, and receive his food in potsherds, but not by the hands of the giver. No Hindoo is allowed, by his religion, to quit the caste in which he was born. Tippoo forced 12,000 Brahmins of the coast of Malabar to swallow beef broth, in consequence of which they lost their caste, became outcasts, and were either starved to death, or committed suicide.

Almost every action in the daily life of a Hindoo is prescribed by his religion; there are rules for diet, and for the manner and time of eating: he must pray thrice a day, morning, noon, and evening. The sipping of water is indespensably necessary in all his ceremonies and religious acts, and running water is always preferred. The Gayatrie, which is regarded as the most holy text in the sacred books, is repeated a hundred or a thousand times, according to the magnitude and the variety of the sins to be expiated. In ancient times, animals, and even human beings, were sacrificed to their gods; but, with the exception of the Ghatteries, who on great occasions choose a human victim, and always sacrifice animals, only fruits, flowers, incense, and money, are offered in sacrifice.

There are 28 holy rivers, dedicated to one or other of their great deities, beginning with the Ganges, and traversing the whole continent to the Indus; but the virtues of the Ganges are universally allowed to be pre-eminent. Its water is conveyed to distant parts; and the dying are often brought to it, that, with their feet in it, they may have a happy passage out of life. If persons think of it, or invoke it, when they bathe in any other water, they will still derive all the benefits of its virtues. The Brahmins also represent four confluences of rivers, or prayajas, as sacred: That at Allahabad, where the Jumnah flows into the Ganges, is the largest and most holy. Many pilgrims to this place annually drown themselves, being conducted to the middle of the river, and then sunk, with pots of earth tied to their feet. There are also a great number of holy places in Hindostan. The following are some of the most distinguished: 1st, Benares, and the district ten miles round it. 2d, Oude, where Rama was born. 3d, Metta, famous for the birth of Krishna. 4th, Hurdwar, already noticed for its great fair; this is frequented by the Gosseins, or worshippers of Siva, who are distinguished by a wrapper of cloth, dyed with red ochre; the Bairajies, disciples of Vishnu, who are distinguished by two perpendicular stripes of yellow ochre or sandal on the forehead, and a string of beads round the neck; the Udassies, the followers of the founder of the Seik sect, who are distinguished by a conical cap and fringe; and the followers of Mahadeva, who have a longitudinal slit in the cartilages of the ear. The period of bathing is when the sun enters Aries; and every twelfth year, when Jupiter is in Aquarius at this time, the concourse of people is greatly increased. No particular ceremony is observed in bathing. 5th, The Hindoos regard all Cashmere as holy land. 6th, The famous pagoda of Juggernauth, in the province of Orissa, is another place of great sanctity. The popular belief is, that the body of Krishna was carried there by an inundation from the vicinity of Surat. At Juggernauth, a Brahmin may receive food from the hands of a Sudra. The idol Juggernauth is placed on a throne, which is raised on a car 60 feet high; and it is said, that many of the pilgrims who resort to this place throw themselves under the wheels of this car, as it is dragged along. The number of those who come to die here is so great, that for 50 miles the ground is strewed with human bones. All persons, except certain devotees, are obliged to pay a tax before they enter the temple. From the 1st of May 1806 to the 30th of April 1807, this tax produced 117,490 sicca rupees. The annual expenditure of this temple is estimated at 56,000 sicca rupees which arises from lands and villages, and an allowance of 20 per cent. from the produce of the tax. The most holy and frequented periods of pilgrimage are in March and July. 7th, Gayah, in the province of Bahar, which is esteemed the birthplace of Budha, is a place much resorted to by pilgrims. The tax levied on them by the Bengal government amounts annually to about 1½ lacks of rupees. See JUGGERNAUTH. 8. Dwaraca, in the south-west extremity of Guzerat, which was long the residence of Krishna, is on that account much resorted to. The ceremonies consist in bathing in a sacred stream—in receiving a stamp impressed with an iron instrument by a Brahmin. On this instrument are engraved the spell, the ring, and the lotus, the insignia of the gods. A pilgrim may receive not only his own stamp, but stamps on his body for his friends. Lastly, The pilgrims visit the isle of Bate, where there is an image of Krishna. For all these he pays a fixed sum. It is computed, that the revenues of the temples here amount to a lack of rupees, and that 15,000 pilgrims annually resort to Dwaraca. There are several other places of pilgrimage, particularly at Parkur, to which place 70,000 pilgrims annually go, to see an idol made of marble, which, after the ceremonies are performed and paid for, is carefully concealed in a spot known only to a few. And at Sagur island, which lies at the junction of the Palicut branch of the Ganges with the ocean, many of the pilgrims used to sacrifice themselves or their children to the alligators and sharks, which abound here; but in 1802 the practice was abolished by Lord Wellesley.

It would carry us far beyond our limits to notice all the various superstitious opinions and practices of the Hindoos. Some, however, may be very briefly touched upon. If the bodies of those who have not been careful, during their lives, to secure the pardon of their sins, are thrown into the Ganges, they will be allowed to transmigrate in such another form as will at last bring them to heaven. The souls of the deceased may also be released from punishment, if their friends will put on a stone, rendered sacred by having been impressed by Vishnu, a certain paste, and at the same time repeat the name of the deceased. The painful distortions and tortures to which the Joguis subject themselves, are too disgusting to be related, and could not be credited except on indubitable testimony. Different kinds of suicide are held by the Hindoos to be meritorious, viz. starving; covering themselves with cow dung, and setting it on fire, and thus being consumed; burying themselves in snow; and cutting their throats at Allahabad,—to this last species of suicide, performed at the eclipses of the sun and moon, great wealth is promised in a future state. Sur, is the art of predicting events, by observing in what manner the breath issues through the nostrils. Akum, teaches what is contagious and hurtful, and what advantageous. Shooghun, is the art of discovering what is happening, or will happen, by observing the motions of birds. Keywall, are omens learned by throwing dice. Samdirg, by observing the form of the limbs, their motions, and the lines and moles on the body. Garud, is the art of repeating incantations for recovering a person stung by a serpent. Inderjal, includes the art of necromancy, talismans, and slight of hand. The following diseases are regarded as punishments for crimes in a former state: Lameness, for having kicked a Brahmin; a fever, for killing an innocent Chehteree; a cough, for killing a Brahmin: For these punishments, the expiations are presents of gold to Brahmins. Some of their superstitious practices have already been described: a few others may be noticed. The practice of the widow burning herself on the funeral pile of her husband, is well known. There are nine kinds of trial; by ordeal—by the balance—by fire—by water—by poison—by the cosha, or drinking of the water in which idols have been washed—by rice—by boiling oil—by red hot iron—and by images. Infanticide was practised by many tribes of Hindoos; by some, their children's lives were devoted to the sacred waters. Other Hindoos, of high caste in Benares, on a prospect of being unable to provide suitably for their female children, were induced, not unfrequently, to put them to death; and other castes of Hindoos, with a view to deter the execution of legal process, or in revenge for a supposed injury, would murder their females or their children, being persuaded that by such means they could obtain spiritual vengeance against their adversaries.

This last species of infanticide, which, as well as the others, has been abolished by the British government, is one of the modes of what is called *dherna;* this is generally practised by a Brahmin, in order to obtain justice, or enforce a petition. For this purpose he places himself before the door of the person from whom he wishes to obtain his object, and threatens, if he perseveres in refusing it, that he will put an end to his life by a dagger, or poison, which he always has in his hand. The Brahmin, as well as the person thus besieged, fast, so that the latter is almost always obliged to yield. Another mode of dherna, which is employed to recover property, is by the person standing up with an enormous weight on his head, which he swears to support till he attains his object. But the most desperate species of it is that called *koor;* a pile of wood is erected before the door of the besieged party, and on this a cow, or an old woman, is placed; the pile is set fire to, unless the request is granted. These species of dherna are common in Hindostan Proper, and in some parts of the Decan, especially among the Mahratta tribes; but they do not appear to prevail in the southern parts of India.

At Surat, there is an hospital for animals, supported by the superstition of the Hindoos; not only quadrupeds and birds are received into it, but it has also wards for bugs and other vermin, which are carefully nourished; this is, perhaps, an extreme instance of the superstitious dread which the more rigid Hindoos entertain of destroying animal life; but the practice of sweeping the ground carefully, and very gently, in order that no living being may be trod upon, and of constantly keeping gauze before the mouth, that no insect may be inhaled by the breath, are by no means uncommon among the more devout Brahmins.

The religion of the Hindoos strongly enjoins marriage as a sacred duty; but as strongly reprobates the marriage of any of the younger branches of a family before the elder: marriages usually take place when the children are 11 years old. Polygamy is permitted, but seldom practised, except where the wife is barren. As a powerful religious prejudice or feeling prevails in favour of leaving a representative, a third marriage is even allowed; and if all are unfruitful, a child is adopted. The marriages of the Hindoos are celebrated with great pomp and expence, and are attended with a vast number of ceremonies: the most material part of the ceremony consists in the bride's taking seven steps, for the marriage is not complete till the seventh step is taken. In the evening the bridegroom points out to his bride the polar star, as an emblem of stability; for three days they remain in the house of the bride's father, where the marriage is celebrated; and then a formal entry into the bridegroom's house takes place: many ceremonies attend this, the principal of which is the liberation of a cow, which had been tied up in the northern side of the apartment, by a barber, who attends for that purpose, and exclaims, "the cow! the cow!" The Hindoos make presents to the fathers of their brides, instead of receiving dowers. All persons bearing the sixth degree of affinity, or even the same family name, are forbidden to intermarry.

As it is deemed of such high importance to have children, the wife, during her pregnancy, is attended to with great care; when she has attained the seventh month, a particular festival is celebrated, and another when she is delivered. As soon as the child is born, it is bathed with cold water: information is immediately sent to the magistrate, in order that it may be added to the list of those who compose the caste to which it belongs: its birth day is also entered by the Brahmins, in registers kept by them in the temples, of births, marriages, and deaths. The astrologer next foretels its destiny. On the 10th day after the birth, when the period of purification is complete, a name is given to the child, from the elements, plants, or stars, or from the symbols by which they are represented. On this occasion, there is a burnt-offering of wood, rice, and butter. Water is consecrated by the Bramins, and with this the child, and every person that is present, is sprinkled. If the parents are too poor to pay a Brahmin, the name of the child is performed by the chief of the caste. New ceremonies, with presents to the Brahmins, take place when boys arrive at the age of seven or nine,—the period at which the three first castes receive the string, which is one of their distinguishing marks. In cases of adoption, the child is placed on a large brass plate, in the house of the person who means to adopt it; and after the husband and wife have repeated a certain form of words, the ceremony is finished by their drinking water mixed with saffron, and pouring part of it on the feet of the child; if they afterwards have children, the adopted child retains his rights, as if he had been their own, and first born.

There are schools in almost every village, for teaching reading, writing, and accounts; the children sit in the open air, under the shade of a cocoa nut, or other tree, and trace on the sand, with the fore-finger of the right hand, the elements of the alphabet, and then smooth it with the left hand. This mode of teaching, like all the other customs and practices of the Hindoos, is very ancient, being mentioned by Megasthenes. The village schools are only day schools; each child pays one or two anas per month. In opulent families teachers are retained as servants, as the children of respectable Hindoos seldom go to school. Persian and Arabic are taught for the most part by molavies, who frequently have a few scholars in their houses, whom they support as well as instruct. When the children have made a tolerable progress in writing on sand, they begin to write on palm leaves, with an iron pen, or style. When the teacher enters the school, his pupils throw themselves down at full length before him, and place their right hand on their mouth, from which it is not withdrawn till he gives them permission to speak. In some parts of Hindostan, there are schools supported by voluntary contributions, or by the produce of land. In the 24 Pergunnahs, a small district in Bengal, which contains only about 882 square miles, there are 190 seminaries of this description, in which Hindoo laws, grammar, and metaphysics, are taught; the annual expence is estimated at 19,500 rupees. When the education of a Hindoo is completed, he commences the business of his father.

The ceremonies which are practised in cases of illness, which it is anticipated will prove fatal, are numerous, and some of them of such a nature as seem intended, as they are certainly calculated, to hasten the death of the patient; their professed object is to secure his salvation. After these ceremonies have been performed, it is deemed unholy to live; and the patient, if he does survive, loses his caste, and becomes a pariar. At the approach of death, he is laid on cusa grass, in the open air, for it is deemed unholy to die in the house; or, if the Ganges is near, he is carried to its banks, and there bequeaths part of his property to the Brahmins. Water and mud from this river are thrown upon him and the salagrama stone, already described, is placed near him. Several other ceremonies are performed till he dies, when another set of ceremonies commence. All the relations repair to the house of the deceased. Cries, lamentations, dishevelled hair, beating of breasts, and rolling themselves on the ground, are common among the women. After all the ceremonies are performed, preparations are made for the funeral: the body is washed; the sign of the caste is marked on the forehead, and betel is put into the mouth. It is carried to the place of funeral by pariars; and when it arrives there, the nose and stomach are pinched, water is flung in the face, and tomtoms and trumpets are sounded, to perceive if it be really dead. The funeral ceremonies are always performed at night. The followers of Siva bury their dead, whereas those of Vishnu burn them. The burying grounds are out of the towns, generally near a river or tank. Each caste has their separate burying place. As a dead body is supposed to pollute not only the house in which it is, but also the neighbourhood, all who live in the same street abstain from food till it is removed. It is not carried out by the door, but through a hole in the wall made for that purpose, in a sitting posture. After the funeral, the nearest relation returns to the house of the deceased, preceded by a person bearing a staff, to drive away evil spirits. A variety of ceremonies are then performed for a few days; and till these are completed, all the relations are restricted to one meal a-day; and in cases where the body has been burnt, they are not permitted to sleep on a bedstead, or adorn or perfume their persons till the ashes are gathered. This cannot be done till food has been offered to the manes of the deceased, the Brahmins have been fed, and the officiating priest received his fee. The ashes are gathered according to a prescribed form, and then thrown into the water. Ninety-six formal obsequies are performed in the course of the year, besides daily oblations to the manes. The mourning of the Hindoos is very simple, and in some respects resembles that of other Asiatic nations. It consists in shaving the hair; covering the head with the linen which they usually wear on their shoulders; and abstaining from the use of betel. As this last is deemed very annoying, the abstinence lasts only for a few days.

The customs of the Hindoos which we have described are immediately derived from, and intimately connected with, their religion and superstitions. There are others, however, to which we must briefly advert. The extreme fondness of the Orientals for formal and minute ceremonies in their interviews with each other, is well known. The most important of these ceremonies, practised especially among the Mahratta tribes, is called milling. A detail of the minutiæ would be tedious and uninteresting. It takes place only between two persons of equal rank, and generally when they are in the field with their troops. A spot mid-way between their camps is selected for the interview; and towards this spot two splendid and magnificent cavalcades set off, as nearly as possible, at the same time. As soon as they come in view of each other, the titles, rank, &c. of the parties, are solemnly and loudly proclaimed by officers kept for that purpose. The person to whom the honour is intended then first lights from his elephant, and mills with all the attendants of his visitor. The ceremony consists in embracing; laying the head first over the right, and then over the left shoulder, and making a salute by lifting the hand up to the forehead. No business is transacted on these occasions. When the chiefs visit each other in their respective camps, valuable presents are given; and on all occasions of visiting among people of all ranks, betel is invariably served round: without it no person ever leaves the house of the person he visits.

There are some customs of the Hindoos which bear a striking resemblance to some of the customs of Europeans. During the festival of Huli, which is held in the month of March, the custom of what we call making April fools is practised; and on one of the festivals of Bhavani, which occurs about the beginning of May, the caste of cow-keepers erect a pole adorned with flowers, round which they perform certain ceremonies, very similar to those which are performed round the Maypole in England.

The Hindoos are much addicted to gaming, especially cock-fighting; besides cocks, quails and other birds are trained for this purpose. At these games, the Hindoos will frequently lose all their ornaments, and even part of their dress. Chess is a favourite play with them, and appears to have been played in the most remote periods of their history, but in a much more complicated form than at present. The mode of playing it, in use among the modern Hindoos, very strongly resembles the European mode. Dancing, tumbling, slight of hand tricks, and wrestling, are favourite amusements with the Hindoos. Dancing, however, is not permitted, except to a particular caste, who are trained to the art. The dancing-girls, or devadassi, are generally of agreeable persons and countenances; their motions display great grace and ease, but are not always scrupulously decent. They devote themselves to the honour of the gods; but this does not prevent them from hiring themselves out to those who wish for their exhibitions; and accordingly their dancing forms part of all great entertainments. They are adorned with jewels; and their robes, which are made not to impede their motions, and to display their persons to the greatest advantage, are hung with little bells There are also male dancers, but these confine themselves to pantomimes. Surat is famous for its dancing-girls. The feats of the jugglers far surpass any that are practised by those of Europe;

in connection with them may be mentioned the exhibition of dancing snakes, which are handled without the least danger. The feats of the professed wrestlers are very surprising, exhibiting a degree of strength and agility, and at the same time of elegance and grace in their attitudes, of which, it is said, those who have not witnessed them can form no adequate idea. But the most favourite amusement of the Hindoos consists in hearing the recital of poems or histories. These are recited by persons who make it a regular business; sometimes they merely recite; at others, a kind of recitative is performed.

The general character of the Hindoos varies much in different parts of India. Even under the Bengal presidency, there are two distinct descriptions of Hindoos. Berar Patna, the Bengalese, as they are called, are weak in body, and timid in mind; and that timidity is accompanied, as usual, by servility and fraud. This class seem to diminish, both in their bodily strength and mental qualities, as they approach the coast; those below Calcutta being reckoned the most abject and imbecile in body and mind, of all the Hindoos subject to the British government. As soon, however, as Bahar is entered, or rather the district of Benares, a different race appears. Throughout all the territories in that quarter, subject to the Company, and the Nabob of Oude, the Hindoo inhabitants are distinguished, not more by their lofty stature and robust frame of body, than by their courage and mental qualities. The great part of the army on the Bengal Establishment is composed of these men; and it is remarkable, that there are few corporal punishments in it, the slightest reproach being felt as severely as the greatest punishment is among soldiers of European nations. On the coast of Coromandel, the Hindoo is inferior, both in bodily and mental qualities, to the Bengalee; the other inhabitants vary much in their character. The Mahrattas are bold, active, and insidious: among the higher classes, and especially among the Brahmins, there is frequently displayed a very extraordinary degree of urbanity, proceeding, not from feeling, or even politeness, so much as from hypocrisy. Their command of temper and countenance is indeed astonishing.

One of the peculiarities of the Hindoos, recorded by Arrian, &c. is their not eating animal food; and this peculiarity still exists. Throughout the southern parts of India, however, fowls are a common article of diet with the lower castes; but in the northern parts, they are seldom eaten, except by the Mahomedans and Europeans. Fish is eaten even by some of the Brahmins, as has been already noticed; but in all cases where fowls or fish are eaten, they are mixed with a very large portion of spices. Vegetables are their principal diet, in all cases most plentifully mixed with vegetable oils. Wheat is used by some of the natives of northern Hindostan, but in no great quantities. Rice, barley, and different species of pulse, made into cakes, is the usual food in Hindostan Proper and the Decan;—raggy, in Southern India. Mrs. Graham thus describes the mode of making rice cake:—After the rice had been pounded by a mill already noticed, the woman, whom Mrs. Graham observed, carefully washed every vessel, though apparently clean before, "and then mixed her rice-flour with milk, water, and salt, when she beat it between the palms of her hands till it was round, and then baked it on a round iron plate, such as is used in Scotland for oat cakes. Besides these cakes, she prepared a few heads of maize, by rubbing off the chaff, and laying them in the fire to roast for the family supper. At the next hut, the woman was grinding missala, or curry stuff, on a flat smooth stone, with another shaped like a rolling-pin. Less than an English half-penny procures enough of turmeric, spice, salt, and ghee, to season the whole of the rice eaten in a day by a labourer, his wife, and five or six children. The vegetables and acids he requires are found in every hedge." *Journal*, p. 20. The Hindoos eat their food generally from dishes made of the leaves of the plantain. In Bengal, a single leaf is sufficiently large for this purpose; but in places where they are not of a proper size, they are fastened together by people called barhi, who make it a particular business, are to be found in every village, and receive their allowance of wages from the Zemindar and Ryot, in the same manner as the Brahmin, bard, &c. The potter, also, who makes the earthen vessels used for cooking the food, or holding water, receives his allowance of grain or of money. Water is the only drink of respectable Indians; toddy and other intoxicating liquors are seldom drank except by the very lowest castes. In such a hot climate, it is absolutely necessary to cool the water and other liquids before they are drank. The vessels used for this purpose are made in most parts of India, but principally in Guzerat. Smoking is very general in the northern parts of India; but in the Carnatic, and other parts of the south, it is held in great disrepute. Here, taking snuff is much more common than in Bengal. The lower classes indeed smoke segars; but by this practice, a Brahmin would lose his caste; and even those of the Sudras, who are comparatively rich, would be dishonoured. It is scarcely necessary to state, that the religion of the Hindoos forbids them to taste any food or liquid, which has been prepared by, or belongs to persons of a different religion.

The distinctions of dress in India consist almost entirely in the fineness of the linen of which it is made. The kinds and form of their garments are the same that they were 2000 years ago, with the exception, perhaps, of the turban, the jumnah, and long drawers, which are supposed by some to have been borrowed from the Mahomedans. The ancient dress of the Indians, as described by Arrian, consisted of a muslin cloth thrown loosely about the shoulders, and a muslin shirt which reached to the middle of the leg. He likewise notices that their beards were dyed various colours. The dress of the women at present, is very simple and graceful; a boddice, or close jacket, with half sleeves, fastened behind, and generally made of coloured brocade, covers their breasts, without concealing their form. The shalice, a wide and long piece of coloured silk or muslin, is wrapped round the waist, in such a manner as to leave part of one leg bare; on the other side, it reaches below the ancle, which it covers with long and graceful folds: in front it is gathered up; and the upper end, which crosses the breast, is sometimes thrown over the head as a veil. The hair is generally tied in a knot on the back part of the head, and the roots are often stained red. The hands and feet are covered with bracelets and rings; and a valuable jewel is frequently fastened in the nose. The large black eyes of the Hindoo women are lengthened out at the corners by black streaks: and the palms of their hands, soles of their feet, and their nails, are stained red with the juice of the seeds of the *hinsea* plant. The dress of the men is either in what is considered as the ancient Hindoo fashion, or in that which resembles the dress of the Mahomedans, and which, as we have already mentioned, is supposed to have been introduced by the Moguls. The former consists of a piece of cloth fastened round the waist, reaching down to the knee. Round the body another piece is folded, in different modes, according to the fancy or taste of the wearer. A piece of fine muslin envelopes the head. In the other fashion, wide drawers reaching to the ancles are worn, together with a long robe, which is crossed over the breast, tied round the loins by a scarf. A kind of turban is worn on the head. The Indians who wear this dress are distinguished from the Moors by the circumstance, that their robes are fastened on the left side of the breast, whereas those of the Moors are fasted on the right side. Sandals, or slippers, are worn on the feet, the latter having a long crooked point. The Hindoos generally shave their heads and beards, with the exception of a lock of hair on the back part of their head, and a small pair of whiskers. The different castes are distinguished, with respect to their dress, by strings worn round the shoulders. The string of the Brahmins is composed of threads of cotton; the number, mode of spinning and dyeing, and of knotting, are most especially marked out by their religion. The Chehteree caste wear a string composed of fewer threads; the Brice have one with still fewer threads; but the Sudras are not permitted to wear any string.

The houses of the great mass of the Hindoos are made with little trouble or expence, and in a very short time. A number of mats, formed of the leaves of the palm or cocoa nut tree, are spread over a roof made of bamboo laths, whilst the bamboo, unsplit, forms the supports of the house. In it, a Hindoo can live for six months in those parts of Hindostan which are not subject to much rain. The houses of rather a better description have walls made of mud, which the intense heat of the climate soon renders sufficiently hard. These walls are raised to the height of six or seven feet; the covering consists of rushes or rice straw. On the west of India, the practice of covering houses with tiles is general. Different styles of building prevail to the north and the south of the Krishna. To the north of this river, the roofs are in many cases pitched and thatched; to the south, those of the lower classes are flat roofed, and covered with mud and clay. The houses in the south of India, also, usually consist only of one story, enclosing a court, with a small gallery supported by slight wooden pillars. The houses of the more opulent consist of two stories, and are sometimes built of brick. The upper story is set apart for sleeping, studying, or performing any business in which they do not wish to be interrupted. On the floor of a gallery which runs out towards the street, and is raised a little above it, the palanquin bearers, and other attendants, often lie down. The cement employed in the construction of the best houses is composed of sugar and lime. The best sort of cari, which is used in painting their houses, is produced in North Canara.

The furniture of the houses is in general very simple. The floors of those of the lower classes are either the bare mud, or are covered with straw. The floors of the apartments of the higher classes are covered with mats and carpets, over which is frequently laid white cotton cloth. The other articles of furniture in the common houses consist of a bed-frame, on which a mat is placed; a few flat dishes of copper or brass; a brass drinking vessel with a spout; a pot in which they boil their rice; a lamp; and a large wooden mortar to pound the rice. A Hindoo has no table: he eats alone upon the bare ground. The whole of what may be called his table service consists of a brass basin and an earthen plate.

From the account we have given of the dress and food of the Hindoos, it may easily be perceived that the expences of their mode of living must be very trifling; otherwise, indeed, it would be impossible for the Hindoo labourer, whose wages seldom reach five shillings a month, and is in general much lower, should be able to support himself and family. On this subject there is some curious and interesting information in the reports on the affairs of the East India Company laid before Parliament. The following table exhibits a statement of the expences and earnings of the family of a Madras labourer, consisting of himself, his wife, and five children, the eldest eight years of age,—the youngest an infant.

				Per Day.			Per Month.			Per Year.		
Necessaries.				Pag.	Fan.	Cash.	Pag.	Fan.	Cash.	Pag.	Fan.	Cash.
Rice for the husband and wife at 1½ measure per day				0	1	40	1	0	0			
Curry stuff				0	0	15	0	5	50			
Salt fish, or greens and herbs				0	0	10	0	3	60			
Fire-wood and bratty				0	0	20	0	7	40			
Lamp oil, and oil for the hands				0	0	20	0	7	40			
Salt				.	.	.	0	0	40			
Betel nuts and tobacco				0	0	20	0	7	40			
Rent of a small room				.	.	.	0	2	0			
Boy, 8 years old, ¼ measure of rice . . .				0	0	20	0	7	40			
4 infants ⅜ do. do. . . .				0	0	30	0	11	20			
							2	8	10	26	6	10
2 man's cloth for a year . . .	0	22	40									
1 turban, do.	0	11	20									
2 woman's cloth, do.	1	0	0									
Cloth for 4 boys	0	17	0									
										2	5	60
										28	11	70
Earnings.												
For the man				0	3	0	2	0	0			
For the woman				0	1	40	1	0	0			
For the boys				0	0	60	0	22	40			
										42	0	0
Deduct for casualties				.	.	.	.	.	.	9	0	0
										33	0	0
Savings				.	.	.	.	.	.	4	33	10,
										or *L*1	17	10½

The following is a statement of the expences for a month of a Madras middling Hindoo family, being that of a dubash, or interpreter, who kept a hackery, or carriage, and 2 bullocks. The family consisted of 6 men, a boy of 12 years old, and 12 women; in all 19 persons.

	Pag.	Fan.	Cash.
30 Mercals of rice, at 1 mercal per day, at 5 mercals per pagoda	6	0	0
30 Measures of do. at 1 measure per day, for the daily beggars, &c.	0	33	60
30 Do. of Nutcheny is 3¾ mercals per month, at 8 mercals per pagoda	0	22	0
3 Do. of doll and green grain do. at 4 do.	1	0	0
Bazar expences, such as ghee, spices, curry, &c.	5	0	0
500 Billets of fire-wood, and bratty	3	0	0
30 Bundles of betel, at 1 bundle per day, at 1-30 each	0	41	20
5 Viss of boiled nuts, at 15 fanams per viss	1	30	0
1 Do. of tobacco	0	7	20
9 Measures of lamp-oil, 54 fanams; 1 measure Gingeley-oil, 7	1	16	0
Sundry expences for vegetables	5	0	0
	25	15	20
	*L*10	2	8½
Hackery Expenses.			
Horse grain for the 2 bullocks, 90 measures, at 3 measures per day, at 8 mercals per pagoda	1	18	20
Straw, 20 bundles, at 4 fenams per bundle	1	35	0
Hackery driver's pay	1	33	60
1 Servant, 1 pagoda, 1 washer, 22-40	1	22	40
	31	34	60
	*L*12	14	2
Cloth for the men and women for a year	80 Pag.		
Father and elder brother's anniversaries	25		
Expences of the Ponjal feast	15		
	12)120(		
Per month	10	0	0
Total expence for a month	41	34	60
	*L*16	14	2
Total per annum	*L*200	10	0

1 Pallem = 1 oz. 25 dr.
40 Pallem = 1 viss = 3 lbs. 2 oz.
8 Viss = 1 maund = 25 lbs.
20 Maunds = 1 candy = 500 lbs.
1 Garce = 9256 lbs.
400 Mercals = 1 garce.
8 Measures = 1 mercal.
1 Pagoda = 8 shillings.
45 Fanams = 1 pagoda.
80 Cash = 1 Fanam.

The cash is a copper coin 37½ to a penny, coined and sent from England to India.

The following is a general estimate of the consumption of natural and manufactured produce in Bengal, Bahar, &c. supposing them to contain 15 millions of native inhabitants, and that these are divided into eight classes:

Number of Persons in each Class.	Number of Families of 4 Persons.	Average rate of each Person per Month.		Average rate of each Family per Month.	Average rate of each Family per annum.	Total consumption per annum.
		Rup.	An.	Rup.	Rup.	Rup.
500 000	125.000	6	4	25	300	37.500.000
1,000,000	250 000	3	12	15	180	45 000 000
1,500,000	375.000	2	8	10	120	45.000,000
2,000.000	500 000	2	0	8	96	48,000,000
3,000.000	750.000	1	8	6	72	54.000.000
5,000.000	1,250,000	1	0	4	48	60.000,000
1,500.000	375.000	0	12	3	36	13.500,000
500,000	125,000	0	8	2	24	3 000,000
15,000.000	3,750,000					306.000,000

4000	Europeans of the 1st rank, at 75 rupees per month, or 900 per an.	3 600,000
3000	do. of the 2d rank, at 30 do. 360	480,000
13,000	do. of the 3d rank, at 8 do. 96	1 248 000
	Total consumption of European and native inhabitants	311,328 000
	Elephants at 10 rupees per month; camels and horses at 4; draught and carriage bullocks at 2; sheep, goats, hogs, poultry, adequate to the consumption of 125 000 families, at 24 rupees per annum,	3,000,000
	Total	314,328,000

On the supposition that four-fifths of the expences of the natives are for food and other necessaries, the average daily expenses of the families of the

	Rup.	Ana.	Pice.
1st class will be	0	10	8
2d.	0	6	5
3d.	0	4	3
4th.	0	3	1
5th.	0	2	7
6th.	0	1	8
7th.	0	1	3
8th.	0	0	10
	1	14	9

—for the total expenditure (clothing excepted) of eight families of four persons, from the prince to the beggar.

The expenditure for clothing will be in the families

	Rup.	Ana.	Pice.
of the 1st class	5	0	0
2d.	3	0	0
3d.	2	0	0
4th.	1	10	0
5th.	1	3	0
6th.	0	13	0
7th.	0	9	7
8th.	0	6	5

	Rup.	Ana.	Pice.	
Persons of 1st class	1	4	0	for raiment and washing per month.
2d.	0	0	6	
3d.	0	1	7	

The average expenditure allowed to the three first classes for food, &c. per day, is 1 ana 9 pice per person.

And for the other five classes rather less than 6 pice per person.

In the first class are included, the nabobs and their near relations, rajahs, superior zemindars, merchants, principal shroffs, or bankers, banians, superior brahmins, &c.

In the second, zemindars, principal renters, inferior shroffs, traders, head circars or accountants, superior officers of the judicial court, collectors, mohorirs or writers, moonshees or secretaries, muftis, second order of Brahmins, first rank of native officers, &c.

In the third class, inferior zemindars and renters; head Ryots or principal men in villages, shop-keepers, gomastaks or factors, second rank of native officers, attendants of superior zemindars, superior menial servants, &c.

In the fourth class, petty zemindars, renters, sepoys, upper servants, head artificers and mechanics, petty factors, pykats, or foot messengers, superior weavers, petty shopkeepers, &c.

In the fifth class, superior labouring Ryots occupying lands, servants, artificers, distillers, confectioners, retailers of cowries, common weavers, washermen, sailors, &c.

In the sixth class, second order of Ryots occupying lands, ordinary artificers, common servants, bearers, boatmen, fishermen, &c.

In the seventh class, hired husbandmen, herdsmen, shepherds, common labourers, &c.

In the eighth class, the most indigent and lowest orders of society, beggars, &c.

One Rupee = to 2s. 6d.
16 Anas = to 1 Rupee.
12 Pice = to 1 Ana.

Such Hindoos as can afford it travel either in a hackery or a palanquin. The first resembles a turret, fixed on a small cart with two wheels, with curtains round it: it is drawn by oxen. The palanquin is a couch covered with a canopy, suspended on poles formed of bamboos; two bearers take hold of the poles at each end, and will carry the palanquin at the rate of nearly six miles an hour. Caravansaries are common on most of the roads in India: they consist of three apartments; in one the palanquins are deposited; the others are intended for the travellers to sleep in; on these mats are spread: boiled rice and water is given free of expence; and other articles of Hindoo diet may generally be obtained from the Brahmins who reside in the neighbourhood.

The ships and boats of the Hindoos are of a very simple construction; they make little use of nails or iron work; the planks are sewed together; the seams filled up with the fine fibres of the cocoa nut tree, and daubed over either with cocoa nut oil and lime, or with fish oil. In some cases, however, their ships are constructed more after the European manner.

An Indian army consists not merely of those who are to fight; they indeed compose a small portion of it; but of the wives and families of the soldiers, merchants and their servants, and adventurers of all descriptions: Every horse has two persons attached to it, besides the rider, one of whom cleans it, and the other provides the forage. The devastations created by an Indian army are dreadful; on its approach the whole population emigrates; the people of a district thus deserting their homes are called the *wulsa:* before a British army, however, unaccompanied by Indian allies, this emigration never takes place. That the Hindoos are capable of being made good soldiers is abundantly proved by the state of discipline, firmness, and courage, to which the Sepoys in British pay have been raised.

In Hindostan all titles are connected with military power; if this is lost, the title is soon lost also. Latterly, however, great wealth and influence also confers a title, in the same manner as a learned person is saluted by the appellation of pundit.

The laws of Menou are the most ancient and most highly venerated among the Hindoos. They consist of eighteen principal articles: the ten first relate to debts, deposits, partnerships, boundaries, sales, &c. and masters and servants; the eleventh and twelfth, to assault and slander; the thirteenth, to larceny; the fourteenth, to robbery; the fifteenth, to adultery; the sixteenth, to matrimonial disputes; the seventeenth, to inheritance; and the eighteenth, to gaming. These laws contain, besides, a variety of very frivolous rules for the most ordinary transactions of life. According to the law of inheritance, the property is divided into equal shares, two to the eldest son, one and a half to the next, and one to each of the others; to the unmarried daughters the brothers give each a fourth of his share. In Hindostan Proper, the Mahomedan law is the rule for the administration of criminal justice; and to this, with a few exceptions, the British government has adhered.

The supreme authority in British India, which, as we have seen, comprises, either in its direct or indirect authority, the greatest part of India, is vested in a Governor-General in council, who is appointed by the Crown and the Court of Directors: the seat of this supreme government is at Calcutta, the capital of the Bengal presidency: in each of the two subordinate presidencies of Madras and Bombay, there is also a governor and council. In the Bengal presidency, there is one supreme court at Calcutta; six courts of appeal and circuit attached to six different divisions; and forty magistrates stationed in as many different districts and cities. The territories subject to the Madras presidency are divided into twenty-one districts: those under the Bombay presidency are less numerous, and less clearly defined. Besides magistrates for the administration of justice, the East India Company have collectors of revenue in all the districts. This revenue is almost entirely derived from land, salt, and opium; it amounts to about seventeen millions annually. In time of war, the troops in the pay of the Company generally amount to about 150,000, of which there are seldom more than 25,000 Europeans; the rest are native troops. The number of British born subjects in India (exclusive of those in the army) is about 6000 or 7000.

The ancient languages of India are supposed to have been the Sanscrit; the Pracrit; the Paisaichi, and the Magadhi; the Sanscrit is still cultivated as the language of literature, science, laws, and religion; of the Pracrit, or spoken language, there appear to have been 10 dialects; that still called Pracrit is spoken on the banks of the Seraswattee; in it great part of most of the Hindoo dramas, and many poems, are written; the next dialect of the Pracrit, named from the Canujacubjas, who anciently spoke it, is supposed to be the ground-work of the modern Hindostanee; the Gaura, or Bengalee, is spoken in Calcutta, and in Bengal on the banks of the Ganges; the Maihhala is used in the Circar of Tirkut; the Uriga, in Orissa; the Guzeratic, which is not unlike the Hindostanee, is spoken not only in Guzerat, but at Surat, Tatta, &c. The Tamelor Malabar extends from Cape Comorin to Canara; the Mahratta prevails through the whole of the Mahratta territories; the Canara is spoken in the mountainous district which lies between the eastern and western divisions of the ancient Carnataca; and extends as far as Goa; the Talenga is spoken on the coast of Orissa, in Golconda, on the Khrishna, and as far as the ceded districts.

The most venerated books among the Hindoos are the Vedas and the two great poems; only the three highest castes are permitted to read these. The Vedas treat of all the different branches of knowledge; the two great poems are the Ramayuna of Valmiki, and the Mahabharut, which contains the adventures of Krishna; there are also other ancient epic poems, besides dramas and lyric poems, in high esteem among the Hindoos; of their dramas, Sacontala, or the fatal ring, has been translated by Sir William Jones and Mr. Wilkins.

The ancient music of Hindostan is supposed to have been superior to the modern, and to have been more cultivated; the modern scale comprehends seven sounds, and in the octave they reckon 22 quarters and thirds; they also divide the seven natural sounds into 84 modes. Their instruments are very loud and disagreeable; and consist principally of drums, trumpets, and pipes; in their stringed instruments, the strings are made of iron or brass wire, and the fingers of those who play on them are defended by thimbles; hence the sounds emitted are harsh and unpleasant. There is no harmony in their songs; one person sings in a high and another in a low voice, beginning in a low tone, till, near the end of the verse, they break out into a loud noise. In the other fine arts they are equally deficient: in painting they are ignorant of perspective; gaudy colours, especially red and blue, with the figures crowned with gold, are in their estimation the perfection of painting. Their sculpture and architecture are rich and elegant in ornaments, but rude and destitute of taste and judgment in their principles and grand outline; the most ancient remains of these arts are the excavations and sculptured rocks in Elephanta and Salsette, at Ellore; the seven pagodas, and in the Cave of Carli in the Mahratta mountains. The Hindoos seem, from very remote antiquity, to have been acquainted with the construction and use of the arch. The modern pagodas or temples differ considerably in their style and ornaments in different parts of Hindostan; those in the north are the most simple; those on the coast of Coromandel are built in the style of the most ancient temples, of large square stones, so arranged and connected that they form a pyramid. The pagodas on the coast of Malabar are for the most part circular, and covered with plates of copper. There are several magnificent and very costly specimens of Mahomedan architecture in various parts of Hindostan Proper, particularly near Agra, where Shah Jehan erected a monument of white marble to the memory of his wife, at Delhi, &c. See CIVIL ARCHITECTURE.

The claims of the Hindoos to an intimate knowledge of astronomy from very remote antiquity have been disputed. It is certain, however, that the ancient Hindoos were better acquainted with this science than the Greeks and Romans; and that the rule for computing the circumference of a circle was known in India at a more early period than in Europe. The division of the zodiac is the same as ours. Their year is sidereal, beginning when the sun enters Aries. The civil year and month begin at sunrise, instead of midnight. The day and night are divided into four day watches, and four night watches, the length of which must, of course, vary with the season. Each watch is subdivided into ghurries, which contain 24 minutes, which are again subdivided into smaller portions of time. These periods are measured by a brass cup with a hole at the bottom, placed in a large vessel filled with water, and marked with lines. As soon as the water rises in it to any of these lines, the watchman strikes a pan made of bell metal with a wooden mallet, indicating the number of the ghurrie. (See HOROLOGY.) Only very rich men have clocks: and there are no public clocks, except those attached to the armies. See ASTRONOMY.

Beside the Hindoo inhabitants of India, there are Moors, Parsees, Jews, and Christians. The Moors are most numerous in Hindostan Proper, especially about Delhi. They may be divided into two classes: The first comprises the descendants of the conquerors, Tartars who are continually naturalising themselves by entering the armies, and Arabians and Persians, who settle in Hindostan for the purposes of commerce; the second class comprehends all the descendants of converted Hindoos. Most of the Mahomedans in India are of the sect of Shiah. The Parsees, who are very numerous in Guzerat and Bombay, are the descendants of the followers of Zoroaster; they are a hardy, enterprising race of men, and some of them extremely rich. The Jews are very numerous, especially in the vicinity of Cochin, where they are divided into two classes; the white or Jerusalem Jews, and the ancient or black Jews,—the latter are considered an inferior race.

Christianity established itself on the Malabar coast at a very early period. Before the arrival of Vasco de Gama there were 44 churches, all of the Nestorian persuasion, containing above 200,000 people. At present there are not above 40,000 of this persuasion; but the number of all kinds of Christians on the Malabar coast is still about 200 000; of whom 90,000 are settled in the province of Travancore. In some parts of this province Christian churches are much more numerous than Hindoo temples. A great proportion of the fishermen on the coast are Christians.

The population of India has been differently estimated, nor is it possible to fix it with any degree of accuracy. According to Mr C. Butter, in his letter to the Court of

Directors respecting the temple of Juggernauth, 19th May, 1813, the whole of the Hindoo population, as far as Cabul, is not much short of 200,000,000. This, however, is undoubtedly much too high an estimate. According to Mr Walter Hamilton, in his *East India Gazetteer*, there are in Northern Hindostan, Hindostan Proper, the Decan, and the South of India, 101,000,000; of which there are 53,500,000 in British Hindostan, 17,500,000 in the territories of the Bristish allies and tributaries, 15,000,000 in the independent principalities, and the same number under the Rajpoots of Ajmeer, the Ameers of Sindee, the Cabul government, the Rajahs of Bootan and Assam, &c. The Marquis Wellesley, however, in a recent debate on East India affairs, stated the population of British Hindostan at only 40,000,000; and this is pobably nearer the truth. Supposing the area of this part of India to be 357,000 geographical square miles, this will give rather more than 112 inhabitants to the square mile. In the years 1800–1 and 1802, answers were sent to the Governor-General to several queries regarding the Bengal Presidency, one of which had relation to the population of its different districts. The following are the results:

Calcutta division.

Zillahs or Districts.	Area square miles.	Population.	Proportion of Mahomedans to Hindoos.		
			Mah.		Hin.
Jessore		1,500,000	1	to	4
Midnapoor	6102	1,500,000	1	to	6
Berbhoom	3858	700,000	1	to	20
Hooghly		1,000,000	1	to	3
Nuddrah	3175	800,000	1	to	5
Burdwan	5174	2,000,000	1	to	16
24 Pergunnahs, including Calcutta	882	2,225,000	1	to	3

Dacca division.

Zillahs or Districts.	Area square miles.	Population.	Mah.		Hin.
Decca city		200.000	145	to	130
Backergunge	4564	926,763	6	to	10
Tipperah	2600	750,000	3	to	4
Silhit	2861	492,495	3	to	2
Mymensing	5700	1,928,531	3	to	5
Jelalpoor	3400	1,000,000	6	to	10

Moorshedabad division.

Zillahs or Districts.	Area square miles.	Population.	Mah.		Hin.
Moorshedabad city . .		35,000	1	to	2
Raghshahy		1,500,000	1	to	2
Bangulpoor		760,340	9	to	7
Dinagepoor	3519	600,000	1	to	8
Purneah	2531	1,450.000	7	to	10
Moorshedabad		650,000	1	to	2
Rungpoor	1000	1,000,000	nearly equal.		

Patna division.

Zillahs or Districts.	Area square miles.	Population.	Proportion of Mahomedans to Hindoos.		
			Mah.		Hin.
Patna city		250,000	1	to	10
Sarun	2560	1,200,000	1	to	4
Bahar	6680	not known.	1	to	4
Shahabad		1,500,000	2	to	98
Ramghar		500,000	1	to	30
Tirhoot		2,000,000	1	to	4

Benares division.

Zillahs or Districts.	Area square miles.	Population.	Mah.		Hin.
Benares city		582,625	1	to	10
Juanpoor		3,171,700	1	to	8
Mirzapoor		900,000	1	to	10
Benares		3.000,000	1	to	5

The following are some further particulars respecting the population of different parts of Hindostan, collected either from the parliamentary reports, or from sources equally authentic.

District of Chittagong 2987 square miles; 1,200,000 inhabitants; 3 Mahomedans to 5 Hindoos.

District of Kishnagur 764,430 inhabitants; 2 Mahomedans to 7 Hindoos.

The population of the province of Orissa is supposed to be about 4½ millions; of Hyderabad 2½ millions, the Mahomedans 1 to 10; of Khandeish 2 millions, the Mahomedans 1 to 6; of Nandere ½ million, the Mahomedans 1 to 10; of Berar 2 millions, the Mahomedans 1 to 10. In the ceded districts, in the year 1806, there were by actual muster 1,917,376, the males one-tenth more than females; in 1801, the population was one-fourth less. In the territories of the Mysore Rajah in 1804, there were 482,612 families, and 2,171,754 inhabitants: 17,000 of these families were Mahomedans; 25,370 Brahmins; 72,627 Lingait; and 2063 Jains.

See *Asiatic Researches; Asiatic Registers; Reports on the East India Company, laid before Parliament in Sessions* 1812, 1812 13, 1813 14; Rennel's *Memoir of a Map of Hindostan;* Milburne's *Oriental Commerce;* Heyne's *Tracts on India;* Mrs Graham's *Journal and Letters;* Orme's *History and Fragments;* Ferishta's *History of Hindostan;* Wilke's *History of the South of India;* Sonnerat's *Voyages;* F. Buchanan's *Travels in the Mysore;* Tennant's *Indian Recreations;* Hamilton's *East India Gazetteer.* (J. S.)

INDIANA, now one of the United States of America, is situate between 37° 45′ and 41° 52′ north lat. and between 7° 40′ and 10° 47′ west long. from Washington City. Its mean length is about 270 miles, and its mean breadth about 130. It is bounded on the north by Michigan Territory, Lake Michigan, and the North West Territory; south by the Ohio River, which separates it from the state of Kentucky; east by the state of Ohio; and west by the state of Illinois. Indiana is divided into 20 counties, as follows, viz.

Counties.	Population.	Principal Towns.
Clark	7.000	Charleston
Dearborn	4.426	Lawrenceburg
*Davies	——	——
Franklin	7,970	Brookville
Gibson	5,330	Princeton
Harrison	6,769	†Corydon
*Jackson	——	Brownstown
Jefferson	4,093	Madison
*Jennings	——	Vernon
Knox	6,800	Vincennes
*Orange	——	Paoli
Perry	3,000	Troy
*Pike	——	——
Posey	3,000	Blackford
*Ripley	——	——
*Sullivan	——	Terre Haute
Switzerland	3,500	Vivay
Warwick	3,000	Darlington
Washington	6,606	Salem
Wayne	6.290	——
Total	67 784	

It contains an area of 34,000 square miles, or 21,760,000 acres. The soil is very fertile, and is well adapted to the production of wheat, rye, indigo, tobacco, &c. &c. A silver mine has been discovered above Ouiatanaw, on the northern side of the Wabash. Salt springs, lime, blue and yellow freestone, and white clay, abound upon the River Wabash. Sea Coal is found on Big River; and on all the streams which run into the Ohio

The principal rivers are, the Wabash, which runs into the Ohio by a mouth 810 feet wide, and about 887 miles below Pittsburg. White River falls into the Wabash about 20 miles below Vincennes. The other rivers are the Tippecanoe, Illinois, and St Joseph's.

The population in 1800 was 4875, in 1810, 24,520; and in 1815, 68,780; but at the present period (1818) it is supposed to be above 100,000.

Indiana formed part of the North-Western Territory till January 1801, when it was, by an act of Congress, erected into a territorial government, with the usual power and privileges. It remained under this form of government till 1816, when, the population being sufficient, Congress authorised the people to establish a state government. A constitution was formed and adopted on the 29th of June 1816; and they were admitted into the union as the *nineteenth state*, on the 11th of December of the same year.

See Morse's *Geography*; Melish's *Geographical Description of the United States.*

INDIANS, see America and Canada.

INDICATIVE, see Grammar.

INDICTMENT, in law, is a mode of prosecuting offenders.

In the law of England, an indictment is a written accusation of one or more persons of a crime or misdemeanor, preferred to and presented upon oath by a grand jury.

Indictments must be framed with precision and certainty. In order to identify the person of the criminal, they must set forth his Christian name, surname, state and degree, mystery, town or place, and county. The time and place of committing the offence are also to be ascertained; but a mistake in these points is not in general held to be material, provided the former be laid previous to the finding of the indictment, and the latter be within the jurisdiction of the court; unless in those cases where a limitation in point of time is assigned by statute for the prosecution of offenders. The offence must be set forth with clearness and certainty; and in some crimes, particular technical words must be used, else the indictment is void. Thus in treason, the facts must be laid to be done "*treasonably, and against his allegiance*;" in indictments for murder, it is necessary to say that the party indicted "*murdered*" the other; in felonies, the adverb "*feloniously*" must be used, and in burglaries, "*burglariously*." In rapes, the word "*ravished*" is necessary, and must not be expressed by any periphrasis. So in larcenies, the words "*feloniously took and carried away*" are necessary to every indictment, as alone expressive of the precise offence. In indictments for murder, the length and depth of the wound should also in general be expressed. In some indictments, it is likewise necessary to express the value of the thing which is the subject or instrument of the offence; as in larcenies, in order that it may appear whether it be grand or petit larceny; and whether entitled, or not, to the benefit of clergy; and in homicide of all sorts, as the weapon with which it is committed, falls as a deodand, to the king.

In the law of Scotland, indictments are framed at the instance of the Lord Advocate, in whose name they are laid. When a private party joins in the prosecution, his name may be added to that of the Lord Advocate; but when the private party is the principal prosecutor, with concurrence of the Lord Advocate, the action is brought in the form of criminal letters. And this last is also the form generally used in prosecutions at the instance of the Lord Advocate, when the party accused is not in custody.

Indictments, in Scotland, are prepared in a syllogistic form. The *major proposition* states the nature of the crime, and, in general, that it is severely punishable; the *minor* states the offence alledged to have been committed by the party accused, and avers that it constitutes the crime stated in the major proposition; and the indictment *concludes*, that, on conviction by the verdict of the jury, the pannel ought to suffer the punishment of the law. See Blackstone's *Comment.* Jacob's *Law Dict.* Erskine's *Inst. of the Law of Scotl.* Hume's *Comment.* Bell's *Dict. of the Law of Scotl.* (z)

INDIES, East. See India.

INDIGESTION. See Medicine.

INDIGO, a well known and much esteemed blue dye. Under the article Dyeing (where see Indigo in the *Index*) will be found an account of the history of its introduction into Europe, and of the processes by which it is applied in practice. Under Chemistry, (see *Index*,) will be found a minute account of its chemical properties, with brief notices of its natural history. But as the importance of indigo renders the history of it, and the processes which it undergoes preparatory to its exportation from the countries which produce it, interesting to those who cultivate or respect the useful arts, we shall, under the present article, give an ampler account of these subjects than appeared conformable to the rank which it held under those more comprehensive heads. At the same time, as even in this instance we avoid unnecessary repetitions, we advise those readers who are deeply interested in the subject, to peruse also the accounts there given.

This substance, or its basis, is contained in the *isatis tinctoria*, which grows in temperate climates, and has been used for imparting a blue colour to the animal and vegetable fibre. It is also contained in some leguminous plants of warmer latitudes, particularly various species of the *in-*

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* Laid out since 1815

† Seat of Government

digofera. When it exists in small quantity along with the other constituent parts of the plant, it may be extracted by water, and detained in that menstruum a sufficient length of time to admit of being used as a dye. These plants, therefore, were, in former times, merely dried and comminuted for the market, and the processes of fermentation and exposure to an absorption of oxygen were left to the care of the dyer. The *isatis tinctoria* and *lusitanica* were, indeed, often subjected to a partial fermentation previously to drying. In Hindostan, for thousands of years back, the colouring matter of the indigo plant has been extracted, oxygenated, and precipitated in a comparatively pure state, for sale. In the plant, the basis of indigo is formed colourless, destitute of the requisite proportion of oxygen, and is then extremely liable to decomposition and destruction; but, after it has received that addition, its qualities are remarkably permanent. This property is mentioned by Dr Bancroft, as manifested by the simple experiment of squeezing the juice of the fresh leaves on calico. The colour is at first green, but, by the influence of oxygen from the atmosphere, it is converted into a permanent blue.

This, however, only affords an imperfect, though a simple, exemplification of the principles on which the preparation of indigo depends. We shall give an account of the process by which this is effected on the large scale.

The plants from which it is produced are, 1. The *Indigofera anil*, a large American plant, which affords indigo of good quality. 2. *Indigofera tinctoria*, a Chinese and Indian plant, which has been carried to America. This is less hardy, but more productive than the preceding. 3. *Indigofera disperma.* This affords the Guatimala indigo. Its produce is uncommonly fine, but less abundant: and, 4. *Indigofera argentea*, which affords the *indigo batard* of the French. All these plants are small shrubs, which emit a smell offensive to cattle. The stems with the leaves are cut, and, either immediately, or after more or less drying, are pressed down into large vats or steepers, then covered with water, which is generally cold. A slight motion, increase of bulk, and evolution of heat, are in a few hours perceived: air-bubbles rise, and patches of froth are formed on the surface, together with a violet or copper-coloured cream, which soon after acquires a fine blue; the body of the liquor becomes green, but in no degree turbid, till fully exposed to the action of the air. Instead of the peculiar smell of the recent plant, a putrescent and extremely offensive odour is generated. In the first part of this process, it has been ascertained that there is an absorption of oxygen; the gas which is separated in bubbles is carbonic acid. While the liquor first becomes green, it deposits a fine green precipitate when treated with alkalies: at a later period, it deposits, when thus treated, a substance of a light sky-blue. When the fermentation is completed, the green liquor is drawn off into the beating vat, in which it is agitated or churned by machinery. It now absorbs oxygen, and the colouring matter is formed into a floculent substance, which is merely suspended in the fluid, while the other principles are still in a state of solution. Lime-water, or caustic alkali, is added, to promote the precipitation of the indigo, as soon as it is observed to be distinctly granulated. At this stage, the froth, from being blue, is rendered colourless by the subsiding of the blue matter. When this addition is made, a further absorption of oxygen takes place; and, after it has settled a little, the evolution of carbonic acid wholly ceases. When the precipitation is complete, the supernatant liquor is of a clear brandy or Madeira wine colour. A greenish or olive tint is an evidence of imperfect precipitation, and arises either from its being united to a portion of carbonic acid, or its not having absorbed a sufficiency of oxygen, most probably the latter, as a further exposure to the atmosphere by churning causes it to precipitate an additional portion of indigo when treated with alkalies.

Great attention must be paid, in all the stages of this process, to adjust the best degree of each change. If the fermentation is too soon stopped, a part of the indigo remains unextracted. This is ascertained by the colour of the twigs, when a few are taken out and inspected. They are of a pale yellow, and tender, when they have yielded the whole. The degree of evolution of gas is also to be regulated: when the quantity is deficient, the liquor is of a yellowish green. When the fermentation is carried too far, the liquor becomes turbid, from an admixture with grosser parts separated from the plant, and the condensation and precipitation of the indigo are prevented from taking place with the due facility, and from yielding an article of genuine purity. This is more dangerous than a deficient fermentation, as not being so easily remedied. It appears from the experiments of Dr. Roxburgh, that the absorption of oxygen is essential, both during the fermentation and the precipitation.

The only further process which the indigo undergoes is that of drying, which sometimes is effected solely by dripping; at other times it is subjected to a pressure, by which the water is squeezed out. It is exposed to a free current of air, but shaded from the light of the sun.

Indigo differs greatly in its excellence, as well as in its accidental properties. Some specimens of it have much less specific gravity than others, and the lightest is the purest. Some of it will even float in water. If the air is excluded while it is in any degree moist, it undergoes a chemical change, by which white specks are formed in its substance. When too much lime has been used in precipitation, it subsides mixed with the indigo, and throws down other adulterating matters. Indigo differs greatly in colour. Of the Guatimala indigo, the most esteemed sort which comes from America, there are three varieties; one, called *flora*, has a fine blue colour; a second, called *sobrè saliente*, is violet; and the third, called *corti-color*, is copper coloured. When the first sells at 9s. per lib., the second is 7s. and the third 5s. 6d. Of the East India indigo, the Javanese was formerly preferred to all others; but the manufacture is now cultivated to a considerable extent in the British possessions, and an article is produced which is often superior even to that of Guatimala.

The comparative value of indigo may be ascertained by dissolving equal portions of different specimens in sulphuric acid, and afterwards comparing the quantities of oxymuriatic acid requisite to destroy the colour of each. Dr. Bancroft proposes to compare merely the depth of the colours, which the same proportion of each communicate to water—a test which must be less accurate. M. Chevreuil analysed the best Guatimala indigo, and found that it contained other ingredients besides the true colouring matter. He obtained from it, by hot water, an unoxygenated base of indigo, with a green matter united to gum, some ammonia, and a little yellow extractive, amounting in all to 12 parts in 100. From the remaining 88 he obtained, by digesting with alcohol, 30 parts, consisting of a green matter, a reddish resin, and a little indigo. By digesting the residue with muriatic acid, he obtained two parts of red resin, two of carbonate of iron, two of red oxide of iron combined with aluminous earth, and there remained three parts of silex, and 45 of pure indigo. This last alone gave out the beautiful purple smoke on burning, which characterises indigo, and which is the substance itself in a state of sublimation. When thus purified, it is of a purple colour, a circumstance which is also observed to take place with Prussian blue, when most condensed.

Bergman obtained 47 parts of pure indigo from the article of commerce, which, when distilled, yielded 2 parts of carbonic acid, 8 of an alkaline liquor, 9 of empyreumatic oil, 23 of a charcoal, containing 2 parts of oxide of iron, and 2 of silex.

Some have attributed the blue colour of the indigo to iron, but this is improbable. Chaptal ascribes it to charcoal; but the mode of combination in which the colouring matter exists is so peculiar, that we ought not to ascribe it exclusively to one principle. One thing in it remarkable is, that the compound base shews a stronger affinity among its component parts, than that which takes place between it and oxygen, as the base may be obtained in a limpid state, in which it requires only the addition of oxygen to impart to it the colouring property. It is by being deprived of a part of its oxygen that it is rendered soluble. This was formerly done by mixing it with woad which had been fermented. A boiling decoction of weld, madder, and broom, was first poured on the woad, and allowed to stand in a proper temperature, till blue veins were formed on its surface. Quicklime, and the indigo in powder, are then added, and the fermentation conducted *secundum artem;* the liquor becomes green and fit for dyeing. This process is employed in dyeing woollen stuffs; but the proportion of lime requires to be carefully adjusted. When in excess, it imparts to it a brown colour. For the same purpose of disengaging the oxygen, or a part of it, urine is employed, also metallic salts, such as green sulphate of iron, in which the metal is at an inferior degree of oxydation: arsenic and oxide of tin are used for the same purpose, or metallic tin assisted by the muriatic or other acids. The substance chiefly employed as a solvent of indigo, without depriving it of its oxygen, or imparting any temporary change of colour, is sulphuric acid. These processes form part of the art of DYEING, and to that article we refer for the details. See Dr. Bancroft's *Researches concerning the Philosophy of Permanent Colours.* CHEMISTRY, and INDIA, p. 262. (*H. D.*)

INDRE, the name of one of the central departments of France, which derives its name from the river Indre, with which it is traversed. It is bounded on the north by the department of the Loire and Cher, on the east by that of the Cher, on the south by the departments of Creuse and Upper Vienne, and on the west by those of Vienne, and the Indre and Loire. This department is about 54 miles from north to south, and 45 from east to west. It contains 362 square leagues. The western part of the department abounds in rocks, pools, and woods; but the part on the right hand of the Indre contains fine fields and vineyards, which afford grain and excellent pasturage. There are iron mines, marble quarries, and mineral waters, in the department. The contribution amounted to 1,652,606 francs, and the population to 207,911 inhabitants. Chateauroux is the principal town. See France.

INDRE AND LOIRE, is the name of one of the western departments of France, which derives its name from the union of the two rivers, the Indre and the Loire. It is bounded on the north by the department of the Sarte, on the east by the department of the Loire and Cher, and the Indre; on the south and south-west by the department of the Vienne, and on the west and north-west by the department of the Mayne and Loire. It extends about 50 miles from north to south, and 45 from east to west, and contains about 325 square leagues. This deparrtment has been called the garden of France, on account of its great fertility. The Peninsula formed by the Indre, the Loire, and the Vienne, is extremely fertile. The district between the Loire and the Cher is light and sandy, though productive. Rye, barley, millet, wine, fruits, and pasturage, are the principal productions, and it contains also iron mines, and mineral springs. The annual contributions were 2,868,779 francs, and the population 278,758. Tours is the capital of the department. See FRANCE.

INDUCTION. See LOGIC.

INDULGENCES. See ECCLESIASTICAL HISTORY, and REFORMATION.

INDUS, a celebrated river in India, known to the ancients by the name of Sindus, or Sinthus; is called the Sindhu, or Sindhus, in the Sanscrit; and Aub Sinde, or the water of Sinde, by the Persians. Its source has never been explored, and still remains a subject of conjecture. The natives of Hindostan assign to it a very remote origin in the mountains, four or five days journey to the north-west of Yarchand; which would place it near the city of Cashgar, in Chinese Tartary, about 44° north latitude, and 70° east longitude. Hence they describe it as taking a southerly direction, and approaching within two days journey of Lahdack; then turning west, as far as Saighur, (probably the same as Shekerdou,) and afterwards proceeding in a direct course to the south. Mr. Colebrook supposes that it may originate on the western side of the great Himalaya ridge of mountains, and thence take a sweep to the north. It enters Hindostan about 33° 15′ north latitude, where it is joined by the Attock or Cabul river, after which it is no longer fordable, and is about three-fourths of a mile in breadth in the month of July. As it proceeds along the frontiers of Afghahistan, it receives all the principal streams of that region; and, from Calabaugh northwards, it is a clear stream, rather deep than broad, flowing between two ridges of rocks, and yielding from its banks abundance of salt and alum. In the province of Mooltan, it receives all the rivers of Lahore, or the Punjab, and increases considerably both in depth and breadth; but is not considered as one of the five rivers, which give the name to the Punjab, being rather the trunk or stock into which the Cabul and Lahore waters flow. About 170 miles from the sea, it divides into two branches, of which the westermost is the largest. This branch, after proceeding about 50 miles to the south-west, divides again into two parts; and, as it approaches the sea, is subdivided into several other branches or creeks, like the Sunderbunds or Delta of the Ganges, of which the largest is the Ritchel. At the mouths of these different branches, the bore or sudden influx of the tide is extremely high and hazardous; but it is a remarkable circumstance, that the tides are not visible up the river at a greater distance than 60 or 65 miles from the sea. From Attock to Mooltan, it is called Attock, or formerly Nilab; and, farther down, it is named Soor or Shoor, till it separates at Tatta, (supposed to be the ancient Pattala,) when its largest branch is denominated Mekran. Its whole course, including its windings, and supposing it to originate to the north-west of Cashgar, is estimated at 1700 miles. From Attock to the Delta, its breadth is generally about a mile, and its depth varying from two to five fathoms. It is navigable for vessels of 200 tons burden, from the Gulf of Cutch to Lahore—a distance of 760 geographical miles. From Attock to the sea, a distance of nearly 900 miles, it runs south by west, with fewer windings than any other river in India; and forms, through the whole of that extent, a distinct barrier to Hindostan, which has never yet been passed by any of the invading armies. Its two principal mouths are those which enter the sea at the village of Ritchel, and at Jiget Point in the Gulf of Cutch; but the number and positions of its several outlets have been very imperfectly ascertained. The Delta of the Indus is about 150 British miles in length along the coast, and 115 in depth from the separation of the superior branches to the most prominent point of the sea coast. The lower part of this Delta is intersected by creeks and rivers in almost every direction, but is altogether destitute of trees; and, except a few of the drier spots, which are covered with brushwood, it is a mere desert of arid sand, noisome swamps, and muddy lakes. The upper part is well cultivated, and produces abundance of rice, which is mentioned by Abul Fazel as forming, with fish, the principal food of the inhabitants of these districts. A great portion of the Delta, especially the nearest to the sea, is set apart for the rearing of camels, which feed upon the tender parts of the brushwood. See Rennel's *Memoir of a Map of Hindostan;* Foster's *Journey from Bengal to England;* Hamilton's *East India Gazetteer;* and Tennant's *Indian Recreations.* (*q*)

INFANTICIDE. The solicitude almost universally observed for the preservation of human life, has been subject to some remarkable exceptions in different ages, and in various parts of the world. Not only has the ordinary course of nature been interrupted in restricting the intercourse of the sexes by positive ordinances, civil or ecclesiastical, but the latent embryo has been destroyed in its progress to maturity, and the infant consigned to death at the moment of beholding the light of day.

Parental affection seems so deeply rooted in mankind, by a wise provision for the protection of the offspring, that, without actual evidence, it would be difficult to credit the extent to which infanticide has extended.

It has been affirmed by some learned authors, that the sole purpose of nature in preserving the animal kingdom is the reproduction of the species. Yet, mankind, as if to disappoint her object, condemn themselves to celibacy, sometimes by vows of such a nature, that their infringement would be attended with the forfeiture of life. Nay, there are repeated instances of married persons having withdrawn from each other's society from similar motives. Mandelslo relates, that, in the island of Formosa, the women have no children until they are thirty-five or thirty-six, "from the impression they receive from their priestesses, that it were a great sin and shame for them to bear children before that age." Therefore, should they become pregnant previously, abortion is procured by violent means, and by the assistance of the priestesses themselves. The laws of Tunkin are so severe against having illicit offspring, that the same practice prevails; and it is thence so frequent, that there are women whose profession it is to facilitate and obtain abortion. It is said, by Krascheninikow, that there are females in Kamschatka who use herbs and conjurations to prevent conception, and that they procure abortions by means of poisonous medicines, wherein they are assisted by skilful old women. M'Kenzie, the late traveller across the North American Continent, affirms that the women of the Knisteneaux frequently procure abortion to avoid the distress consequent on taking care of, and maintaining their children. The Eskimaux, inhabiting the shores of Hudson's Bay, according to Ellis, constrain their wives to obtain frequent abortions for the same cause, by means of an herb common in that country: and an older author, Denys, says, that if a woman of North America became pregnant while suckling her child, she obtained abortion; alleging, that nursing one at a time was enough. Other examples might be given; for procuring abortion is common over the world, and must to a certain extent prevail, where misfortune or disgrace attend the birth of the offspring.

There is too great reason for considering these motives as the cause of infanticide where the child is actually born. The instances of it are innumerable, though arising also from different causes. Among the inhabitants of the Kurile islands, it is customary to destroy one of twins. The American Indians, in the neighbourhood of Berbice, are said to do so, from believing that the birth of two children proves the infidelity of the mother. Kolben informs us, that the ugliest of Hottentot female twins is put to death, under the pretext that a mother cannot suckle two females at once. At least one of twins was wont to be destroyed with the Kamtschadales; and in New Holland, the weakest and lightest is quickly suffocated by the mother.

As there is greater difficulty experienced in supporting feeble and sickly children, or those labouring under prominent personal imperfections, so the parents have had less hesitation in bereaving them of existence. Diodorus relates, that all deformed children in Taprobana, which we suppose is Ceylon, were put to death. Quintus Curtius says the same of those in the kingdom of Sophitus. Promising children were reared in Sparta: the others were destroyed; nor could parents spare those whom they chose, as they were submitted to the examination of certain persons, and, if weak or deformed, were thrown into a cavern. Gemelli Careri was told in Paragoa, one of the Philippine islands, that children born with imperfections, which would apparently disable them from working, were put alive into a hollow cane, and buried. These cruel expedients must be viewed as the result of necessity rather than of choice; because, in countries where each has to depend on his own personal exertion for a precarious subsistence, there is no room to provide for the helpless. It has even been seen, that, by a barbarous custom, originating from a similar source, when a man perished, his widow and orphans were put to death; not from the desire of shedding blood, but because the survivors had no means of supporting them. In Greenland, when the mother of an infant at the breast died, the child was buried along with her, if the father and relations could not find a nurse. At the present day, it seems an invariable practice of the savages of New Holland, to inter the sucking infant in the same grave with its departed mother; nay, the father is the first to heap the earth over the bodies of both. No concern is testified by the relatives for its fate. They seem satisfied that this is what ought to be done; for their own helpless condition deprives them of the means of providing for a being still more helpless than themselves.

The sources of infanticide may, in general, be traced to necessity, superstition, the love of pleasure, and shame. Mothers in Japan, it is affirmed, do not scruple to suffocate children at the breast, on finding themselves too poor to bring them up. Infanticide is said to be common in China exclusively from that cause. The women of the Knistineaux, whom we have already named, frequently put their daughters to death, to spare them the miseries attached to a life of continual pain and labour, which is their own condition. According to Gumilla, the South American women on the river Orinooko are so keenly alive to the unfortunate condition of their sex, that, to spare their daughters from it, they cut the navel string too close, that they may perish. A missionary having reproached a woman with the cruelty of this practice, "Would to God," she replied, "that my mother, when she brought me forth, had shewn as much compassion and regard for me, as to have preserved me from the pain I have endured and must endure until the end of my days. Had she buried me alive when I was born, I should not have felt death, and it would have saved me from all I am indispensably subjected to, as well as labours more cruel than death is terrifying. Would to God, father, I repeat, would to God, that she who gave me life had shewn her affection by depriving me of it at my birth: my heart would have had less to suffer, and my eyes less to weep!"

In most countries, it is the female offspring which is doomed to destruction, while the males are spared: thus, if the twins of the New Hollander be of a different sex, it is the daughter alone that perishes. Dobrizhoffer relates, that he has known mothers among the Abiponians, a South American tribe, who destroyed the whole offspring as soon as they were born; but others more commonly spared the males than the females. The ancient Arabians, especially those of the tribes Koreish and Kendah, were accustomed to bury their daughters, from the apprehension of inability to provide for them, as also, it is said, from the grief which would be felt on their becoming captives, or from their immoral conduct. But most probably the first was the leading cause, which, as well as the fact itself, is proved by various passages in the Koran: "Verily the Lord will enlarge the store of whom he pleaseth, and will be sparing unto whom he pleaseth: kill not your children, for fear of being brought to want; we will provide for them and for you: verily the killing of them is a great sin." By this, and other injunctions of Mahomet, the practice is supposed to have been abolished in Arabia. Probably it never was universal there. But it has been reserved for modern times to discover the existence of a numerous tribe, which seems to have destroyed almost the whole female offspring without exception. As the British dominions extended to the north-west of the Indian peninsula, a certain race called Jarejahs, was found in the province of Guzerat, and the district of Cutch, where civilization had made considerable advances, and where the nature of the country removed all apprehensions of want. Here there are different gradations of rank, and the members of this tribe are far superior in point of refinement to those in savage life. The Jarejahs destroy all their daughters at the moment of their birth, just as the result of an ordinary custom, which excites no concern, and induces no reproach. But if the deed is not perpetrated immediately on birth, it becomes criminal: It is also done in obedience to the will of the father, who may direct the life of the infant to be spared. The birth of a son among these people is a scene of mirth and festivity; that of a daughter passes unnoticed. As Mahomet writes of the ancient Arabs, "and when any of them is told the news of the birth of a female, his face becometh black, and he is deeply afflicted: he hideth himself from the people, because of the ill tidings which have been told him, considering within himself whether he shall keep it with disgrace, or bury it in the dust." On the birth of a daughter, it is said that the attendants of the mother repair to the oldest man in the house, who desires them to go to the father of the infant, and obey his orders. They do so, and he merely enjoins them to act as is customary, and so to inform the mother. On their return, she is told to proceed in conformity to their usage. It seems doubtful, however, whether all this ceremonial truly ensues, for ceremonies are generally obliterated in matters of frequent occurrence; but the death of the infant undoubtedly follows, and more commonly by the hands of the mother. Yet here there is much mystery preserved, somewhat similar, as we shall see, to the customs of that society which is instituted exclusively for the purpose of infanticide. The deed is committed in private, though not with the design of concealment, for neither shame nor punishment is its consequence. Ladies of rank, who may have slaves or servants, are said sometimes to charge them with this cruel office, but they are usually the perpetrators themselves. As to the mode of destruction, it is figuratively expressed by the Jarejahs that the infant is drowned in milk; but it rather appears, that when the mother is apprised of the paternal sentence, she puts opium on the nipple of her breast, which being absorbed along with the milk, speedily extinguishes life. When destroyed, the infant is put into a basket and carried out for interment. The extent to which female infanticide is carried in Cutch and Guzerat is surprising, not fewer than 3000 females perish yearly in the former, and it is affirmed 20,000 in the latter. It will appear strange how the race can be preserved under such a system of depopulation; but natural children are not within its sphere; wives are obtained by the men from other tribes, and there are, besides, a few exceptions in parents sparing their daughters. No account of the origin of the custom can be given by the Jarejahs, who affirm that it subsisted among them for 5000 years. Fortunately for the natives of Guzerat, the British influence extended to that province, and the resident, Lieutenant-Colonel Walker, (who now resides on his property of Bowland in Selkirkshire,) conceived the possibility of abrogating a custom so revolting to humanity. He endeavoured, with admirable skill and perseverance, not only to divert the chief men of the country from this horrible practice, but to gain the support of the female part of the inhabitants in promoting his views. Many difficulties opposed his wise and benevolent exertions; but he had at last the felicity of seeing them crowned with complete success. The chiefs renounced a practice, which they defended as having been interwoven with the existence of their tribe for thousands of years; mothers soon brought their offspring, thus saved from premature destruction, to the arms of their preserver; and the very first lesson they were taught was to pronounce his name. It must certainly appear singular, that prejudices so deeply implanted, and passing, as it were, by inheritance, could be rooted out by the efforts of one individual, and thus admit a benefit of such magnitude being conferred on humanity. But when reflection is awakened to the welfare of our offspring, it is nature which begins to plead, and whose voice will surmount almost every obstacle.

Other instances may be given of that infanticide which is not restricted to females. Krascheninikow says, that there are some of the Kamtschadale women so unnatural as to destroy their children when born, or throw them alive to the dogs. The missionaries affirm that the Bosjesmans, or Bushmen, an African tribe, whose history is little known, "take no great care of their children; that they kill them without remorse on various occasions, as when they are ill-shaped, or when they are in want of food. When the father of a child has forsaken its mother, or when obliged to fly from the Dutch boors, or from others, they will strangle them, smother them, cast them away in the desert, or bury them alive." Should there be no exaggeration here, the barbarity of these savages is greater than that of any other tribe whose name is preserved in history. But the missionaries even seem to assert, that a lion comes to their dwelling for the express purpose of devouring infants. "There are instances of parents throwing their tender offspring to the hungry lion, who stands roaring before their cavern, refusing to depart until some peace offering be made to him." Mr. Barrow passes a strong censure on this sentence; but, when stripped of its apparent extravagance, it may be resolved into what a later missionary, Mr. Campbell, expresses with greater simplicity, "the Dutch boors affirm, that the Bushmen often throw their children to the lion to preserve themselves, which has greatly increased the desire of these animals after human flesh, especially the flesh of Bushmen, so much so, that were a lion to find a white man and a Bushman asleep together, he would take the Bushman, and leave the white man." The same author mentions, that the bushmen are very kind to their own offspring,—"though there are frequent instances of those who have had children murdering them, if the father refused to provide for them."

It is generally agreed, that infanticide is universal in China, being either immediately committed by the hands of the parents, or resulting from exposure to the influence of the elements. The exposure of children was a privilege commonly sanctioned among the ancients: it was so prevalent, that Ælian celebrates the humanity of the Thebans, who decreed capital punishment against it: nevertheless, where the parents were in poverty, they might offer the child for a price to the magistrates, who, having brought it up, were entitled to sell it for a slave. Almost all the children exposed in China are females; and the number, though it be difficult to approximate the truth, is certainly very great. Mr. Barrow computes, from the most authentic data which may be deduced from the statement of the missionaries, that it is not less than 9000 in Pekin, the capital, and as many in the provinces. It is part of the duty of the police, to carry away in carts, early every morning, those who may have been exposed during the night. No inquiries are made: many are dead, but some still survive, and all are conveyed to a pit without the walls, wherein they are thrown promiscuously. Here the Roman Catholic missionaries attend, selecting the most lively among the infants for future proselytes, and administering baptism to others before they are left to expire. The causes of exposure and infanticide are sought in the necessities of the parents, as with the ruder nations; for those least capable of providing for themselves are compelled to abandon their offspring. Infanticide is well known to be connived at by the Chinese government, and never the subject of punishment.

Instead of awaiting that period, however, when even by exposure an infant may have the chance of survivance, we find the Arreoys forming a mysterious society, expressly for the purpose of destroying their whole offspring at the moment of birth. This society is peculiar to the islands in the South Pacific Ocean. It consists of both sexes, and is chiefly composed on the one part of persons distinguished by valour or merit; whence some of the families of the chiefs are always of the number. The greatest trust and confidence are reposed in its members; and it appears that the females are principally of the highest rank. The whole enjoy great privileges, and are every where united by the ties of reciprocal friendship and hospitality: their clothes are of the finest materials; they feed on the choicest delicacies. They pass their time in the enjoyment of luxuries, and travel about in great companies from island to island, where nocturnal sports are held for their amusement, along with lascivious dances, to which no other spectators are admitted. They are considered a class separate from the other inhabitants, entitled to every distinction and gratification. Different gradations subsist among them, which are externally demonstrated by the mode of tattooing their bodies. By the fundamental laws of the Arreoys, their whole offspring must be destroyed; and it is to be inferred that the murder is perpetrated in solitude, and immediately after birth. None must be present, or behold its commission, otherwise they would themselves be deemed participators in the crime, and liable to forfeit their lives. The ordinances of this society seem absolute and imperative; and although any member may withdraw, while the association subsists, the offspring must perish. A woman who does so, however, incurs a reproachful name, signifying "the bearer of children." An instance is quoted of a chief who killed his first born child, but preserved the second, having ceased to be an Arreoy in the interval. Another chief married a sister of one of the kings of Otaheite, by whom he had eight children, and the whole, without exception, were destroyed; yet the parents afterwards adopted a nephew as their heir. The proceedings and peculiarities of this society are veiled in mystery; they have never been explained, and all that can be said on the subject consists of mere gleanings from transient observation. It is not proved that the mother usually suffers much distress from the death of her infant; and so little criminality, in the opinion of the South Sea islanders, attaches to the deed, that women disclose, without scruple, the number they have killed. Examples occur of mothers whose feelings are awakened, resisting every importunity to murder their offspring. The ultimate object of this association always is infanticide: it is not known that any similar society exists, or has existed; for the words of Father Gobien, which have been referred to, are not sufficiently explicit to establish the reverse. He observes, that in the Ladrone Islands there were young people called *Urritoas*, who never married, and lived together in a kind of community in unbridled debauchery. They carried a certain ornamented staff as a badge of distinction; and the Spaniards having attempted to destroy the public dwellings which they inhabited, some of the missionaries became the victims of their resentment. Independent of the infanticide of the Arreoys, it seems a common practice among the South Sea islanders. When an Otaheitan chief has a child by a woman of the lower order, it is never suffered to live; and the like seems to take place reciprocally with the higher ranks of females. All their natural children must perish. No satisfactory conjectures can be offered concerning the origin and purpose of this mysterious society. Its source has been sought in the provision of some wise lawgiver to check superabundant population: but who has ever heard of mankind dwelling in territories, frequently fertile, destroying one another's lives to obtain a greater portion of subsistence? Others have ascribed its contrivance to the pursuit of pleasure, which, without such restraints, might be more freely courted; and if we may reason from analogy, the reasons actuating the Abiponian women will support this opinion. During three years that children are suckled among that tribe, no conjugal intercouse subsists between the spouses: the husband sometimes takes another wife in the interval; and to obviate these alienations, or even repudiation itself, the mother destroys her progeny.

But we shall find a more powerful motive for infanticide than all the rest, in that unbounded ascendency which superstition sometimes gains over the human mind. The practice of the moderns, however, is not so explicit in this respect as what we may collect from antiquity. It is said that the Kamtschadales destroy their children if born during storms, though the necessity of doing so may be averted by conjurations. The indigenous inhabitants of Madagascar and Ceylon are likewise accused of infanticide, should the epoch of the birth of a child be declared unfortunate by their priests and astrologers. Certain periods of time, as the months of March and April, the last week of every month, together with every Thursday and Friday, are judged ominous. The child born at these times will either be animated by evil propensities, or occasion numberless disasters, from which exemption is purchased by the sacrifice of its life. Mankind have been prone to embrue their hands in each other's blood, to propitiate or appease their sanguinary deities; but of all offerings, children were deemed the most acceptable, being a sacrifice of what was the most precious to parents. The Moabites offered up their children for propitiation in desperate enterprizes. Thus, "when the King of Moab saw that the battle was too sore for him, he took with him 700 men that drew swords, to break through even unto the King of Edom; but they could not. Then he took his eldest son, that should have reigned in his stead, and offered him for a burnt offering upon the wall." 2 Kings, iii. 27 Again, it is said that Balak, King of Moab, consulting Balaam, the son of Beor of Mesopotamia, and calling on him to come and curse his enemies, exclaimed, "Wherewith shall I come before the Lord, and bow myself before the high God? Shall I come before him with burnt offerings, with calves of a year old? Will the Lord be pleased with thousands of rams, or with ten thousand rivers of oil? Shall I give my first born for my transgressions, the fruit of my body for the sin of my soul?" Micah vi. 7. We read that Hamilcar, on receiving similar intelligence, attended with alarming circumstances, immediately seized on a boy, and offered him for a sacrifice to the deity Kronus: while, for an opposite reason, after Hannibal had gained the battles of Ticinus and Trebia, it was proposed in the senate to sacrifice his infant son. On occasion of an enemy being at the gates of Carthage, Diodorus relates, that 200 children, of the most distinguished citizens, were offered up to the sanguinary deities to avert the danger. We read also, though with more uncertainty of the fact, that the Grecian soothsayers recommended the sacrifice of Iphigenia, the daughter of Agamemnon, to Diana. In descending to a more modern period of history, Hacon, King of Norway, offered his son to Odin to obtain a victory over his enemy Harold; and Harold, the son of Gunild, sacrificed two of his children to his idols, to obtain a tempest for the dispersion of a hostile fleet. The modern Peruvians are said to have sacrificed their first born to redeem their own life when in a state of sickness, as Aune, King of Sweden, in older times, sought to purchase a prolongation of his with the blood of nine sons. It was with them as the Israelites, "Yea, they sacrificed their sons and their daughters unto devils; and shed innocent blood, even the blood of their sons and daughters, whom they sacrificed unto the idols of Canaan." Psalm cvi. 37. Thus can the powerful ascendency of superstition stifle the feelings of nature. Nay, the mother herself, who offered her child in sacrifice, never uttered a sigh, lest its efficacy might be impaired; and while the vital stream was flowing from a multitude of innocent victims, their screams were drowned by the noise of drums and trumpets sounding before the idol. "Tell me," exclaims Plutarch, "were the Typhons and the Giants to expel the gods, would they exact such horrid rites of men?"

Infanticide may therefore be traced to a feeling of shame on the part of the parent, which she has not fortitude to bear, to necessitous circumstances, to the pursuit of pleasure, and to the influence of superstition. We cannot affirm, however, that such are exclusively its sources; but it is not probable that many others will be disclosed. See Ælian *Varia Historia*, lib. i. cap. 7.; *Diodorus*, lib. i. cap. 80.; Plutarch *De Superstitione*: *Opera*, tom. iii. p. 321, 1603, in 8vo. *Quintus Curtius*, lib. ix. cap. 11; *Justin*, lib. xviii. cap. 6; Eusebius, *Prepositæ Evangelica*, lib. iv. cap. 15; Dobrizhoffer, *De Abiponibus*, tom. ii. p. 105; Mandelslo's *Voyages and Travels*. p. 170; Collins' *Account of New South Wales*, vol. i. p. 607; Peron, *Voyage aux terres Australes*, tom. i. p. 469; Krascheninkow's *History of Kamtschatka*; Barrow's *Travels in China*, p 167; *Missionary Transactions*, var. loc.; Gilii, *Saggio di Storia Americana*, *Voyage à la Guiane et Cayenne*. p. 132; Cook's and Forster's *Voyages*, var. loc.; Moore's *Hindu Infanticide*; Cormack's *Female Infanticide*; Mallet's *Northern Antiquities*, vol. i. cap. 7; *Koran*, chap. vi. xvii. lxxxi. (*c*)

INFINITIVE. See GRAMMAR.

INFIRMARY. A building provided by the public, or by charitable persons, and endowed with funds for the treatment of the diseases of the poor.

Infirmaries are among the most laudable of all charitable establishments, and do not fall under the same objections with some others. They do not, like the system of poor laws, encourage indolence, carelessness, and improvident marriages; nor do they depress the minds of the individuals who obtain relief. Accidental injuries, and attacks of disease, are not, like the unavoidable infirmities of old age, evils with which all must lay their account, and against which a manly spirit calls on every person to make a definite provision. It is undoubtedly to be commended, when the labouring classes provide against every casualty. But evils of this description often intervene unexpectedly, when want of time, and other pressing claims, have rendered such a degree of successful providence impracticable; and the evils, when they come, are in their nature overwhelming. It is a noble feature of human sympathy, to find society so constructed, that institutions exist, on a scale sufficiently large to afford a ready attention to every emergency of this sort that occurs in the average course of events.

It is to the spirit of Christianity that we are indebted for them. They seem to have had their origin about the time of the Emperor Justinian. It has become a question among some of the moderns, who have seen the imperfections attending our existing institutions, How was the want of them supplied among the ancients? It seems to have been expected that, from their practices, some hints might be obtained by which our plans of charity might be improved. But it ought to be recollected, that the mass of misery which exists in such an imperfect state of society must pass unknown. An immediate neighbour may become acquainted with a scene of distress, and may exert himself to relieve it; but, where no general encouragement is held out to make known cases of this kind to those who are ready to relieve them on such a scale as can be depended on, they remain neglected. The persons whom our infirmaries relieve would, among the ancient Greeks and Romans, have languished and died with disease and hunger. Piety impelled numerous individuals in the Christian world to appropriate a part of their funds, either during life, or after their death, to religious and charitable purposes. By institutions proceeding from this origin, an immensity of benefit was conferred on the sick poor. But these became liable to abuses which had not been foreseen, and ages of experience were required for the formation of a correct policy. The funds devoted to charitable purposes, being unalienable, tended perpetually to accumulate, and gradually to absorb every other kind of property; and the monastic institutions with which they were connected became the abodes of idleness, and were contaminated with extravagance and debauchery. The Reformation, together with an internal correction of abuses in the church of Rome, placed these, among many other establishments, on a better foundation. The greater part of our infirmaries are of an origin much posterior to the Reformation; and some of those of Catholic countries are less dependent on monasteries than formerly. It would be a matter of too tedious detail to enter on their individual history. In all the European capitals, and most of the other large towns, infirmaries are established. In London, there are seven general institutions of that sort, besides others more numerous, devoted to particular branches of the same benevolent object. Almost every large town in England, and several in Scotland, have one. These have been gradually improved, and the principles on which they are conducted have several leading features in common, though not always executed in the same manner. We hope our readers will be gratified, as well as instructed, by an account of some of the difficulties attending such institutions, and the manner in which they are surmounted. It will be found, that it is not enough that the spirit of liberality should be sufficiently ample, to commence and endow them; and that much invention and sound judgment, together with persevering labour, are required on the part of those who conduct them.

In the first place, it has been found, that the crowding of many patients under one roof had the effect of exasperating several diseases, and of generating others, such as the hospital fever, and the hospital gangrene, which derived their names from these charitable institutions. It was found that the mortality thus occasioned was beyond all comparison greater than under all the disadvantages of domestic treatment. The Hotel Dieu of Paris, previously to its reformation, was the grave of the sick poor of that metropolis. Hence a general outcry was raised against infirmaries. It seemed dangerous to go near them, and the conclusion at one time appeared plausible, that they ought to be abolished. This, however, has not been found necessary. The influence of contaminations of the atmosphere has been more accurately ascertained. It is now found that no disadvantage arises from a plurality of patients being within one building. All the reformation necessary was, to avoid excessive crowding, and to resign the vain boast of the great numbers of patients contained in these places. The beds of infirmaries are now placed at proper distances. The wards are regularly ventilated. Frequent whitewashing of the walls, and cleansing of the floors, are practised; and, in consequence of these observances, all the former evils have disappeared. It has been found that even contagious fevers may be safely treated under the same roof with promiscuous diseases, provided they are placed in separate wards, to the ventilation of which due care is devoted. This object, however, has more recently been prosecuted by the erection of separate establishments, which we shall consider in the sequel.

Serious surgical cases, such as injuries of the cranium, compound fractures of the limbs, and gun-shot wounds, when a plurality of them are brought together, have a tendency to generate an obstinacy in the healing process, and require still more care than in guarding against febrile contagion. This has often been experienced in military hospitals, in the spread of the hospital sore. When it occurs, the dispersion of the patients is the most effectual method of stopping it.

Infirmaries are so constructed as to admit of thorough ventilation; the windows are made to open both from above and from below; in the former way, that fresh air may be admitted without a hurtful cold draught, and, in the latter, that the heavy polluted air, which is apt to rest in the inferior part of the wards, may be more effectually dislodged, by seasonably opening the inferior sash. The practice of collecting urine for the manufacturers, to which the servants of infirmaries were formerly tempted by money, is now discontinued. The bedsteads are of iron, a material to which contagious and other animal effluvia are less apt to adhere than to wood. The bed-clothes are more frequently washed; and, when it is convenient, they are regularly aired. For this last purpose, there is probably room for further improvement. We have sometimes contemplated a plan of having the beds of those patients who sit up through the day so contrived, that, with little labour, they might be elevated by some simple machinery, by the windows, to the roof of the building, and brought in again at pleasure. Flock and feather beds are not used. The preference is given to straw, chaff, and other materials, which, from their low value, admit of frequent renewal. In cases in which articles are used which cannot be frequently renewed, they are exposed not only to frequent ventilation, but to purification by water.

There are other circumstances apt to occur in infirmaries, unfavourable to the recovery of the patients. They may be exposed to the sight of neighbouring patients in the agonies of death. This is remedied by having curtains or screens for the different beds, an arrangement which gives them the advantage of a more comfortable appearance, and more individual privacy. They are not employed in every infirmary, partly on account of the expence, and partly from the obstruction which they give to ventilation; but they ought always to be at hand, and rods to which they can be fixed should accompany each bed. The sight of epileptics, the unpleasant noise which they make in their fits, and the shocking spectacle, and stunning noise, of patients under insanity, are obviated by providing separate wards to which these may be sent, and also such patients, occasionally, as might annoy their neighbours by the piercing cries which under pain or delirium they emit. In some infirmaries, for example that of Glasgow, every ward has three single bedded rooms at one end, a method admirably adapted to these purposes; as a patient may be instantly moved to one of them, without formality or trouble.

For the convenience of the surgeon, it has in some places been common to perform surgical operations at the bed-side, in sight of the other patients of the ward. This, which could not fail often to shock their feelings, is avoided by the easy regulation of having a separate theatre allotted for all surgical operations. Accordingly no such practice exists in the British hospitals.

Some disadvantages have arisen from negligence on the part of the different servants and officers connected with these institutions. To obviate these is a difficult task, and requires the utmost vigilance. It is equally requisite to see that no abuses are committed by any of the patients themselves, to the detriment of others. A system of inspection is for these purposes evidently necessary. Monthly or weekly inspections are therefore practised. The nurses are examined apart from the patients about the conduct of the latter, and they, in their turn, about their satisfaction with the nurses. The medical gentlemen who reside in the house are under the direction of the attending physicians and surgeons; and these, notwithstanding the respectability of their station, and those principles of honour, by which they are supposed to be actuated, are not placed above inspection and admonition. Though a rude and frequent interference on the part of persons who are not adequate judges of medical duties is avoided, the inquiries of the house visitors have it for a part of their object, to ascertain how the patients are satisfied with them. Opportunities are thus afforded for friendly and instructive explanations. The medical gentlemen derive gratification from the interest which others take in their duties; and where all wish to do their duty, and possess that degree of patience which is necessary to every public character, a good understanding is cultivated. On occasions of a different kind, flagrant errors and abuses have been fully exposed, and the means have thus been afforded of putting an end to them. Different infirmaries enjoy different advantages for this species of vigilance, which often depend on the manner in which they are constituted. Where the number of managers is small, they have the best chance of maintaining harmony, and of understanding their duty. But they are apt to become remiss; and, from a false delicacy, to overlook the omissions of one another, and of the principal officers. The duty of visiting the house is also apt to become too burdensome, when the turn to each comes frequently round. Where the number of managers is large, amounting, as in some instances, to hundreds, many of them are unacquainted with the nature of the institution, and either go through the forms of duty in their turn without intelligence or care, or mar the business of the charity, by encouraging frequent and vexatious complaints. It is pleasing, however, to find, that these ends are in general so effectually and agreeably obtained.

Infirmaries are liable to a variety of petty abuses, which have a tendency to accumulate in their amount, and thus generate much evil. One of these is the practice of nurses taking money from the patients. This is not always easily prevented, as the latter feel a debt of personal gratitude; and it might appear hard to deprive them of the liberty of showing it, and the nurse of the opportunity of receiving a slender reward for superior attention. But it is necessary to suppress such a practice, otherwise it infallibly leads to a system of exaction which amounts to a robbery of the poor. The only way in which such practices could be at all tolerated, would be by prohibiting them while the patients are in the house, and conniving at expressions of their gratitude, which are made after the lapse of some days or weeks. Even this would not be safe, nor probably any thing short of a positive suppression of such perquisites, especially when we consider that the same patients may be liable to return.

A system of inspection and explanation does not merely secure the conducting of the charities on correct principles, but produces a most beneficial effect, by satisfying the minds of all concerned. Hence each patient is required to read an enumeration of the advantages of attendance which he may expect, and a statement of the behaviour required of him. A table of his diet is also shewn to him. This is a subject on which abuses might creep in. It is also one, on which hurtful mistakes, and unjust complaints, are liable to occur. Persons from a distant place, differing in its customs from that in which they are admitted into an infirmary, are sometimes apt to find fault with the provisions, and their complaints will always be more or less soothed, when they are informed of the usages of the country. Poor persons from the south of England find fault with the colour of their bread in the northern hospitals, though fully as wholesome as their own. When the reason of the difference is pointed out, they may despise the customs of the place, but they cease to harbour the idea that they are defrauded of a right. In all public matters, systematic explanations compose the public mind, and produce a charming alteration on the moral aspect of society. It is better to cure jealousy by intelligence, than to suppress it by inculcating blind confidence.

Public charities are in some particulars apt to operate unfavourably on the moral feelings of those who are relieved. We have already stated the encouragement of indolence as one of these, but one from which infirmaries are exempt. Another is a tendency to generate a depressing sense of dependence. Some attempt to remove this; by teaching the patients to look on such relief as a right rather than a favour,—a notion, which is considered as keeping erect the dignity of an independent mind. Some delicate distinctions, however, are here requisite for moral practice. Such relief must not be considered as a right of the same indefeasible kind as those advantages that are obtained by a man at his own expence. The duties of charity are of such a nature, that their limits and appropriate occasions do not admit of being easily defined. They require much reflection and care in the performance, and the neglect of them is more excusable than an act of common injustice. This ought never to be forgotten, otherwise the person who receives charity cherishes unreasonable expectations. While the poor man applies for the relief provided by public institutions with a mind sensible of his claims, he must be taught to recognize the spirit of active benevolence in others, without which his wants could not be supplied. If he does not, his independence degenerates into pertness, ingratitude, and clamour. When matters are thus cautiously and modestly conducted, the moral feelings both of rich and poor are improved. The rich find that they are relieving persons in whose situation they may afterwards, by the reverses of human affairs, be placed; thus their deeds of charity remind them of the lot of mortality. Humbling instances of such reverses frequently fall under the observation of those who visit infirmaries. They are also made to reflect, that no man is absolutely independent. The rich depend on the poor as well as the poor on the rich, and they feel that their deeds of charity are only acts of justice, though they derive in the eyes of others a merit from being voluntarily and cheerfully performed.

For the sake of preventing any unnecessary mortification that might occur, as well as dispensing bounty in a more equitable manner, some descriptions of patients are required to make a payment in the name of board. In some cases of this kind, a difference has been made in the diet. This is perhaps injudicious. The diet of all ought to be wholesome, and the only differences allowed should be those that are rendered proper by the state of the complaint. Any other distinction has a tendency to mortify the more helpless of the patients, unless they are completely separated.

Moral disadvantages are apt to arise from the mixture of opposite characters. The virtuous are shocked and made unhappy by the profligacy of the vicious, and may afterwards be disposed to dissuade others from entering such houses; while the young, whose habits are not yet confirmed, are in danger of being corrupted by bad company. These evils are most apt to appear, where venereal patients are accommodated promiscuously with others. Accordingly this has been in a great measure corrected, by assigning to such persons distinct wards, and prohibiting all intercourse between them and others, or erecting separate institutions for their accommodation; such as that highly beneficent charity, the Lock Hospital in London, which holds forth to the diseased children of vice, both medicine and the sedulously employed means of reformation. Want of correctness is in other instances kept down by a system of domestic superintendance. A person of respectable character and manners, capable of exercising due authority, is selected for a matron, or house governor. This is particularly necessary, and sometimes requires great delicacy, when any of the resident medical officers are pupils, and young men addicted to pleasure, who require control for the prevention of abuses.

These charities are occasionally liable to be perverted by the persons who apply for relief. They are sometimes abused by daring impostors, who apply under the guise of distress so artfully assumed as to escape detection. This is not unfrequently done, for the mere purpose of obtaining temporary support. Hence the necessity of the utmost circumspection in examining the symptoms of the patient, and, where these are ambiguous, practising a well-directed policy for subjecting them to a full probation. Suspicions on this head authorise a practitioner to abridge for a day or two the comforts of such individuals,—a measure to which a sick man will submit, as intended for his recovery, while a conscious impostor will make his escape as soon as possible.

The strictest regulations are always practised for preventing the patients or their friends from bringing into an infirmary any provisions or articles of comfort, except such as are submitted to inspection, and for totally prohibiting the introduction of spiritous liquors. Habits of sobriety, thoughtfulness, and religion, also receive the usual encouragements, by the appointment of spiritual overseers, and the regular maintenance of religious worship.

The difficulty of managing all these complicated concerns, and the great labour which is, in most instances, bestowed on them, ought to be duly appreciated before any complaints are uttered against the imperfections of infirmaries. Nothing is more hurtful to society than the censorious spirit which conceives itself authorised to mutter and frown on every occasion on which a colour appears, on a superficial glance, for pronouncing the words injustice, partiality, negligence, or others still more indignant. This spirit of complaint is fostered only among persons who do not bestir themselves for active good. Those who are experienced in such affairs are sensible of the difficulty both of executing justice and humanity; and, while they do not withhold their strictures on such imperfections as appear, bring them forward in the true spirit of social benignity, and thus contribute to improvement, without generating displeasure.

In many respects, infirmaries create additional comforts, and cherish additional virtues among those who fall under their protection. It not unfrequently happens, that by bringing individuals into the notice of the friends of humanity, they have proved the means of accomplishing the moral reformation of the vicious, and on other occasions providing encouragement to neglected genius, or unsuccessful industry. Employments are contrived for those patients who are able to work a little. They sometimes assist in the lighter domestic labours. A common occupation among them is that of preparing surgeon's lint from old linen. They thus acquire useful dexterities, which may afterwards promote their domestic comfort, and enable them to administer assistance to their neighbours in private life.

One article of comfort and of cure is provided in infirmaries, which is a powerful remedy in many cases of disease, yet, from the trouble of providing it, is too frequently postponed in private life, and is inconvenient even for persons in decent circumstances, viz. the cold and warm bath, especially the latter. Being always ready in an infirmary, it is exhibited at those times which are most suitable to the patient, or at such regular periods of the day, that the due preparation of the patient for it is always well timed. Thus it is not rendered abortive by the intervening of sleep, or of a change of symptoms.

While the more humble members of the community receive direct relief from infirmaries, these institutions prove beneficial to society at large, by the singular advantages which they present for the improvement of medical knowledge. Within a small compass, much more practice can be seen by a medical pupil, than by going round among the dwelling-houses of patients. Thus a larger portion of his time may be devoted to reading and other studies. With all the trouble and time he could expend, it would be impossible for him to see the same variety in private practice as at an infirmary. He not only sees those who are under the care of the physician or surgeon whom he follows: every extraordinary case within the walls becomes quickly talked of; and interesting surgical cases spontaneously strike the eye. The establishment of clinical lectures on the diseases of the patients gives that completion to the knowledge of the student, which can only be obtained by a perfect combination of the theory with the practice, and of the detail of practical precepts, with the actual exemplification of the history of disease, and the changes produced by remedies. The interests of the patient are not sacrificed to the object of medical instruction. On the contrary, they materially promote one another. A practitioner, who treats his patients in so public a manner, and lays himself under the pledge of explaining his reasons for every thing that he does, and for every omission, solicits new motives for the excitement of his diligence, and declines to screen his errors under those ambiguous pretexts for which private practice furnishes so ready opportunities. The opening of the bodies of deceased patients is another advantage of the utmost importance in the conducting of infirmaries. This practice has often furnished one topic of unjust clamour. Dissections have been held up to the horror of the public, and have been mischievously represented as the ultimate object of the medical attendants of infirmaries. This is highly absurd. In infirmaries, as in private life, no inspections of bodies are made without the consent of the friends of the deceased, if he has any; and none are made different from those which a rational man would invite to be performed in his own family. When this is the case, no reason can exist that should prevent the performance of this sacred duty to the living. It is not for the personal gratification of the medical profession; it is for their instruction and usefulness in society that dissections are intended. The barbarous prejudices which existed against them among the ancients retarded the progress of medicine, and kept it in a state of comparative inefficiency for many ages. Where such prejudices still prevail, let them be submitted to. Let medical knowledge continue obscure and stationary, if it cannot be improved without shocking the delicacy, or rousing the indignation of an ignorant age. But let those who are superior to this fastidiousness use their endeavours to open the eyes of others, and, in a particular manner, by holding forth the enlightened examples of fathers, in the midst of their parental sorrow, examining with their own eyes and hands the bodies of the children whom they have lost. The illustrious Haller, while he commemorates the excellencies of a deceased son, adds, as a circumstance of course, that he gave his body to be dissected.

The seven general hospitals of the metropolis, viz. St. Bartholomew's, St. Thomas's, Guy's, the London, the Westminster, St. George's, and the Middlesex, contain constantly about 1600 persons, and the annual number admitted is about 20,000.

We shall in this article take some notice of the succedaneous means which have served to complete the objects for which infirmaries are instituted.

It is for the relief of strangers and persons who have no permanent home that their utility is most highly conspicuous. In a large metropolis, numbers of labourers and artizans, who have resorted thither for employment, occupy lodgings at weekly payments, which they cannot retain when sickness deprives them of their earnings. Strangers, also, who come from a distance for a temporary purpose, occasionally fall sick. Such are the poor Highlanders, who annually migrate to the south of Scotland to assist in the harvest. Many of these obtain, in their casual sickness, a cure and an asylum at the Infirmary of Edinburgh, and are justly enumerated among the most interesting objects of public sympathy.

Yet it is not to strangers alone that these institutions are adapted. Many persons, who are domesticated in the places where infirmaries are situated, fall into sickness so overwhelming, that they require more care than their relations at home can bestow on them. Thus the family is not only deprived of the fruits of the industry of a member who has fallen sick, but is forced to renounce part of its usual earnings in attending on this person. For these cases, infirmaries furnish a most seasonable relief.

There are, however, cases of a different description, for which they are not suitable. Poor persons are often afflicted with slight complaints, which require medical care to prevent them from becoming dangerous, but to whom removal from their own houses is not necessary, and would even prove injurious, by preventing them from following their usual occupations. This is frequently the case with the fathers and mothers of families, whose domestic duties, as well as their other exertions, are of great importance to society. For such persons dispensaries are formed, at which advice and medicine are given to patients who attend on stated days. Many of these are too poor to purchase medical attendance, though able to make a scanty provision of the necessaries of life. There are other patients whose complaints are so tedious, that they could not be retained in infirmaries, without occupying the place of others who are capable of receiving greater benefit. There are some diseases for which infirmaries are positively improper, as they require the free air, the varied scenery and exercise of the country, and may receive all the direction, and all the medicine they need, by occasionally repairing to a dispensary. The case is similar with the aged poor, labouring under complaints which admit of no radical cure.

Poor children, when they fall sick, require such a degree of care as an infirmary does not afford, and their parents usually object to the removal of them from their own immediate superintendence. The necessities of this description of patients are not yet in most places sufficiently provided for. In Philadelphia there is a society of benevolent females, who provide attendance in a separate place for the children of the poor, even when in health, in such a manner as to enable the mothers to follow some species of industry. One of their expedients for the abridgment of labour is, to have large cradles, consisting of fourteen or sixteen subdivisions, each of which admits a child, so that the attention of rocking them can be paid by one, while the opportunities of industry are afforded to the mothers in the same house in which their children are thus provided for. Similar apartments might be assigned to the nursing and the medical attendance of sick children. With regard to children who are able to walk, the suggestions of Mr. Owen of Lanark Mills, for consulting their comfort and good behaviour, in a systematic and abridged manner, might be advantageously applied to the formation of an institution for the cure of their diseases. All the institutions now mentioned will, like infirmaries, be liable, in the first instance, to abuses; and the means of obviating these will gradually occur, in proportion as the facts become known.

But many, even of adult patients, can neither be relieved by infirmaries nor dispensaries. For this reason schemes of more extended charity have been attempted, amounting to a regular gratuitous attendance of the sick poor at their own houses. This would have appeared at one time a plan of impracticable magnitude; and it must be confessed, that the enterprize of those who undertake to execute it is sometimes in danger of being defeated by the inadequacy of the means which can be provided, especially as many apply, besides those who are unable to provide for themselves. It is scarcely possible in any place to find well-educated men, who are supported by medical practice, in sufficient number for so much labour; and the characters of those who are connected with public charities will not allow them to admit into their body any who are in this respect of a decidedly inferior rank. By efforts of this nature, however, much good has undoubtedly been done. It still remains a desideratum in medical charities to provide for this object, consistently with the interests of the medical attendants, and with the limitation of their duties to such a scale of moderation as is compatible with cheerful perseverance. After the funds are provided for furnishing medicines for such institutions, it would be desirable to provide salaries for the medical attendants, not indeed adequate to their trouble, but serving as an acknowledgment for their labour, and a partial preservative against ultimate disgust in the execution of their duty. This object would be well worthy of the separate consideration of those prosperous individuals who have it in contemplation to devote part of their riches to charitable purposes, either in the form of donations or bequests. It is most like to be duly appreciated by medical men who have acquired a fortune in the exercise of their profession, which they are disposed to dedicate to public uses.

Some of the miseries accompanying the sickness for which the poor are admitted into infirmaries, do not come within the limits of these charities, and the relief of them might be too burdensome, both for the attention and the funds which they would require. To these, in some instances, the attention of the humane has been directed, and the task of affording relief has been made a separate object. An association was formed in London in 1791, under the designation of the Samaritan Society, which attached itself to the London Hospital. The singular utility of this laudable institution will be best shown, by describing the views of its founders, as exhibited in their first address to the public.

" Observations prove, that there is distress in hospitals calling on humanity for consideration, that cannot be brought within the provisions of those valuable institutions.

I. Poor servants who have been obliged to quit their places and go into hospitals, when dismissed cured, but yet in a weak state, have frequently no friend to receive them, or place wherein to lay their heads securely, till they are reinstated in service.

II. Many young females, who, through distress, have pawned or sold their clothing, when raised from the bed of sickness, might be saved from ruin by proper assistance.

III. Many within the walls of an hospital suffer the greatest anguish, on account of their families at home starving for want of the wages of their labour.

IV. Patients from remote parts of this kingdom, when discharged from hospitals in a low, lame, or incurable condition, frequently know not whither to go, or what course to take, for avoiding worse evils than have befallen them. And foreigners, under similar circumstances, experience at least as great hardships.

V. Many a languishing fellow creature, it is reasonably supposed, might be saved by the opportune benefit of fresh air for only a few days.

VI. The efficacy of the waters of Bath, where there is an hospital for paupers, and of the sea, would probably preserve the lives of many, who are unable to defray the little expence of a journey.

VII. In cases of mutilation, various services might be rendered the sufferers towards gaining a livelihood.

VIII. Patients are frequently without change of linen, so essential to cleanliness, and consequently both to their own continued health, and the safety of those with whom they may live.

IX. Instances occur of blindness in persons remote from their parishes and friends, in which the distress might be greatly alleviated by proper assistance at their departure.

X. Cases of rupture frequently occur, from sudden causes, requiring trusses."

After these observations, they give their opinion, that such objects will be best fulfilled, by a supplementary institution of this kind attached to each hospital.

This society was now regularly organized, and proved extremely beneficial, as appeared by their report in 1795, in which it was observed, that they had extended their benefits to a great number of instances of distress, comprehending nearly all the cases enumerated in their first address, and found that much evil might be prevented, and much good done, at little expence, by help thus seasonably supplied. They were then enabled from experience to recommend, in the strongest terms, the formation of other societies on a similar plan. One other has at least been formed, which is attached to St George's Hospital.

Under the denomination of infirmaries, we shall also notice institutions which embrace only one important department of the same general object. The most conspicuous place is due to those intended for the treatment of contagious fevers, and which have been called Fever Hospitals, or Houses of Recovery. These accomplish ends of peculiarly extensive utility at comparatively little expence. The objects whom they patronize are generally in the most deplorable state, and are relieved as speedily as the nature of their cases will admit. The attendance required, which would exhaust the strength and the means of support of their domestic friends, is given gratuitously in the best possible manner; and the spreading of infection through the rest of the family, and its calamitous diffusion through a populous neighbourhood, are prevented.

In consequence of the investigations made by Dr Haygarth of Chester, and other eminent physicians, into the laws of the contagion of various fevers, especially typhus and scarlatina, it was found that the dissemination of these diseases depended chiefly on deficient ventilation, and on the promiscuous contact of the healthy with the sick, through the medium of clothes and various other solid substances, which is always most apt to happen where cleanliness is neglected, and that, when measures are taken to prevent such communication, the infection loses its virulence by dilution and decomposition.

The first house of recovery was established at Manchester. In that populous town, a large proportion of the working classes live in confined dwellings, are slovenly in their domestic habits, and in their morals dissolute and intemperate. Fevers, when once introduced, used to spread rapidly from house to house, and from one neighbourhood to another, till the families even of the wealthier ranks were ultimately assailed. Occurrences of this sort, from their great frequency, excited much general alarm, and, when the physicians sketched a plan for the suppression of these evils, their representations met with a ready attention among the public spirited inhabitants.

In the year 1795, a fever prevailed at Ashton-under-Line, which had been introduced by a patient from Manchester. On that occasion, a temporary institution, on the plan of a fever hospital, was formed at Ashton. This example animated the inhabitants of Manchester in the same cause. A plan was drawn up by Dr Ferriar, containing his matured views of this subject, which he had attentively studied, and in which his zeal was deeply engaged. He pointed out the following fertile sources of fever among the poor: 1. Crowded lodging-houses; 2. Dwellings in cellar stories, which were damp and ill ventilated; and, 3. Cotton mills, which were kept close, warm, and crowded with people. The advantages he pointed out that would arise from a house of recovery were, That air and convenience would be better consulted, proper nurses would be provided, and the spreading of the infection arrested. This measure was not at first readily acquiesced in by all. It was conceived that the bringing of many infected persons under one roof would render that place a focus of contagion, which, in any populous quarter of the town, would be pregnant with danger. That prejudice, however, was in a short time removed. The point of doctrine which had been previously ascertained by the learned was gradually impressed on others by experience,—that, when several persons are brought together in a well ventilated place, the effluvia emanating from each patient, instead of uniting with those from others, are dissipated by the qualities of the air, and by the means employed; whereas, in ill ventilated private dwellings, the bad air, in which the people habitually live, cherishes and rapidly disseminates the contagion generated by a single case. In the proposed institution, the attention, and the whole conduct of the nurses, were to be placed under the best inspection. The access of unnecessary visitors was to be prohibited, and the visits of near relations prevented from becoming dangerous, by the enforcement of precautionary regulations in the mode of their intercourse with the sick. The clothes of the patients were to be stripped off as soon as they were brought into the house, put immediately into water, and afterwards well purified. The patients, while under treatment, were to wear clothes belonging to the institution, and dismissed in their own clothes, now in a clean state.

The patrons of this institution formed themselves into a Board of Health, which watched over the sources of infection, and encouraged the people to give them the earliest information of every appearance of fever. This board also actively propagated all that information requisite for promoting the general health, which was derived from the most enlightened sources.

The patrons of the Manchester Infirmary co-operated cordially with the Board of Health. Poor persons under fever had been formerly attended at their own houses by the physicians of that munificent charity; and a facility was thus afforded to the object in view, as these gentlemen, who were the best judges of the case, were to be authorised to send such patients to the House of Recovery. The means of conveyance were provided, all unnecessary delay was thus prevented, and orders were even given, when it was thought proper, to have the houses from which the patients were taken white-washed and thoroughly purified.

In 1796, the House of Recovery of Manchester was on these principles first established, at a time when fevers were extremely prevalent, and the numbers of febrile patients, attended by the physicians of the infirmary, were on the increase. In a few weeks, these began to be diminished, and the average number of fevers in that town has continued ever since to be much smaller than formerly. In the first year, they were reduced to 57, having been 226 in the year preceding; and, of these 57, several were brought from the suburbs, the fevers of which, in the preceding year, were not included in the 226.

One advantage of this institution was, that a spirit of cooperation on the part of the owners of cotton manufactories was excited, and the health of their work people became much more than formerly the subject of study.

It was also found that, of those who were seized with fever, a larger proportion now recovered, the medical practice being materially aided by the attendance and the comforts which this institution provided. "A clean bed, a quiet ward, an attentive nurse, and the frequent visits of the physician, were," as Dr Ferriar observes, "so many medicines to a poor creature, who otherwise had been languishing in a damp cellar, or in a garret, exposed to the injuries of the weather, amidst the neglect and confusion of a wretched family, clamorous from hunger, or brutal from debauchery."

Some time intervened, after the first establishment of this institution, before it was placed on a scale sufficiently ample to comprehend all the cases that occurred in Manchester and its environs. But, after this was accomplished, the result was, according to Ferriar, that the medical faculty of the infirmary felt themselves complete masters of the disease. "Epidemic typhus," says this author, in the third volume of his *Medical Histories and Reflections*, published in 1810, "is now unknown to us, while it has been raging in some of the neighbouring towns."

Institutions of the same kind have been formed in London, Dublin, Liverpool, and several other populous towns. The principles on which these are founded are the same which have been enumerated, and the effects which have been produced by them correspond to those of the parent institution in Manchester.

In houses of recovery, one part is appropriated exclusively to scarlatina. In Manchester there is a ward for this purpose, under the same roof with those for typhus, but entering by a separate outer door, that the contagion of this disease, which is peculiarly difficult to be decomposed or dissipated, may be prevented from attacking the other patients or their attendants.

In London, a small-pox hospital has been long established, by which similar attention is given to patients under that disease, and the contagion is prevented from spreading, as it might otherwise do. The important object of inoculation has been comprehended by the same institution, first the variolous, and latterly the vaccine. See Inoculation.

Among infirmaries limited to particular diseases may be mentioned, with applause, lunatic hospitals, (see Insanity,) lying-in hospitals, hospitals for syphilis, as the Lock hospital in London; the hospital for diseases of the eye; and the cancer ward of the Middlesex hospital. The laws of these institutions are founded on the same principles as those of other infirmaries, with such variations in their application as are adapted to the nature of the particular objects to which they are directed. Bang's *Selecta Diarii Nosocomii Hafniensis* (*Preface.*) Iberti, *Observations generales sur les Hopitaux*. Highmore's *Pietas Londinensis*. Blizard's *Suggestions for the Improvement of Hospitals*. Cross's *Sketches of the Medical Schools of Paris*. Roux's *Narrative of a Journey to London*. Ferriar's *Medical Histories and Reflections*. Haygarth *on the Prevention of Infectious Fevers*. Clark's *Collection of Papers on Fever Wards*. *Proceedings of the Manchester Board of Health*. (*H. D.*)

INFLAMMABLE Air. See Hydrogen, in the article Chemistry.

INFLAMMATION See Medicine.

INFLEXION, or Diffraction *of light*, is a property of light, in consequence of which coloured fringes are produced, both without and within the shadow of bodies placed in a divergent beam of attenuated light. These fringes are not produced, as has always been supposed, by the action of the body near which the light passes, but arise from the constitution of light itself. In our article Optics, this curious subject will be treated at considerable length.

INFLUENZA. See Medicine.

INK, a liquor used for printing or writing. The colour chiefly wanted for these purposes is black; and the principal properties of good ink are, deepness of colour, distinctness, and durableness. The vehicle employed for producing adhesion of the colour to the substance on which it is impressed differs according to the instrument employed in forming the lines. It is chiefly on this account that printing ink and writing ink are of so different composition. We shall describe the modes of making the best inks of these two kinds, and then the different coloured inks, and the compositions known by the name of sympathetic inks, which last are, on the whole, more curious than useful.

Printing ink is a mixture of black carbonaceous matter and oil, and makes a near approach to black paint. It requires, however, some difference of mechanical properties. Paint is fixed by drawing a brush in lines along the substance to which it is applied. But printing ink is made to adhere by a pressure, without superficial motion. It requires to be more tenacious and hard, but less tough and greasy than paint. This, and the other qualities, are communicated to it by a proper choice in the kind of oil, and by the preparation of boiling. Linseed and nut oil are the most suitable. The latter is the fittest for black ink; but the boiling imparts to it a brownness, which injures the brightness of red ink. The other oils dry too slowly, and inks made of them come off and smear the paper, or the oils sink into its substance, so as to surround the letter with a yellow stain.

The oil is boiled in a pot large enough to hold at least half as much more, to prevent boiling over. While boiling, it is constantly stirred with an iron ladle; the surface also is kindled, and allowed to burn for half an hour, in order to consume and separate more completely the inflammable parts on which the greasiness chiefly depends. After the burning is extinguished, it is allowed to boil some time longer. A thick kind is made for use in hot weather, and a thinner for cold. Both go under the name of varnish. The thick varnish is known to be of the due consistence, when it draws into threads between the fingers like weak glue. It is viscous, like a soft resinous juice. A proportion of turpentine or rosin is boiled along with it, to give it body, and increase its drying quality; some add a quantity of litharge. But as these admixtures render it extremely difficult to cleanse the types, it is much better to employ varnish which has acquired the same property merely by age.

The colouring matter generally employed is lamp black, two ounces and a half to sixteen ounces of the varnish. They are ground together like paint. It is probable that the varnish has acquired by the preparation a gummy quality, and loses in part its oily constitution, a change which gives it the property of adhering to wetted paper. The substance left, when dried, is tough and flexible, and little disposed, either to mix again with oil, or with water. The gummy and oily matter were thought by Dr Lewis to be so proportioned, as to defend one another in some degree against the menstruum of each.

The preparing of printer's ink is a very delicate art, and hence is in the hands only of a few. The ink used in all parts of Great Britain is made in London. That which is used in France is somewhat different, and hence the French typography differs from the British. It has a brilliancy and distinctness which we cannot imitate, except by using the article prepared in France. Differences of opinion exist as to whether these properties are advantages or not. Some complain of them, as accompanied with a dazzling effect.

Ink used for printing from engravings by the rolling press, must have less of the adhesive qualities, and a greater degree of yielding softness; it must easily run into, and fill the hollow lines in the copper-plate, and at the same time be easily wiped off the polished surface of the plate, previously to the taking of the impression. The peculiarity in the manipulation of the varnish consists in giving it less boiling than that which is to be used for type ink. Lamp black is improper for engraver's ink, as it communicates to it an inconvenient toughness. The charcoal blacking, such as that called German or Frankfort black, supposed to be procured from burnt vine-twigs, or kernels of fruits and wine lees, is in highest reputation, as more free from grittiness than the ivory black of this country.

The preparing of engraver's ink does not require the same delicacy with that of printing ink. The black, indeed, requires to be well chosen; but when this is done, every engraver mixes up his own ink, which is not the case with the printer.

Our common writing ink is a substance of a totally different kind, both in its colouring matter, and its menstruum. The colouring matter is a tenuious substance, formed by precipitating iron from a saline solution, by the gallic acid and tannin, and the vehicle is water, slightly impregnated with a mucilage. But, though this is the radical principle on which ink is made, the preparing of good ink requires considerable nicety in the choice of materials, as well as skill in the manipulation. Although any salt of iron would give a dark precipitate, when treated with astringent matter, the only one which gives a good black is the sulphate, and the only form of astringent which answers is the gall nut. It is, indeed, often improved by conjoining it with a little logwood. It has been observed that many inks are liable to become pale, or to disappear.

The learned and laborious Dr. Lewis instituted a series of minute experiments, for the purpose of determining the just proportion of the different ingredients, and obtained some interesting chemical results. He found that equal parts of this salt, and of blue or Aleppo galls, gave an ink which, though of a good black when first used, became yellowish brown when the writing was kept for a moderate time; that in proportion to the quantity of the sulphate, the inks were less durable in colour; and that those in which the galls were in excess were most durable. Thus it appeared that the galls were the most perishing article in ink after it is applied to the paper, and therefore ought to be in largest proportion; that a durable ink should contain at least three parts of galls for one of the sulphate of iron; but when much above this proportion, they render the colour too pale.

The degree of dilution of ink admits of considerable latitude. The fullest and blackest colour is produced, when the water is just sufficient to cover the powdered ingredients. But 40 or 50 ounces of water to one ounce of the metallic salt, and three of galls, make an ink sufficiently black for common purposes. Distilled or rain water was found, by Lewis, preferable to common water. But white wine formed a blacker ink than water, and vinegar formed one still blacker than wine. Spirit injured the colour, and occasioned a precipitation of part of the colouring matter. A decoction of logwood instead of water improved both the beauty and the deepness of the black. A piece of iron kept in ink for a length of time after it is made, improves its colour, probably by uniting with the sulphuric acid disengaged by the galls. In order to give ink a greater consistence, and enable it better to keep the colouring matter suspended, gum arabic is added, and it probably preserves the black matter in a state of greater tenuity, preventing, by its mechanical qualities, the attraction of cohesion from forming that matter into larger particles, and thus preserving it nearer a state of solution than it would otherwise be. The gum also prevents it from spreading on the paper. A greater body of colour is thus collected on each stroke, and the writing retains its blackness much longer than when none is added. A common addition is sugar; but its only good quality is that of communicating a shining gloss to the writing. It renders the ink more tedious in drying, and a sufficient glossiness is obtained by the gum alone. Dr. Lewis found that the addition of other metallic substances which had been sometimes recommended, such as sulphate of zinc or of copper, injured ultimately the quality of the ink; and that the galls ought to be finely powdered, and not merely bruised, as some had directed.

The recipe of Dr. Lewis, deduced from his numerous trials for making good ink, was, one ounce of powdered sulphate of iron, one of powdered logwood, and one of gum, with three of powdered galls, and a quart of white wine or vinegar, although water will serve common purposes. These ingredients are to be put in a glass or other convenient vessel not metallic, and the mixture shaken four or five times a-day. In ten or twelve days it will be fit for use, and sooner if in a warm situation; but it continues for a long time to improve if left without decantation. When it is separated from the powdery residue, it will be kept in a good state with greater certainty, if some broken galls, freed from the fine powder, and some pieces of iron, are put in it. Iron, however, is the only metal which it is safe to retain in contact with ink. Leaden or copper vessels, when used for containing it, become dissolved by its acid ingredients, and part of the iron is precipitated. This fact appeared an anomaly during the prevalence of the doctrines of elective affinity, as explained by Bergman. As iron precipitates other metals from their solutions, it appeared contrary to all chemical principles to suppose that these other metals were capable of precipitating iron. But, since the investigations of Berthollet have imparted a new, and in some respects more correct, light to the doctrines of chemical affinity, we acknowledge that the acid exerts a simultaneous attraction for both metals, and dissolves a proportion of each, depending on their relative affinities. These precautions relating to ink were clearly laid down by Dr. Lewis as the result of practical experience, while the doctrines of Berthollet were as yet unknown, and in that state of science such precautions appeared inexplicable; but, in its present state, they are recognised as furnishing a beautiful illustration of them.

In order that ink may be more durable in the manuscript, the paper may be advantageously dipped in a solution of galls; this obviates the fading on the back of the paper; *i. e.* in the part to which the ink has sunk deepest, where that change is most apt to commence. Dr. Lewis found this to be very effectual in his experiments. Others have recommended that the paper should be dipped in prussiate of potassa, which makes any tendency to change of colour to consist in the acquisition of a deep and rich blue tint.

But as this species of ink, after the best preparation, is apt to decay, Dr. Lewis made attempts to form one of still more durable materials. He found that a composition of black carbonaceous matter, such as lamp black, with varnish, and half the weight of a thick mucilage of gum arabic, formed an ink which, though it was easily rubbed out with water on common paper, proved in every respect durable when applied with a pen to bibulous paper. The manuscripts of the ancients were written with lamp black and gum; and the Chinese use a similar composition for all their writings, the same which is sent to Europe under the name of China ink, which they apply with a stiff hair pencil, fixed in the end of a reed. When vinegar is used instead of water in tempering it, the ink sinks deeper into the paper. Dr. Lewis ingeniously suggested, as an improvement, the union of the ancient with the modern method, by adding a small portion of the ancient composition, or of

Indian ink, to our common ink. In this case, cotton must be used in the ink-stand, to prevent the settling of the black powder.

These methods are sufficient to secure every advantage, where the effacing of manuscripts is not done by design. But it has become, in recent times, an object, on many occasions, to guard against frauds of obliteration. These are more easily executed since the discovery of the oxymuriatic acid, and its power in effacing all inks made of the gallic acid, or vegetable astringents, with iron. For preventing the possibility of this, when it is dreaded, an admixture of lamp black or other burnt carbonaceous matter is effectual, and ought to be in larger proportion than on other occasions. Finely ground indigo is recommended by some along with the lamp black. Others employ finely levigated manganese, and others a solution of indigo in concentrated sulphuric acid. The editor of the *Annales des Arts*, vol. ii. p. 106, observes, that the common ink may be rendered incapable of being discharged by any action which the paper can withstand, if, instead of water, the expressed juice of green vegetables be used, such as the *lathyrus*, the *sambucus niger*, or common grass.

Indian or China ink, being an article possessed of valuable properties, experiments were made by Dr. Lewis to analyze and to imitate it. He found that the adhesive ingredient in it was an animal glue, and he formed very good imitations of it by means of glue and lampblack. The superior delicacy of the imported article seems to depend on the black. It brings different prices, according to its fineness; and this depends on the kinds of oil from which it is produced. Various oils are burned in that country, in chambers made for the purpose. Du Halde gives three receipts for this composition, on Chinese authority. In one of them, the conglutinating ingredient is gum tragacanth; this must have formed an ink different from that brought to us from China. In another it is thin size, and in a third the size is mixed with a decoction of certain vegetables, which probably impart no quality excepting smell.

Indelible ink, for marking linen, without being liable to obliteration by washing, is merely a solution of nitrate of silver, with which the letters are traced after the part to be written on has been dipped in a solution of soda, and dried with a strong heat.

Inks of various colours may in general be made by using a strong decoction of the ingredients used for dying, mixed with a little alum and gum arabic.

Red ink from an infusion of logwood.

Green ink from a solution of acetate of copper, with gum arabic and white sugar.

Blue ink from indigo, ground with white of eggs, and brought to the due consistence by water.

Yellow ink from an infusion of crocus, with alum and gum arabic.

Sympathetic ink is a substance with which writings may be formed, which are invisible till they are subjected to some process, which immediately renders the whole distinct. This purpose was fulfilled among the ancients by means of milk, or some other viscous substance, which was rendered legible by means of soot thrown over the writing; part of it adhering wherever the lines were drawn, while from every other part it was blown entirely off.

There are some articles employed for this purpose, which are rendered visible by the addition of a substance which acts chemically. The materials of writing ink may, for example, be employed in a separate state. Invisible words may be first written with a solution of the sulphate of iron. If a rag, dipped in a decoction of galls, be drawn over them, they become immediately legible. If this be afterwards rubbed over with sulphuric acid, it is effaced. But the application of a saturated solution of potassa will make it re-appear like yellow writing.

The golden sympathetic ink consists of a solution of gold in nitro-muriatic acid, diluted with six times its quantity of water. Letters traced with this are invisible; but when a similar solution of tin is applied to them, the writing appears in the form of beautiful purple letters. Nitromuriatic acid is now capable of effacing them, and the re-application of the muriate of tin will restore them. Letters made with the muriate of gold, indeed, become spontaneously visible when exposed to the air. This, however, requires several days, and, if kept closely shut up, they remain invisible for two or three months. The acid evaporates, and leaves a violet oxide or submuriate. Nitrate of silver affords invisible letters, which become black by long exposure.

There are many sympathetic inks which are rendered visible by exposure to a fire. Solutions of muriate of ammonia, and various other neutral salts, act on paper by means of heat, in such a way as adapts them to this use; but the letters become, in process of time, confused and illegible.

The best sympathetic inks are those made from ores of arsenic, bismuth, or cobalt. Diluted nitric acid is poured on arsenic ore, and afterwards carefully decanted, treated with nearly half the quantity of dried muriate of soda, and evaporated. Letters or figures formed with this are invisible till held near a fire, which renders them visible, and of a beautiful bluish green colour. This disappears again when it is removed from the fire. Alum, with the sulphate of soda, used instead of muriate of soda, renders the substance red. Borate of soda, or nitrate of potassa, also makes the letters appear red.

The nitro-muriate of cobalt forms a similar ink, which appears on exposure to heat, and disappears in the cold. The heat applied to it, however, must not exceed a certain strength, otherwise the letters become permanently visible both in heat and cold. These inks are employed for making amusing landscapes, in which the trees acquire a summer foliage as often as they are brought near a fire.

A sympathetic ink may be obtained from fresh urine, evaporated, then dissolved in nitric acid, and saturated with ammonia or its carbonate. Lines drawn with this become visible, of a fine red, on exposure to a gentle heat. Sulphate of zinc applied to them gives them a rich yellow. This ink must be applied, however, immediately after it is formed. It becomes deteriorated in so short a time as twenty minutes. (*H. D.*)

INLAND NAVIGATION. See NAVIGATION *Inland*.

INN, VALLEY OF, a valley of Switzerland, in the canton of the Grisons, bounded on the north-west by the mountainous chain of Septimen, Julien, Scaletta, Fluela, Varaina, and Salvretta; to the west by the Maloggia; and to the south-east by the chain of Bernina. It extends eighteen leagues in length, from north-east to south-west, and is traversed throughout by the river Inn. This valley is named *Engadine* in German, and in the language of the country *Engiadina*, which some etymologists conceive may be derived from words signifying the head of the *Oen* or Inn. It is one of the richest and most beautiful in Switzerland, and is divided into two portions, the *Higher* and *Lower Engadine*.

As the valley of the Inn belongs to the primitive Alps, and lies in a high situation, the climate is rude during a long part of the year; but almost every different quarter has a different climate. Winter continues nine months, and the inhabitants can seldom dispense with fire in their apartments in the course of the other three. The sun is never oppressive: a week seldom elapses without hoar-frost during the warmest weather; and sometimes the hottest day is succeeded by freezing in the night. Snow frequently falls in June or July: the lakes freeze from the end of November until the month of May, and snow lies five or six feet deep. Earthquakes, nevertheless, are frequently felt, the shocks proceeding in a direction from east to west.

The river by which the valley is watered rises in a small lake called Lungin, or Lugin, behind the mountain Septimen, and is at first called the water of Oen. It falls into the lake of Sils, at Siglio; leaving which, it is united to a much larger torrent, descending from the glacier Muretto, where several geographers place the source of the Inn. After being enlarged by a multitude of streams, and passing through the valley to Thupf, it rolls its waters across the plains of Bavaria. At Parsan it unites with the Danube, there a much less considerable river, when it loses its own name for that of the other. The Inn is a beautiful limpid stream, characterized by fine and picturesque scenery. There are twelve small lakes in the valley of the Inn, and twenty-five lesser valleys terminate within its boundaries.

The Higher Engadine extends seven leagues in length, from Mount Maloggia to Mount Casanna; but its level ground is only from a quarter to half a mile in breadth. It universally presents the appearance of having been hollowed out by the action of the waters. It is traversed by primitive beds of calcareous stone and gypsum, and contains argil of all colours.

The Lower Engadine extends eleven leagues, from Brail to Pont St Martin, and is more fertile and populous than the former. Many thick forests of pine clothe the valley; and the southern sides of the Lower Engadine are covered by those of fir, from which constant supplies are drawn for the salt-works of the Tyrol. Barley is the only grain which is cultivated. Legumes succeed well; but there are few fruits, and the climate, in general, is not favourable to vegetation. The bread baked here is made to last three, or even six months, and is thence extremely hard.

The inhabitants of the valley are of agreeable physiognomy, laborious, active, and in a comfortable condition. Those, however, of the Higher Engadine, are represented as superior, in every thing, to the inhabitants of the Lower Engadine. They dwell in several villages, of which Soglio is computed to be at the height of 6300 feet above the level of the sea. All the villages of the high district contain good inns, those of the lower district are not equally so. Agriculture is prosecuted to a much greater extent in the latter, but there seems to be no manufactures of any importance. A particular essence, known by the name of *spirit of iva*, is distilled from a plant which is much prized in Italy for its musky and aromatic odour, and the plant itself is exported, in considerable quantities, to Saxony and France, for the same purpose. The population of the valley is annually decreasing, and luxury is making rapid advances. There is a considerable preponderance of females, probably from the resources offered for the enterprize of the males being too limited; whence they have to perform many of the offices, which would more naturally fall to the province of the other sex.

Most of the Protestant clergy of the canton are natives of the Engadine; and the Protestant religion is professed throughout the valley, except by the community of Tarasp. The administration of justice is better in the High than in the Low Engadine, where the judges are accused of too great a propensity to severe punishment, and resorting too readily to torture. Likewise, it is said, that the laws are very defective, and law suits tedious and expensive. Emigrations are not so general from the former as the latter. The natives repaired to Venice in great numbers from the thirteenth century; and, in the year 1614, several thousand shoemakers, all from the valley, were found in that city. But their entrance into the Venetian states was prohibited in 1766, since which time many have principally followed the occupation of confectioners. Carrying their industrious habits to other countries, some are enabled to return, with considerable profits, to pass their old age at home.

The inhabitants of the valley have sometimes participated in the political disquiets of the neighbouring nations. All their villages were burnt by the Austrians in 1721 and 1722, and the valley became nearly deserted. Five years later, the Austrians were expelled by the Duke De Rohan; and the inhabitants enjoyed profound peace until the recent revolutionary wars which have agitated Europe. A French army having passed the frozen lakes in 1799, took possession of the valley, in the course of the aggressions of their government; and in Switzerland several conflicts ensued betwen them and the Austrians, by whom they were finally driven out in the year 1801. (*c*)

INOCULATION, in Medicine, the artificial production of an infectious disease by morbific matter, brought in contact with the animal fibre. This is practised for the sake of inducing a milder form of disease than that which is the general consequence of casual infection, and for protecting the constitution against future attacks of the same disease.

Inoculation has been performed for the sake of experiment, in various diseases which are known to attack the human frame only once, but in none with that marked success which has taken place in small-pox. Wherever it has been practised, it has greatly diminished the mortality arising from that disease; and hence has, for nearly a century, been in general use as a preventive of its dangerous forms.

Inoculation comprehends some of the most curious phenomena of physiological and pathological science, and therefore becomes interesting, both in a scientific and a practical view. We do not know all the causes of the differences in degrees of mildness of the same disease. Physicians are most generally inclined to ascribe them to previous differences in the state of the constitution of the person affected. It could not have been concluded, and scarcely even surmised *à priori*, that a difference in the mode in which the morbific matter was applied, would have in this respect any marked effect. Far less could it have been supposed, that matter, in a fixed and moist state, brought in contact with an exposed living part, would have produced a disease milder than that which is generated by dry contagion, casually applied to the cuticle or volatile effluvia inhaled in respiration. These points of doctrine are only known in consequence of continual experience. It might be expected, that some extension of the knowledge of this law of contagion might enable us to insure to the attendants of the sick a mild, rather than a severe form of other contagious diseases, where one or the other is unavoidable; but as yet we know nothing more than the gross facts connected with inoculation as actually practised. Even a plausible *rationale* of the well known result is a desideratum in medical science. It might be ascribed to the minuteness of the quantity of matter introduced; but this is hardly a probable theory, and does not seem in perfect accordance with some other facts attending the communication of contagious diseases. But it is highly satisfactory to find, that the beneficial effects of inoculation are so undoubted and so extensive in exempting society from the incursions of one of the most desolating diseases, or reducing the mortality of it within an incomparably narrower compass. It will, therefore, be interesting to take a retrospect of the history of this valuable discovery.

The small-pox had prevailed for several centuries in civilized Europe, before inoculation was generally known. It is not, however, one of the most ancient diseases. It was not known to Hippocrates, nor any of the old Greek or Roman authors. It is first mentioned by the Arabians, after the establishment of the Mahomedan religion. The mode and principles of its production must, like all other points of the same kind, remain to us unknown, and the formation of conjectures on such a subject is a fruitless application of inventive genius. The existence of it cannot be traced farther back than to the siege of Alexandria in 640. But whether it originated among the besieged Egyptians or their Arabian invaders, is not known. We are indeed told that traces of it have been found in some Chinese writings of much more ancient date, and also in some of the sacred books of the Gentoos; but these accounts are too general to prove the high antiquity of the disease, and are equally unworthy of confidence with the fanciful comments by which a similar testimony has been extorted from the Jewish writers. The only accounts worthy of being listened to are those in which this disease is said to have attacked the army of the Arabian and Abyssinian Christians at the siege of the pagan city of Mecca, in 522, about the time of the birth of Mahomet. But it was certainly unknown to the most intelligent writers till the siege of Alexandria by the Saracens. The history of its subsequent ravages was but imperfectly recorded. We only find occasional traces of them. Circumstances of that kind are often omitted in the historical page, but we have enough to show that this was one of the most formidable diseases to which society was exposed. Many persons of distinction are casually mentioned as having fallen victims to it. The time of its first introduction into Britain is not precisely known, but both here, and in every other country, it has been peculiarly destructive when it made its first appearance. It is said to have been imported to Europe by the crusaders; but it appears to have been of much earlier introduction. In 1520, it first visited some provinces of South America, and proved fatal to one half of the inhabitants. In Europe it continued to be, till the last century, the principal risk to which human life was exposed at an early age.

About that time the practice of inoculation first excited public attention. But this preventive had been previously known and resorted to in confined districts in different countries. The discovery of it must have been entirely fortuitous, and it is probable that the want of any analogy between its effects and all the facts previously known, prevented the attention of medical men from being duly directed to it. Hence it was for several ages under the management of poor old women, and other ignorant persons. After inoculation had been introduced into London in 1724, and excited much general conversation as a foreign invention, it was found, (to the great surprize of the learned,) that it had been known in South Wales as far back as tradition could be traced. And it was a remarkable circumstance, that it had there been communicated artificially, under the denomination of *buying* the small-pox, exactly in the same manner as in Africa and Turkey. When thus bought, a quantity of the matter was rubbed on the skin, or inserted by pins infected with it. Sometimes dry variolous crusts were held in the palm of the hand. In the Highlands of Scotland it was artificially communicated, for many ages, by tying worsted threads contaminated with the matter round the wrists of children; and it was superstitiously imagined that it would not produce the desired effect unless purchased for a piece of money, or some other article, however trifling, in exchange. This was the case in different parts of Italy, France, Germany, Denmark, and Sweden. In China it seems to have been practised for more than 200 years, and still longer in Hindostan. The Chinese performed inoculation by introducing dried pustules with aromatics into the nostrils, a method less successful than that which has been in general use in other countries In Hindostan this operation was practised by a particular tribe of Brahmins, by means of a slight puncture, over which they tied a rag impregnated with variolous matter, accompanying the operation with superstitious observances.

In 1701, inoculation having been previously in frequent use among the poor Greeks of European Turkey, was adopted by the higher classes in consequence of a very mortal small-pox which then prevailed at Constantinople. The knowledge of this fact was circulated in England in 1716, by a paper from Pylarini, published in the *Philosophical Transactions*, and by Mr. Kennedy, in an essay on external remedies. But the subject was more generally impressed on the public mind by one of the letters of Lady Mary Wortley Montague, written from Adrianople, for the purpose of introducing this useful invention into her native country. That celebrated lady had the operation performed on her own son. It was in 1721 that it was first attempted among persons of education in England. Dr. Jacob de Castro and Dr. Harris exerted themselves to recommend it. We must, however, consider the lady now mentioned as having the chief merit of the introduction of inoculation into Britain. It did not meet with a ready adoption among the generality of medical men, who were rather inclined to despise it on account of the obscure origin of the invention, and the progress of it was somewhat unsteady. It was for some years forgotten from mere indifference, or held in dread in consequence of the remonstrances of eloquent and plausible adversaries. The inoculators were sometimes assailed by the most formidable invective. Mistakes occasionally arose among them in consequence of the imperfection of the knowledge of the subject under which they for some time laboured. Mr. Maitland, for instance, maintained that the inoculated small-pox was incapable of transmitting infection, and he encouraged persons indiscriminately to handle children under the inoculated disease, in consequence of which some received it in a severe or fatal form. Advantage was taken of such occurrences to misrepresent the whole motives of the advocates of inoculation; and the crimes of mercenary cruelty, and downright murder, were imputed to them. A few theologians united their intemperate denunciations to swell the general outcry. In performing this imaginary duty, the Rev. Mr. Massey maintained, " that the cutaneous disease of Job was produced by inoculation from the hands of the devil, and that the whole art was of infernal invention." One of its most powerful opponents was Dr. Wagstaffe, physician to St. Bartholomew's hospital, whose high character for learning and professional practice gave uncommon weight to his opinions. He condemned it on account of the uncertainty of the consequences, drawn from facts which had appeared only in one sort of climate. He denounced it as contradictory to reason, and maintained that, though some who were inoculated took the disease in a moderate form, others were either not affected, or so slightly, that no security could be expected against a future attack, while others had it in the most alarming and dangerous form, and died under it. He denied its power in securing the constitution against the disease in future. He condemned it as keeping up a focus of contagion from which much danger to others proceeded. He took advantage of the dissensions existing among its abettors, as evincing that their positions were unworthy of confidence. Some cases occurred in which, after the inoculated small pox, the disease was said to have been received by casual infection. These gave rise to much clamour against the inoculated disease as an ineffectual security, though they were generally found, on fair inquiry, to be cases of chicken pox. The argument was, on the whole, enveloped in much confusion, till Dr. Jurin fixed the attention of the public on the two important points in dispute, which were capable of being brought to the test of experience, and which, if established, were sufficient to supersede all theoretic reasoning, and all religious scruples. He first detailed the multiplied facts, which shewed that the inoculated small-pox secured the constitution against the disease in future, and then those which proved that the hazard of inoculation was much less than that of the natural small pox. He stated, that the whole number of deaths, in London, for forty years back, was 903,798, of which 65,079 were occasioned by the natural small-pox, shewing that more than one-fourteenth part of mankind died of this disease; and as some must have died without having had the small-pox in any form, he concluded, from a judicious calculation, that of those who were seized with small-pox, two in seventeen, or nearly one in nine, died. But, by some actual inquiries into the history of numerous families, it appeared that the natural small-pox was fatal to one patient in five or six, while those who died of the inoculated disease were only one in 60. In the years 1721, 1722, and 1723, 474 persons were inoculated in England, of whom 9 died. In 1724, the number inoculated was only 40, of whom one died. In the following year, when the natural small-pox was very prevalent, and very mortal, 151 were inoculated, and in the following year 105, making 256 in these two years, of whom 4 died. In the next two years only 124 inoculations took place. Thus, during the first 8 years of inoculation, 897 persons were inoculated. From statements, it appears that 845 of these had true variolous pustules, and 13 an imperfect eruption; in 39 no disease was produced by the virus, and 17 were suspected to have died of the inoculated disease. From domiciliary visits, it was discovered that of 18,229 persons who had been affected with the natural small-pox, 3008 had died of it, *i. e.* one in six; whereas the deaths by inoculation, granting the utmost contended for by its adversaries, did not exceed 1 in 50.

Inoculation was first practised in Scotland in 1726 at Aberdeen, on eleven persons, by Mr. Maitland, who had come home from Turkey; and, as one of these cases proved fatal, a violent prejudice arose against it, in consequence of which it was for 20 years after this discontinued in that part of the country. At Dumfries, it was practised first in 1733, during the prevalence of a malignant variolous epidemic; but in other parts of Scotland it was not adopted till about the year 1753.

In Ireland, it was first introduced in 1723 by Mr Hall, surgeon in Dublin, who inoculated 16 persons. Other 9 operations were performed about the same time, and of these the number that died was three,—a circumstance of a discouraging tendency.

In England, inoculation declined during the twelve years after 1726, *i.e.* till 1738. It was now, however, making considerable progress in the transatlantic world. The popish missionaries introduced it among the aborigines of South America, to whom the natural small-pox was highly destructive. In 1738, when a fatal epidemic prevailed in South Carolina, in consequence of infection imported in a slave ship from the coast of Africa, Mr Moubray, surgeon, introduced inoculation, and performed it on 450 persons. He was followed by Dr Kirkpatrick and some others, so that the number of the inoculated soon amounted to about 1000. Among these there were eight deaths. Dr Kirkpatrick published, in London, an essay on inoculation, in the year 1743. The practice was soon after introduced at Philadelphia, and in some of the West India islands, where it proved still more successful in checking the progress of a fatal epidemic. The accounts of this success contributed to the revival of inoculation in England in 1751, and the subsequent years. Serjeant Ranby had, in 1751, inoculated 1000 persons. The writings of Dr. Mead and Dr. Frewen had considerable weight on the side of inoculation.

In 1746, a scheme was proposed by some public spirited characters, among whom were several persons of high rank, for a hospital for the reception of patients casually affected with small-pox, and another for inoculating the poor. This was immediately opened, under the designation of " The Middlesex County Hospital for small-pox." Other two were soon after established, and their plan was greatly extended. In 1750, there was an institution, which consisted of three houses; viz. one in Old street, for preparing the patients for inoculation, another in Frog-lane, Islington, for receiving them when the disease appeared, and a third in Lower street, Islington, for patients labouring under natural small-pox.

The opinions which then existed on the necessity of a long preparatory course of medicine rendered the business of this charity tedious and expensive. The patients were subjected to this process for a whole month; and, that they might not be exposed in the interim to any casual infection, a great number was inoculated on the same day, and no inoculation was performed till these were removed from the house of preparation, and the house subjected to a process of purification. Thus the inoculations were only once in seven weeks, and the patients were subjected to confinement for two months. This institution had to contend with the prejudices of the populace, who regarded it as a source of calamitous infection to the neighbourhood in which it was established, and insulted the patients in the grossest manner as they passed along after their dismissal. Application was even made to the Lord Chancellor to have it suppressed as a nuisance. This of course proved effectual.

Dr. Madox, Bishop of Worcester, who was made president of that institution, was a most zealous and enlightened advocate of inoculation, and preached an eloquent sermon in recommendation of it, exhibiting a luminous contrast to the intemperate abuse which Massey had poured on it thirty years before, and it so happened, that it was delivered from the same pulpit. It was afterwards published, and contributed considerably to the promotion of the cause. It now made an uninterrupted progress, though still opposed with equal violence by a few individuals. Its friends watched assiduously the attacks of the enemy; divines, as well as physicians and surgeons, co-operated in vindicating and recommending it, and all opposition ceased, except from persons of very low character.

In France, it made a similar progress, in which it had to encounter opposition, which was apparently formidable, but betrayed equal weakness and absurdity as that which we have already described. Dr. Hecquet expressed so great an antipathy to inoculation, as to question the lawfulness of performing a certain operation which goes under that name on *trees*, and stigmatised it as contrary to the laws of nature, and strongly savouring of magic.

In Holland, inoculation was begun at Amsterdam in 1748, by Dr. Tronchin, in his own family. It was not, however, brought into general favour in that country till 1764. It was afterwards greatly promoted in the Low Countries by the favourable accounts of the American inoculation, as given by Dr. Tennet, an American student, in his Thesis published at Leyden, in which he stated, that of 8,327 persons who had been inoculated in Pennsylvania and the neighbouring pronvices, only 19 (making one in 438,) had died. In Denmark, it was introduced by Dr. D. Argent, and in Sweden by Haartman. In both of these countries, its progress was greatly accelerated by the paternal encouragement of their respective courts.

In Switzerland and Italy, it was introduced about the year 1754. In Germany, it was begun at Hanover almost as soon as in England. The Prussian and Austrian states were the last in which it was received, as it was opposed by De Haen of Vienna, and discouraged by the occurrence of three fatal cases in the beginning of Professor Mechel's inoculations at Berlin.

It was in 1768 that it was first known at St. Petersburgh, though the small-pox had destroyed two millions of persons annually in the Russian empire. In that year, it was established in the Russian dominions by Dr. Dimsdale, who was sent from England for that express purpose, and returned to his native country loaded with wealth and honours for his services. It was first established in Spain in 1771, though it had been practised for many years before at Iadrique, an obscure town of that kingdom.

The principal writings by which this subject was elucidated in our country, were those of Dr. Kirkpatrick, Mr. Burgess, and Dr. Munro. Dr. Kirkpatrick published a second edition of his work, with large additions, in 1761. In 1764, Dr. Munro published his account of the inoculation of small-pox in Scotland. The number then inoculated in this part of the kingdom, was 5554, of whom 72 died, *i. e.* one in 78. In the most northern isles, 112 had been inoculated in the middle of winter, and though they went abroad bare-footed in snow and ice, not one of them died.

The public attention was long and powerfully excited by the Suttonian method of inoculation. This was introduced by Daniel Sutton, an eminent surgeon in Ingateston, Essex. It consisted chiefly in shortening the period of medicinal preparation of the patients for the operation, from a month to a few days, and in keeping them in the open air during the whole progress of the distemper. In this he succeeded to his wishes. The advantages of his plan attracted so many patients, that in the first year he cleared 2000, and in the second 6000 guineas by his fees. In 1767, he removed to London, but did not meet with proportional encouragement. The medical success of his practice was greatly exaggerated by his friends. It was maintained that he had a secret medicine which gave him perfect command over the number of pustules produced, and rendered the inoculation absolutely exempt from danger. The few deaths which occurred were ascribed to causes independent of the disease. His plan of preparation consisted of abstinence from animal food and fermented liquors for a fortnight. A dose of a powder, which appears to have been mercurial, was given three several evenings during this fortnight, and next day a dose of cathartic salts, during the operation of which (and then only) fruit was prohibited. The months of May, June, July, and August, were preferred as the most seasonable for the inoculation of delicate subjects. The autumn was reckoned the most unfavourable season; and aguish habits the least safe. Scorbutic constitutions he considered as not objectionable. He inoculated with recent moist matter, introduced under a piece of elevated cuticle; and he is said to have often inoculated with a lymph taken from the arm of another inoculated patient, before the eruption of the small-pox. A pill was given on the night following the operation, and every second night till the eruptive fever made its appearance. The same diet used during preparation was continued in the course of the disease. During the fever, if there was no perspiration, drops were administered which brought on profuse sweating. In cases of high fever, he gave a powerful powder or pill, the composition of which he concealed; cold water to allay dry febrile heat; and balm tea during the desired perspiration. When the sweat abated, and the eruption appeared, he ordered exercise in the open air, and milk gruel in unlimited quantity. The diet was kept low in proportion to the symptoms of local inflammation. Sir George Baker, who interested himself in some inquiries into the Suttonian practice, ascribed the success attending it chiefly to the free and cool air, which formed part of the regimen, and corresponded with the plan, which Sydenham had found most successful in the natural small-pox. Others ascribed the success of this plan to the preparatory steps by which the patient was predisposed to perspiration, and the profuse perspiration afterwards induced, previously to the variolous eruption. Mr. Sutton's most partial advocate, the Rev. Mr. Houlton, (who was a chaplain settled under that gentleman's patronage, at the place where his inoculations were conducted,) maintained that the whole process was unknown to all except the discoverer himself. Mr. Chandler asserted, that the success of Mr. Sutton arose from his taking the matter at a very early stage, before it had been ultimately variolated by the succeeding fever. Baron Dimsdale explained, in perspicuous language, free from mystery, what he considered as the most eligible way of conducting inoculation. This author preferred matter taken during the eruptive fever, as the most active; and he preferred it taken from the place of inoculation, rather than from the other pustules. He describes the appearances at the different stages, with the corresponding prognosis, and appropriate treatment, the basis of which was the same with that of Mr. Sutton.

If the variolous inoculation had continued to be equally important, we should have reckoned it our duty to insist still more largely on the preceding particulars. But this has ceased to be the case, not indeed from any failure of this form of inoculation, but from the substitution of another, which is still more advantageous. For a more particular account of the preceding part of the subject, we refer to the works which we have already mentioned, and also to the interesting History of Inoculation of the Small-pox, by Dr. Woodville, which, in a great measure, supersedes every other to the modern reader. That work abounds in apt quotations, and is, on the whole, one of the most interesting specimens of medical and literary history with which we are acquainted.

We proceed to describe the form of inoculation now practised, which is commonly called VACCINATION, OR THE COW-POX, one of the most brilliant discoveries of modern times, and which, at present, derives a great interest from the scope which it still affords for speculation and experimental inquiry. It is founded on an extraordinary power possessed by a disease incident to the cow, and capable of being communicated to man, viz. a power of obviating the susceptibility of the system to small-pox. The existence of such a power, derivable from such a source, though often asserted by individuals, appeared incredible to persons most extensively acquainted with all the facts in pathology received among the learned, and the accounts of it were disregarded as vulgar fables. Since it has been ascertained, it must be considered as a death-blow to that sceptical incredulity which gratuitously rejects all novel suggestions previously to their plausible introduction into intelligent circles. It is too common to find medical men, whose information extends no farther than the routine of the day, cherishing their self-complacency with a semblance of systematic reasoning, and asking with incredulity, when any thing new is proposed, what good it *can* do? This spirit contracts greatly the sphere of salubrious expedients. We have no right to deny the existence of a power till we have disproved. We have no right, indeed, to assert the existence of any power without evidence; but we may figure to ourselves the possibility of it for the purpose of instituting experiments, or watching coolly the results of experiments made by others. After the discovery of the cow-pox, we find, accordingly, that the shock given to incredulity produced among its enthusiastic advocates a fertile suggestion of experiments, and a description, by anticipation, of numerous supposable discoveries. We cannot, however, advance as a point in science any principle which has not been actually ascertained. The truths known to us respecting the cow-pox are worthy of the attentive contemplation both of the philosopher and the philanthropist, and furnish matter for further research, as equally subservient to the extension of science, and the securing of additional advantages to human society.

For this discovery we are indebted to the now celebrated Dr Jenner. It was previously known among persons concerned in several large dairy farms, that the disease, when received by accident from the teats of the cow, protected the human system against small-pox. Inoculation with it is said to have been practised in some instances by obscure individuals. Several years before Jenner wrote on the subject, some eminent physicians had heard of it, and mentioned it casually in their writings, but never with that pointed seriousness which was suited to so great an object. Dr Jenner was the first who wrote a treatise for the express purpose of bringing it into view, and extending its beneficial application. This was in 1798, and the treatise was entitled "An inquiry into the Causes and Effects of the Variolæ Vaccinæ, a disease discovered in some of the western counties of England, particularly Gloucestershire, and known by the name of the Cow-Pox." He did not blazon his discovery with the enthusiastic *ευϱηκα* of Pythagoras. He exhibited the facts with that philosophic coolness, which placed a just confidence in the candour and the enterprising spirit of the age; and he quickly found a band of warm coadjutors in the investigation of the subject, and the extension of the knowledge of it. Among these, Dr Pearson of London was one who united much zeal with enlightened caution. He collected a copious body of information: he urged several important inquiries, and he availed himself extensively of his opportunities of ascertaining the laws of cow-pox by experiment. It would be unnecessary to mention the names of many others who were conspicuous for their exertions in the same cause. In all parts of this island, and in every country of the civilized world, it was hailed by enlightened men as an important discovery, and they eagerly sought for opportunities of giving it universal currency. It was sent to the most distant countries, and spread even among the most unpolished nations; and it is now problematical, whether any tribe on the face of the earth has not already experienced its beneficial operation. Prejudices have existed against it, but have been generally subdued by the gradual introduction of correct habits of thinking. Alarms have, indeed, been sounded against it, even by men of liberal education. Instances of this, however, have been few. They have arisen from accidental occurrences, rashly construed into the operation of constant natural causes. Zeal was precipitate in its movements on both sides of this momentous question; and the unblushing contention for fame, which on some occasions appeared, was ridiculous, and worse than boyish. The effervescence which controversy produced has gradually subsided. The inoculation with cow-pox has gained ground; facts of all kinds that occur relative to it are coolly observed. We cannot, however, boast of being in possession of a satisfactory knowledge of all the laws of vaccination. Occurrences occasionally arise, which create a doubt concerning the exact extent of its effects, both in exciting and in preventing disease. We shall, therefore, in the remainder of this article, give an account of the principal points which have been ascertained, and take notice of some desiderata which are not yet fully supplied.

It was maintained by Dr Jenner, that this disease is never of sporadic origin in the cow, but is derived from a disease of horses called the grease, by the application of the thin secretion yielded by that disease in its earlier and less conspicuous stages. Several presumptive evidences of this connection are given by him. Some experiments made by subsequent observers gave a different result. Negative evidence, however, is less to be trusted than that which is positive; and we have the respectable authority of Dr Loy for believing, that this matter is capable of communicating the true disease to the cow, and through it to the human system; nay, that without passing through the cow, the virus taken from the horse at a particular stage of the disorder, imparts the real cow-pox to the human subject. Whether it ever originates in the cow independently of the horse, is a question of more difficult solution, as all the outbreakings of contagious diseases are enveloped in some obscurity.

In the cow, the disease appears in the form of irregular pustules on the teats. At their first appearance they are commonly of a palish blue, or rather of a colour somewhat approaching to livid, surrounded by an erysipelatous inflammation. These pustules, unless remedied by caustic applications, or other effectual means, degenerate into tedious and troublesome phagedenic ulcers.

This disease is transferred to the hands and wrists of the persons employed in milking. It appears in the form of blisters, similar to those which arise from burning. Their shape is circular, where the situation will admit of it. Tumours are formed in the arm-pits. Various febrile symptoms arise, as shivering, pain of limbs, vomiting, headach, and delirium, which continue for several days.

When communicated by inoculation, this disease assumes a milder aspect, partly in consequence of the matter being less extensively applied, and partly in consequence of the parts in which it is inserted being less disturbed, and having a thinner cuticle than the hands. The inoculated cow-pox is much more regular in its appearances than the casual. About the third or fourth day, a small red spot appears in the punctured part, which gradually becomes more florid, and is slightly hardened and swelled. On the fifth or sixth day, this spot is converted into a small white vesicle. In two days this is much increased in size, and generally acquires a diameter of one-third or one-half of an inch. It has elevated edges, and, in the centre, a small depression, which is soon surrounded with a narrow crust. This last circumstance has been ascribed to the artificial puncture; but we have found a similar appearance in those rare cases in which other vesicles arise besides that which is formed at the inoculated part. On the eighth or ninth day, a circular inflammation appears around the vesicle, which increases for three days, and is sometimes half an inch, sometimes two inches, in diameter. On the eleventh or twelfth day, this inflamthe areola begins to disappear, first at an intermediate place between the vesicle and the outer margin of the red areola, producing the appearance of two florid concentric rings, one in contact with the vesicle, and another at a distance, like a lunar halo. The vesicle becomes harder, and of a dark brown colour, and, after the inflammation is gone, is converted into a horny crust, which adheres for a time, and afterwards separates, leaving a red raw-looking depression, which continues to be distinguishable through life, being either somewhat depressed, or merely of a whiter colour than the neighbouring skin.

The appearances are subject to some slight varieties. One of these is a copious eruption of minute papulæ on the inoculated arm, about the third day. This goes off in a few days. It most probably arises from some peculiar irritability in the inoculated subject, and is not generally found to bring after it any disadvantages.

In some instances, a copious pustular eruption has appeared over the whole body, which has given rise to interesting discussions. These chiefly occurred under the practice of Dr Woodville, at the small-pox hospital in London, and hence were ascribed to some influence of variolous matter, or a variolated atmosphere. They are, with greater probability, considered by Mr Bryce as cases of true small-pox. We have, however, seen two cases of general eruption, one of which was copious, and the vesicles, though smaller than that which usually arises at the inoculated part, were distinguishable from those of small-pox by a minute central, and apparently depressed crust, which resembled the vaccine vesicle. From one of these, matter was inserted in the arm of another child, and produced the real cow-pox. Such cases, however, are extremely rare. The greater part of those in which pustules appear over the body, are cases in which the infection of small-pox has been received into the system previously to the inoculation, has been silently operating, and at last shown its symptoms in this form. Matter taken from such pustules for inoculation has, accordingly, produced the true small-pox.

The febrile symptoms attending cow-pox are sometimes well marked; more frequently they are slight, and sometimes scarcely discernible.

Two important questions are involved in this subject. First, Is the cow-pox perfectly safe? and, second, Does it afford full security against small-pox?

Its safety might almost be presumed from its general mildness, when compared to the inoculated small-pox. The latter has much fever, and is acknowledged to be sometimes fatal. A slight fretfulness or uneasiness for 24 hours, or less, is all the fever that generally attends inoculated cow-pox; and of this none have died. Deaths may happen from other causes, while the cow-pox runs its course; but even this is an infrequent occurrence; and some have indulged fancy so much, as to think it probable that the cow-pox increased for that short period the average chance of human life, and thus was not only no disease, but an additional confirmer of the constitution against every contingency.

But, though never fatal, the cow-pox may be supposed capable of generating other diseases, either immediately, or on some future occasion, or of making the system obnoxious to some diseases in a more severe and dangerous form than they would otherwise assume. Some intemperate enemies of cow-pox endeavoured to explode it, by describing it as capable of producing that loathsome cutaneous affection, the itch; and, that they might the more fully substantiate their point, added, that this itch was cured by the same means as the common psora. This last observation evidently took away the whole force of their objection. Who would hesitate to employ the cow-pox, though succeeded by an itch which required a few rubbings with sulphur ointment for its removal, in order to avoid the small pox—a disease which combines so much greater loathsomeness with imminent danger of death, and of hideous permanent deformities? Cases of this sort have certainly occurred. The practitioner has told the parents that the eruption had no connection with the cow-pox, that the children had caught the itch, and ought to be treated for that complaint. The parents have taken offence at such an imputation, and remained unshaken in their opinion that the eruption was generated by the cow-pox; and unhappily this contest has produced a remissness in the use of remedies, which ended in a permanent liableness to cutaneous eruptions. We apprehend that such inconveniences would be avoided, if practitioners would admit the occasional existence of such a *sequela;* and, without offending the delicacy of a parent, prescribe, upon this principle, the same remedies which are found effectual in the disorder now mentioned.

The cow-pox has been accused of giving origin to the symptoms of scrophula. This accusation we believe to be wholly unfounded. Some have even maintained that it powerfully corrects the scrophulous diathesis, and the one doctrine appears at least fully as well supported as the other.

It has been remarked by some, that, of late years, the measles have been more dangerous and fatal than in former times; and this circumstance has been supposed not an unlikely consequence of the practice of the new inoculation. Till we see further proof, we cannot acquiesce in this suspicion. Investigations of such laws of disease, however, are important. Accurate comparative observations should be made on the varieties of subjects seized with measles, before we admit any such conjecture to possess the least plausibility. The generally increased mortality of measles is in itself not well established. It often appeared in the form of a very fatal epidemic before vaccination was discovered; and it is well known that in this respect the epidemics of different years, and different series of years, differ materially from one another. We have no better reason for suspecting the cow-pox of exposing the system to any disadvantages in compensation of the protection which it affords, than for attaching such an imputation to any article of diet or of medicine which we are in the daily habit of employing.

The other question is one of considerable magnitude. Does the cow-pox give effectual security to the human constitution against small-pox?

That it does so in many instances, is fully ascertained. The evidences of it are innumerable, and in the individual cases they are in general absolutely decisive. Apparent exceptions, however, have occurred. Reports of these damped a little the ardour of Jenner at an early stage of his inquiries. But conceiving it improbable that nature was in this instance capricious, he laboured to discover the true cause of failure. He found some circumstances to have occurred in the unsuccessful cases, to which he ascribed it; and on these he established some discriminating marks between the false and the true, the imperfect and the perfect cow-pox. He considered the occurrence of febrile or constitutional symptoms as essential to the complete security of the patient; and, in this point, he was followed by Dr. Pearson and others. It must be acknowledged, however, that this may be a source of considerable hesitation. The febrile symptoms are acknowledged to be generally slight; and we may believe in the existence of an influence extended universally over the system, although no such symptoms are produced. On the other hand, uneasiness, fretfulness, and febrile heat, may arise from a local disease, which acts only through the medium of sensation, or fugitive irritation. If to these circumstances we add, that a vaccinated subject is only occasionally seen by his medical attendant, and that the reports of mothers and nurses are often influenced by fancy, by carelessness, or by a wish to please—we shall find little satisfaction in trusting to febrile symptoms as affording a sure *diagnosis*. The world is, therefore, under the highest obligations to Mr. Bryce of Edinburgh, who, in his treatise on cow-pox, has proposed a test of a much more ascertainable kind. It consists in making a second insertion of the vaccine matter at the end of the fifth day, from the first inoculation, and observing whether this produces a vesicle of its own, which is smaller than the first, and follows the same stages, but with an accelerated progress, so that the areolæ surrounding the two vesicles are formed nearly at the same time. These appearances will show that the influence of the original inoculation extends beyond the part operated on, so far as to comprehend the site of the second insertion. In order that it may be ascertained to be universal over the system, it may be some improvement to make the second at a part of the body the most distant possible from the first. By this test, we discover in what instances the modification to which the system is subjected is not merely local. Where no effect follows the second insertion, we are uncertain of this fact. If a vesicle is produced, but is not modified in its appearance and progress in a manner different from the usual course of the first insertion, we conclude that the constitution has not received the requisite change. This accordingly has sometimes happened where the first vesicle has been accidentally broken. We do not know if it is even liable to occur where the progress of the first vesicle is apparently regular. If not, we should conclude that no test, besides the regularity of the local appearances, would continue to be requisite. These important points may be numbered among the desiderata of this part of pathology. It is rash to infer that this difference would have taken place in any particular instance, merely because we find the patient afterwards seized with small-pox. That a person who has passed through this test in the most satisfactory manner never can be seized with small-pox, is a principle which ought not to be confidently anticipated, but only inferred after the amplest experience. Mr. Bryce's test is principally to be valued for the important improvement which it affords in the investigation of the subject; and for the pleasing light which it throws on the pathology of the animal economy. With respect to the advantages which it promises for distinguishing imperfect from perfect vaccination, it is certainly, *a priori*, much superior to that of watching for febrile symptoms. Such symptoms might arise from the temporary commotion of a great central organ, but the phenomena which occur in that test evince an important change in the dispositions of the most minute fibres in which the functions of secretion and assimilation are active.

The occasional alleged failure of vaccination in securing the constitution from small-pox has been sometimes thought to arise from "the manner in which the operation has been performed." If this were the case, we should naturally look for some definite variations of the subsequent effects, corresponding to the deviations from the best method of inoculating. But there is a looseness in the causes by which the failures are accounted for, which shows that something still remains to be explored.

If the vesicle, when ineffectual, were always distinguishable by its appearance, no dubiety could occur. It is therefore somewhat satisfactory to be told, that "the spurious pustule is more elevated and opake than the genuine, and more rapid in its progress; that it is not cellular, nor surrounded with a distinct circumscribed areola, nor converted into a dark shining scab." If these appearances are observed to take place, we, of course, put no confidence in the preventive power of the affection induced. But it would be more satisfactory to have a precise knowledge of the causes even of this variation. These causes, however, are merely enumerated in a mass. Such a pustule is said to occur instead of the genuine cow-pox, "in those who have had the small-pox;"—it is said to be "produced by *blunt* or rusty lancets;—by matter taken from a spurious pustule—or from a genuine pustule at too late a period—or by matter which has been too long kept—or dried before a fire." (See the article *Cow-pox* in Rees' Cyclopædia, written by Mr. Ring.) All these circumstances (excepting the bluntness of the lancet) may be supposed to occasion a modification in the disease; but is it probable that they all agree in the *kind* of modification which they produce? A cautious inquirer will suspect that there is here some defect of observation—something presumed rather than discovered, unless numerous cases of this wonderful coincidence are minutely described; while the captious critic will exclaim, that these assigned causes are only so many hedges behind which the wary vaccinator provides for himself a variety of shelter in case of disappointment. The only light in which reason and duty view them is, as so many motives for more extended inquiry. These remarks have indeed been elicited only by the explanations given of a vesicle which "carries its spurious character in its aspect." But we may derive instruction, by contemplating a specimen of that precipitance in forming conclusions, to which the medical world is liable in other points connected with this important subject.

In order that vaccination may afford us the required advantages, we ought to be able to distinguish, "without difficulty," all the cases in which the constitution is secured by it either from disease or from danger. Vaccination has been chiefly in the hands of persons not medical; for this reason, it is among these that the most numerous failures have occurred, and room is left for ascribing the failure to some imperfection in the cases of cow-pox, which escaped the observation of all concerned, though it might have been ascertained by better instructed individuals. If failure takes place among those inoculated in the most approved manner, and declared by good medical authority to have had the genuine disease in the most perfect form, the necessary conclusion is, that the faculty stand in need of more accurate information.

That some such cases have occurred is admitted; but they are declared to be extremely few: and we are justly reminded that cases of repeated natural small-pox, as well as of natural small-pox after the best variolous inoculation, have also occurred. The rule of security is not wholly without exception in either instance.—But, are the exceptions *equally* infrequent in both? This is what we are also told on very respectable authority. Such exceptions, we are informed, *appear* to be more numerous than they are, only because chicken-pox occurring after vaccination has been mistaken for small-pox. There are various sorts of chicken-pox, according to the accounts given us in the writings of physicians, and all of them are mild and safe diseases, compared with the small pox. See the varying descriptions of this disease given in the works of Drs. Morton, Sauvages, Van Swieten, Burserius, Heberden, Cullen, and Willan. Some assert that there is another chicken-pox, at least an illegitimate small-pox of a severer kind, not clearly described by any of the older writers, and that the rare exceptions to the efficacy of vaccination have been cases in which this form of disease has been erroneously taken for small-pox. The general fact we have found to be, that, where parents have brought their children, apparently under small-pox, to the practitioner who had vaccinated them, and declared them safe from that disease, he has told them that it could not possibly be small-pox, and must be chicken-pox. Each party continues to retain his own opinion. The parent is certain that it was small-pox, the vaccinator that it was chicken-pox; but, since the children have got well, the contest is not worth the maintaining, and the inoculator enjoys his triumph.—And who will deny that he is entitled to this triumph, if the children always get well?—Is that the fact?—We believe it is, or at least exceptions to that most important of all results are extremely rare. However, therefore, we may in some particulars acknowledge ourselves to be in the dark regarding the minute laws of the inoculated vaccine disease, this one fact must determine us to cling to it as a sure preventive of all the dangers arising from small-pox. We use the word *sure*. not in an absolute sense, but as admitting of exceptions so rare as to be totally unworthy of being taken into calculation.

The pathological principle by which the present state of our knowledge directs us to explain this fact is, that, where the infection of the small-pox comes in contact with a vaccinated constitution, it meets with a diminished susceptibility, which, in most instances, obviates every tendency to the actual production of small-pox, and almost always obviates the fatal tendencies which it otherwise brings along with it.

From numerous other facts which presented themselves, we had been led lately to conclude that it affords a sure protection against the occurrence of the secondary fever, the principal danger of small-pox. We have, indeed, recently heard of an exception to this conclusion; a vaccinated person who has been known to die under secondary fever. This is not in conformity to any thing we have seen, and must be a phenomenon still more rare than the exceptions to which we have referred. As tenacious advocates for vaccination, we are obliged to declare it as our opinion, that those who agree with us in this feeling will do much less justice to this preventive, by pronouncing all the alleged exceptions to its efficacy to be cases of chicken-pox, than by allowing that small-pox may occur after it, and by insisting rather on the comparative safety, than the great infrequency, of the disease under such circumstances.

It has sometimes been intimated that, "as the laws of nature are uniform, such exceptions are *prima facie* improbable; and that it is most rational to infer, when they apparently occur, that either the cow-pox, or the subsequent small-pox, is different from the corresponding disease, in the form in which the one is a preventive of the other." This may be the case. The exceptions may proceed from some cause of a powerful and decided nature. That cause may be discoverable by human inquiry; or, it may lie so deep as to mock our researches. But, let us remember that, in the present state of our knowledge, we have other facts which warrant us, from analogy, in allowing that such modifications of the animal system may not be absolute and invincible, but may exist in different degrees. Here it will be useful to revert to some well known circumstances connected with small pox. Even a person who has already had that disease, either from casual infection or inoculation, though most frequently secured against it in future, is not always secure. Some are attacked even when the exposure is casual, and not remarkably intimate or long continued. Others are secured in a greater degree, so as never to take the disease unless in close and long contact with a variolous patient. On such exposure, a disease which has been called local, and which certainly is partial, may be generated. A nurse who has passed the small-pox has found variolous pustules breaking out on her breast while she suckled a child under that disease. These pustules, though their number may be considerable, are generally confined to one part of the body. They are seldom attended with any fever: yet, in other instances, febrile symptoms have in a slight degree appeared. Such symptoms are then generally attributed to mere irritation, and their true variolous nature is denied. It appears most philosophical to consider all these varieties as evidences that the correction of this susceptibility is liable to gradations. Such gradations, we think, take place remarkably in the influence of cow-pox. But, obscure as their causes are, and unable as we yet are to tell in what degree they depend on constitution, on habit, on unknown varieties of vaccine matter, or unknown varieties of variolous infection, we have the valuable consolation of concluding that, in every case of cow-pox "not evidently spurious," the susceptibility is so far subdued as to secure the individual, in all human probability, from all the dangers, and (it is not unimportant to add) from all the deformities, occasioned by the small-pox. It remains for future inquirers to substantiate a still more select form of cow-pox, by which the security will be more perfect. In the mean time, we ought to be thankful for the valuable advantages attending it even in its most questionable form.

These observations are called for by a most important circumstance, the occurrence of an epidemic small-pox in Cupar, in Fifeshire, in the spring of 1817, of which an account has been published by the author of the present article, founded on inquiries which he made in the form of domiciliary visits, while the circumstances were fresh in the memories of the parents of those who had recovered, and while some patients still laboured under it in its different stages. From this account we shall take the liberty of extracting some of the leading circumstances.

"Though I was there only sixteen hours, that is, eight hours on the 31st of May, and eight on the 4th of June, I received accounts of seventy patients.

"Fifty-four of these were said to have gone through the vaccine disease.

"Sixteen had either not been inoculated, or no vesicle had appeared after the insertion of the vaccine virus.

"In almost the whole, both the inoculated and those who were not, there was a well marked eruptive fever.

"Very few of the cases were mild during their whole course, viz. about eight of the inoculated, and two of the uninoculated.

"It was not easy to classify them with greater minuteness as to their severity. There seemed to be, in this respect, an insensible gradation.

"Of the fifty-four who had been inoculated, one died. Of the sixteen who had not been inoculated, accounts were received of six deaths.

"Here we have in the one class, one death in fifty-four; in the other, more than one in three. But the cases taken into computation ought to be much more numerous, in order to afford an average on which we can depend.

"*Of all who were attacked, none had been inoculated with the small-pox.*"

This last fact seemed to justify a remark which the author afterwards makes, and which has been subsequently animadverted on, that, "as a sure preventive of an attack of small-pox, there is a marked distinction between cow-pox and the variolous inoculation." The security afforded by the latter has had some rare exceptions; but, on this occasion, we have found it securing the system from an epidemic which attacked numbers of vaccinated persons, while many who had received the old inoculation must have been equally exposed. This is a *real* difference between the two inoculations in one obvious point; but is perfectly consistent with the confidence which cow-pox claims in obviating a very extensive and a very alarming danger. For the features of the different cases, and some casual suggestions for the further prosecution of the subject, as well as some marked instances of protection even from the attack of the same epidemic, we must refer to the account itself. We shall only further transcribe the summary of general practical conclusions there given, which, though differing in some instances from the belief previously entertained, are in their nature consoling.

"We are justified by the following considerations in steadily adhering to this practical conclusion, that vaccination ought still to be valued, and universally recommended.

"That *by vaccination we do not positively endanger life*. By the old inoculation, a disease was produced which was sometimes fatal. The danger artificially created was immediate, while that which it was intended to obviate was remote. Yet the former was comparatively so small, as to prevail on the reflecting part of the community to concur in encountering it. In the vaccine inoculation, however, we are saved all these painful calculations, because we communicate an affection attended with no danger, and the power of which over the constitution is great, but silent.

"Again, allowing that the individual who has been vaccinated is equally liable to small-pox with any other, (which no person will be bold enough on the large scale to assert,) *he is not liable to it in the same form as if vaccination had been omitted*. This point cannot be longer doubted; and, if we proceed at first on the supposition that the small-pox succeeding vaccination is exactly equal in risk to the disease which used to be communicated in the old inoculation, it must be allowed that *we gain time in the life of the individual by preferring vaccination*. He is not subjected to the risk in the first instance. Years may elapse before he is exposed to the contagion of small-pox: When so exposed, he will, in most cases, be protected from it by the cow-pox; and, if at last he is attacked, he encounters a risk only equal to that which would have been earlier incurred by a previous inoculation with variolous matter.

"But this supposition is much less favourable than the truth. The risk even at that late period is far from being so great. *The small-pox occurring in a vaccinated person is much safer than the inoculated small-pox*. It has never been maintained, that the disease induced by the variolous inoculation was always exempt from the occurrence of secondary fever. On the contrary, some of the few who died of the inoculation were cut off by that fever.

"The most unfavourable conclusion, therefore, that can be admitted is, *that there may be the same risk of deaths from small-pox after vaccination, as of deaths in the early stage of the inoculated small-pox*. Thus, the risk is not only deferred to a later period, but is ultimately far inferior to what it was under the use of the best inoculation previously to the discovery of the cow-pox, and is, in fact, reduced almost to nothing. What more can be reasonably desired? We do not expect to provide an absolute security from all accidents."

We have already stated, that since the preceding publication appeared, we have heard of a case of death in the secondary fever of small-pox in a patient who had been vaccinated. If such occurrences should be well authenticated, we must trust solely to the extreme diminution of the gross risk as ascertained by observation, afterwards assisted by tabular statements. This still continues decidedly favourable to vaccination, as infinitely superior to the preventive by which it was preceded.

In order that this important subject may be duly improved, the following requisites ought to be attended to. The inquirer ought to see numerous inoculations, and his observations on the progress of the disease ought to be strictly daily. He ought to inoculate with matter taken from the vesicle at various periods of its progress, all within the limits now acknowledged to be well adapted for communicating an efficacious vaccination. He ought to ascertain the number of successive reproductions in the human subject, to which the different specimens of matter which he uses owe their origin since they proceeded from the cow. Classifications of patients ought to be founded on these and other differences. Written accounts ought to be kept of every circumstance, even the most minute, and apparently trifling, in the past history of each patient, and in the phenomena which occur during the progress of the disease. The aspect of his subsequent diseases, especially those of a contagious nature, as scarlatina and measles, ought to be inquired into and noted wherever it is practicable, and comparisons made in this respect between patients of different kinds. All this ought to be done simultaneously by persons in different places, each of whom ought to be ready to take a journey on the shortest notice, in order to investigate occasional anomalous appearances. To execute these objects on a large scale, and to provide for them men whose faithful and assiduous exertions can be relied on, till such time as satisfactory conclusions can be drawn from ample statements, might be a work of some difficulty. To secure the daily attendance of the patients, or to visit them at their own houses when they do not attend, and to note down every occurrence in the most scrupulous manner, is a task to which no man can be expected gratuitously to submit, unless his fortune is independent, his time completely at his command, his heart bent on the object, and his resolution much firmer than his hopes are definite. We do not see how it is practicable without the provision of a fund for the express purpose; and, since we find that governments have shewn themselves not averse to appropriate part of the revenues of nations to the great object of preventing the contagion of small-pox, it may not be useless to remark, that their future munificence will be best bestowed on those arrangements for the attainment of the object which call for the most laborious, and perhaps otherwise unattainable exertions.

We shall now give a brief view of some of the most interesting collateral circumstances attending the cow-pox.

This disease is not capable of being disseminated by volatile effluvia. In this respect it differs from the inoculated small-pox, and exhibits one important advantage above the latter disease, that no contagious affection is by means of it diffused through a neighbourhood.

Another circumstance is worthy of remark, that cow-pox, once occurring, does not give security against a future attack of the same disease. On this point different opinions have been entertained, and experiments have varied in their results. It appears, on the whole, that by one attack of cow-pox, whether casual or as the consequence of inoculation, the susceptibility to the same disease in future is only diminished. Milkers in the dairy counties are, by passing once through it, generally able to resist the contagion in future; sometimes they receive it, but always in a much milder form. It is important to keep this circumstance in mind, because some have thoughtlessly trusted to the effects of a second vaccination, after the first had for some time run its course, as a sufficient test of its efficacy. That is, they have looked for an absence of future susceptibility to vaccine influence in those cases which were worthy of dependence. The influence of a previous attack of small-pox has a similar virtue. It in a slight degree diminishes, but does not destroy, the susceptibility of the constitution to cow-pox.

Some precautions are proper in conducting the vaccine inoculation. The choice of matter should be carefully attended to. It should be taken from a good vaccine vesicle, in a healthy subject, from the 5th to the 9th day of the disease. It is most certain in its effects when immediately inserted. If it is to be kept, it should be allowed to dry. Some confine it, in order to preserve it in its original moist state. They are not aware that it is subjected to much greater change by moisture than by exposure to the atmosphere. It may be kept on glass, or on the point of a lancet, or on the end of a small pointed piece of ivory. Mr. Bryce has suggested the employment of the crust, which, in its central part, contains matter dried in an early stage of the disease, and therefore perfectly pure and safe, and from which the light coloured part round the margin ought to be removed. Dried matter, in these different forms, is convenient for transportation; when about to be used, it must be moistened with water, either cold, or of a blood heat; but recent matter is always preferable, and therefore ought to be secured in every populous place, by regular weekly inoculations.

The end of the third month, when the constitution has acquired some firmness, and before it is subjected to the disadvantages of the period of teething, is the most eligible time for the operation. In an adult in whom it has been neglected, it should be performed when the constitution is in its soundest state; when, for example, no cutaneous disease is present, and in females when there is no pregnancy, and when the *catamenia* are absent. But, when the contagion of small-pox prevails in a neighbourhood, these disadvantages must be disregarded.

With respect to the mode of insertion, the object kept in view is, to secure the contact of the matter with the *cutis vera*. The operator, therefore, should delicately raise the cuticle, without any effusion of blood if possible, and apply the matter to the abraded part. The method of doing this, which Mr. Bryce has found most certain of success, is, first to lay a drop of the matter on the surface, and then make several light punctures through this matter and the cuticle with the lancet. It is then to be held exposed to the air, but not to an artificial fire, till it dries, and afterwards left to itself.

The inoculator must now mark its course, whether it is conformable to that which we have briefly stated, which is described by authors, and delineated in their plates. These last, however, afford but feeble assistance, unless the operator has already seen the disease as it appears in nature. The spurious cow-pox is sometimes accompanied with a severe phagedenic ulcer, instead of a regular vesicle. It would be proper to watch the constitutional symptoms, viz. the heat of the skin, and the state of the pulse. It is better, however, to use the test invented by Mr. Bryce. If irregular eruptions appear during the progress, or after the termination of the vaccine affection, we ought to guard against cold, which might suddenly repel them, and generate a visceral affection. If daily cold ablutions have been hitherto used, these should be intermitted in such cases, and tepid bathing substituted. It is always necessary to protect the vesicle from being rubbed and broken, as such an accident destroys its efficacy. When it happens to be broken, Mr. Bryce directs that the further discharge of its contents should be prevented, and the regular course of the affection restored, by cold applications and chemical astringents. If a troublesome sore is formed at a late stage of the affection, astringents and escharotics ought to be employed, on surgical principles similar to those adopted for other ulcers presenting a similar appearance. When the vesicle is formed, but the inflamed areola is too late in appearing, the part should be exposed to the heat of a fire, in order to quicken the local action, on which the regular phenomena depend. Where the local inflammation is excessive, or where a tumour is formed in the axilla, laxatives should be used, accompanied with cooling applications, or with fomentations, according to the state of the parts. If febrile symptoms should in any case be immoderate in degree, they are to be alleviated by the usual antiphlogistic treatment.

The success of the practice of variolous inoculation led the late Professor Home of Edinburgh to make some experiments for the inoculation of measles, which gave encouragement to other attempts of the same kind. But the disease was not found to be easily communicated in this manner. The operation was performed by means of the blood of a patient under the disease.

Repeated daring trials have even been made to inoculate the plague. These, for the most part, have either terminated in the death of the person who made himself the subject of the experiment, or have failed to communicate the disease. See Woodville's *History of the Inoculation of Small-Pox in Great Britain.* Jenner's *Observations on the Cow-Pox;* his *Further Observations;* and his *Continuation of Facts and Observations.* Pearson's *Inquiry.* Woodville's *Reports of Inoculation for Cow-Pox;* and his *Observations on Cow-Pox.* The Writings of Moseley, Rowley, and Birch, (in opposition). Brown *on Cow-Pox.* The works of Willan, Moor, Ring, Lettsom, and Thornton. The Compends by Aiken, Bell, and others. Bryce's *Practical Observations on the Inoculation of Cow-Pox.* Sanders' *Comprehensive View of Small-Pox, Cow-Pox, and Chicken-Pox.* Dewar's *Account of an Epidemic Small-Pox in Cupar. The Medical and Physical Journal*; Duncan's *Annals of Medicine; The Edinburgh Medical and Surgical Journal*, and other medical periodical works *passim.* (*H. D.*)

INOCULATION, in the vegetable kingdom. See HORTICULTURE.

INQUEST, is a term synonymous with Jury, and is frequently used in that signification in the law of Scotland

INQUISITION, or the HOLY OFFICE, is the court which takes cognizance of heresy in some countries subject to the Pope, and particularly in Spain and Portugal.

The existence of such a court proceeds upon the idea, that it is the duty of the civil magistrate, either in his own name, and by his own authority, or as the prop and the resource of the ecclesiastical power, to search after heresies, and to extirpate them. It takes for granted, likewise, the absurd and monstrous proposition, that the human understanding can be influenced and won by other means than those of information communicated, or argument proposed; and that real and conscientious discipleship can be the result of civil or political deprivations, or the infliction of corporal punishment.

In the early times, the church herself appears to have maintained a doctrine, the very opposite of that which has now been stated. As the satirist, when reduced to poverty himself, speedily perceived that poverty was no fit object of satire, so the Christians, when trembling under the fear of persecution, or expiring amidst its agonies, were not slow to discern, or backward to declare, that persecution was not the means by which true converts were to be made. Accordingly, in the *Apologies* which they presented to the Roman emperors, in behalf of their religion, during the first three centuries, they argue the question, and zealously maintain, that the province of the civil magistrate extends no farther than that of securing the peace, and promoting the welfare of the community; and that persecution for any opinion which lies hid in the understanding, whether that opinion be true or false, is not only absurd, because it is inefficacious, but unjust and cruel in the highest degree. "*Non religionis est*," says Tertullian, "*cogere religionem, quæ sponte suscipi debeat, non vi.*" And the same idea is expressed by Lactantius, who lived in the fourth century. "*Quis imponat mihi*," says he, "*necessitatem, vel colendi quod nolim, vel quod velim, non colendi; quid jam nobis ulterius relinquitur, si etiam hoc quod voluntate fieri oportet, libido extorqueat aliena?*" And again, in another place, "*Nihil tam est voluntarium quam religio, in quâ, si animus sacrificantis aversus est, jam sublata, jam nulla est.*" St Hilary of Poictiers, likewise, who lived, as well as Lactantius, in the fourth century, and who, though he held the very same opinions with those which have just been quoted, is unexpectedly to be found among the saints in the Romish calendar, openly maintains the inadequacy and utter impropriety of coercive measures in promoting the worship of God. "*Est Deus*," says he, "*universitatis, obsequio non eget necessario, non requirit coactam confessionem.*" And, addressing himself to those whose pride or whose zeal induced them to give information to the magistrate, and to prompt him to the rigorous execution of the imperial edicts, he says, "*Oro vos episcopi, quibusnam suffragiis ad prædicandum evangelium, apostoli usi sunt? Quibus adjuti potestatibus Christum prædicaverunt, gentesque fere omnes, ex idolis ad Deum transtulerunt? Anne aliquam sibi assumebant è palatio dignitatem, hymnum Deo, incarcere, inter catenas et flagella cantantes? Edictis regis Paulus Christo ecclesiam congregabat? Neronese credo aut Vespasiano patrocinantibus, tuebatur, quorum in nos odiis confessio divinæ prædicationis effloruit?*" Even so late as the fifth century, St Martin, in France, (and it had been well for the world if the calendar had been filled with such saints as he,) excommunicated a bishop for accusing certain heretics to the usurper Maximin, by whose means they were put to death; adding, in the spirit of genuine Christianity, that he looked upon that man as a murderer, who procured the destruction of a fellow-creature, chargeable, in strict justice, with nothing else than being mistaken in his opinions.

These correct and righteous sentiments prevailed for a considerable time, and the deviations from them were slow and progressive. When the empire became Christian, it still appeared to the civil magistrate, that he was bound to support the religion adopted by the state. Hence it was that certain laws, which are yet to be found in the codes of Theodosius and Justinian, were enacted against heretics; by which they were subjected to fines, and confiscation of goods, and to imprisonment and banishment, according to the description of the offence, and the measure of the delinquency: with this limitation, however, in every case, that it was the peculiar province of the ecclesiastical judge to determine, whether the opinions professed were heretical or not. Hence, too, it was, that those charged with heresy by the magistrate were usually charged with sedition or rebellion at the same time; and, whenever the punishment was capital, it was understood to be the result, not merely of inaccurate or of perverted theology, but of a criminal opposition to the civil and political authorities. In this situation the law and the practice, respecting heresy, continued till about the year 800. The trial of the whole case was in the hands of the civil magistrate; and, with the exception of ecclesiastical censures, it belonged to synods and councils merely to answer the question, "Is the opinion or doctrine libelled heretical or otherwise?"

During the course of the ninth, tenth, and eleventh centuries, however, the power of the ecclesiastical tribunals, and of the papacy itself, increased in a most remarkable degree. The zeal which animated the church, and the people of Europe, became fierce and ungovernable; and the crusades against the infidels in foreign parts were equalled, in ferocious feeling and disposition, at least, by those against the heretics at home. At last, in an evil hour, and under some planet of malignant aspect, and of disastrous influence, St Dominic, (as he is called,) the father of the inquisition, arose. It was the object of this zealous, but mistaken individual, to secure the purity of the Christian faith, and to support the Papal authority, by institutions appropriated to these purposes. The trial of the accused was now placed exclusively in the hands of the ecclesiastical judicatory. The principal inquisitor was likewise the principal judge; he was responsible to no other authority than that of the Pope; and he decided, not only upon the description or quality of the propositions maintained, but finally, and without appeal, upon the guilt or innocence of the prisoner. And so complete was the revolution, achieved by the skill and the perseverance of the Romish See, that the civil magistrate, once the sole judge in matters of heresy, was now called upon to do little else than to execute the sentences of the ecclesiastical tribunals. Strange as it may appear, this monstrous system was received by many of the nations of Europe. It found its way especially into the dominions of Spain and Portugal. The inquisitorial courts were established; and the emperor, or king, or powerful lord, themselves trembling under the fear of excommunication, proceeded to remove from this world the unhappy individuals whom the church had pronounced to be guilty of heresy. And the example of their pagan predecessors had long ago taught them, that fire and faggot were the appropriate means by which their removal was to be accomplished.

It was by Pope Innocent IV. (A. D. 1251,) that the inquisitorial courts were introduced into Romania, Lombardy, Marca Trevigiana, and the other Italian provinces, more immediately under the authority or influence of the Holy See. About the year 1484, they were established in Spain, and in Portugal in the year 1537. In the following observations, however, we shall confine ourselves, in a great degree, to the inquisition as it exists in Spain.

At the head of the inquisition in Spain stands the inquisitor-general. This high officer is appointed, nominally, by the king, but in reality by the Pope; for the Holy See enjoys the privilege of a *veto* upon the election of the sovereign, a privilege which on certain suitable and well-chosen occasions it has not failed to exercise. The supreme inquisitor cannot proceed one step in the discharge of his office, till he has received the confirmation of the Pontiff. When thus elected, and thus confirmed, the inquisitor-general appoints the subordinate inquisitors; but, in this last instance, the nomination of the supreme inquisitor is subject to the review of the king. Besides the inquisitor-general, there are five councillors, who have the title of apostolical inquisitors: it belongs to them to deliberate upon all affairs with the inquisitor-general; to settle disputes among the particular inquisitors; to punish the familiars attached to the institution, and to receive appeals; and these officers, together with an advocate fiscal, two secretaries, and other inferior functionaries, constitute the supreme council or high court of the inquisition in Spain. This supreme council meets every day (with the exception of holidays) in the royal palace; and such is the ascendancy which the Holy Office has acquired, that the king of Castile, before his coronation, subjects himself, (*quoad sacra*, we presume,) by a special oath, to the judgment and decision of the high court of inquisition. In the inferior tribunals there are, respectively, two or three inquisitors; these have the epithet of *provincials* attached to their designations, and they exercise their functions, by the authority, and under the review, of the supreme inquisitorial court.

The privileges which the inquisitors enjoy are many and valuable. Each of them bears the title of *lord*. They are not subject to the bishops of the provinces where they reside, or to the superiors of the religious orders to which they belong. They alone can publish the edicts against heretics; they can excommunicate, interdict, and suspend; and, except in a few cases, which are distinctly specified, they can prevent the ordinaries, or resident bishops, from absolving those whom they have subjected to the censure of the church. "Whosoever, by himself or others, shall kill, beat, or strike, any of the inquisitors, or officials of the Holy Office, or who shall injure or damage the effects of the said inquisitors or officials, shall be delivered over to the secular power." These lordly and privileged functionaries likewise enjoy the entire rents of their benefices, without tax or impost, they are exempted from all "real and personal offices," and they may form new laws, after the nature of bye-laws, against heretics, and modify the punishment at pleasure. And, last of all, they can mutually absolve, and dispense with themselves, grant indulgences to the penitent, or to those whom they shall pronounce to be so, for 20 or 40 days, as they shall think proper; and for reasons, of which they alone are the judges, they can release "the companions and friars of the several inquisitors, and likewise their notaries," during the space of three whole years, from all the penances which may have been enjoined them.

When the chief inquisitor arrives in any of the provinces, he proceeds in the exercise of his functions after the following manner: In the first place, he delivers a sermon, respecting the purity of the Catholic doctrine, and exhorts the people to zealous and conscientious endeavours in the extirpation of heretical pravity. He then publishes the letters monitory, or, what is otherwise called, the edict of faith; by which all persons, of whatever condition or state, clergy or laity, are commanded, under pain of excommunication, to discover to the inquisitor, "within the six or twelve days next following, any person, known to them," who entertains heretical opinions, or is suspected of entertaining them. He then reads the sentence of excommunication, and makes comments upon it, and promises indulgences to those who shall favour or support him in the execution of his office. The whole ceremony is of an imposing and awful nature; and, in countries where the inquisition prevails in its most fearful ascendency, it is usual, immediately after the publication of the edict, for those who are present, and especially for the magistrates of the principal cities, to engage themselves, under an oath, solemnly sworn before the crucifix and the gospels, to protect and to assist the ministers of the inquisition with all their authority and influence.

There are three ways in which the process may begin before the inquisitorial courts: 1. By investigation, where the inquisitor summons certain individuals into his presence, and inquires into the state of the town or district where they live. 2. By accusation, where a direct charge of heresy is brought before the court against one or more persons distinctly named. 3. By denunciation, where the inquisitor is merely informed that certain heretical persons, or persons suspected of heresy, (who are likewise distinctly named,) exist within the limits of his jurisdiction. This last is by far the most common mode, and it is that which the inquisitors are most desirous to encourage. Informations are avowedly received without any respect to the characters of the persons by whom they are given. The lowest and most worthless of the clergy and of the laity, thieves and cheats, just let loose from prison, prejudiced persons, strumpets, and even children, are all allowed and invited to inform. When the information has been lodged, the following questions are usually proposed: Whether the informer knows the person suspected of heresy, and how long he has known him? Whether he is suspected of heresy, on account of his words, or on account of his actions? Whether he has said or done the things imputed to him oftener than once? and whether in jest or in earnest, and in whose company those things were said or done? The answers to these and similar questions are written down by the notary, and read over to the informer, who either subscribes his name to the document, or, if he cannot write, puts under it the mark of the cross. He is then sworn to secresy; for secresy, say the Catholic doctors, is the *chief sinew* of the inquisition. His name, his personal appearance, the place of his abode, and every other circumstance respecting him, are studiously concealed by the inquisitors, lest the practice of informing should be discouraged; and having once put the court in possession of the requisite intelligence, he drops away entirely from the view, and is never again mentioned, and, if possible, is never again referred to in the whole course of the process. Thus does this odious tribunal, called by an abuse of language the Holy Office, in the very first step of its judicial procedure, afford to the most infamous the pleasure of gratification, with the certainty of concealment, and provide an opportunity for indulging the worst feelings and passions of our nature—personal malice, envy, and revenge.

After dismissing the informer, the inquisitor proceeds to call the witnesses. And here, too, the distinctions of character are often altogether overlooked. No previous transgression of the decalogue, no loss of reputation or of credit in society, prevents the witnesses from being listened to. Usurers, detested and abhorred, are permitted to give their evidence; "also, common blasphemers, common gamesters, persons quite intoxicated, and not merely exhilarated by wine, stage-players and prize-fighters, apostates from religion, persons bastinadoed, bankrupts, traitors, backbiters, and spendthrifts." (*Limborch. Abridg.* p. 370.) And the number of the witnesses is allowed as an equivalent for their inadmissibility when they are severally considered.—We turn aside for a moment from this catalogue of infamy, in order to prevent a mistake into which our readers might naturally fall. When we speak of witnesses, in Great Britain, we almost unavoidably think of a charge regularly brought, the judges upon the bench, the jury sworn, the criminal apprehended, and in open court, the people admitted as auditors, and the whole judicial assembly feeling and acting under the assurance, that they are responsible to an intelligent and watchful public for every part of their proceedings. But, in the inquisitorial tribunal, when the witnesses are summoned, the party accused has not even been taken into custody. He remains in his own house, and in the bosom of his family, engaged in his ordinary occupations, and entering, it may be, into the amusements of the place where he lives; utterly ignorant of all that has been done against him, and utterly unprepared for all that is to follow. In truth, the depositions of the witnesses are viewed, rather in connection with the charge, than with the issue, and relate not so much to the guilt or the innocence of the party accused, as to the sufficiency or insufficiency of the information. Like the informer, the witnesses are sworn to secresy; their names, and personal history, are most industriously concealed; and there are instances upon record, where brothers and sisters have given evidence against brothers and sisters, where the wife has deposed against the husband, and the husband against the wife.

The next step is the apprehension of the victim. This usually takes place in the night; and for the most part too under some favourable combination of circumstances, when the proceeding, by its suddenness, and its appalling character, is best fitted to overpower resistance, and prevent inquiry, and to multiply the occasions of secret fear. Like the tiger surveying the wild animal from the thicket, the inquisitor meditates, in silence, his horrific purpose, regards his prey with anxious vigilance, considers the whole case maturely and well, and selects his opportunity. Not the slightest hint of insecurity is given, not a suspicion is breathed, till, in the dead time of the night, a band of monsters calmly approach the residence of the accused, and demand an entrance. To the question, In whose name is this required? the answer is "The Holy Office." In an instant the ties of nature are broken, every feeling of friendship is suppressed, and parents and children, or sisters, or brothers, with a promptitude altogether inconceivable, hasten to deliver up the victim; and the wretched individual, scarcely recovered from his surprise, and without knowing what he is accused of, is hurried away into the prisons of the inquisition. Should conviction afterwards take place, (and the rich merchant or substantial citizen very rarely escapes,) his property is confiscated; and the sentence of confiscation applies retrospectively, not only to the date of his apprehension, but to the time when the purity of his faith was first suspected, or the first palpable indications of his heresy were perceived.

After a short delay, the prisoner is brought forth and examined. It is worthy of particular observation, however, that no crime is ever laid to his charge: he is never accused; for, strange as it may sound in British ears, it is the exclusive object of the inquisitor to draw from his own lips a confession of his guilt. He is first required to declare, upon oath, that he will answer sincerely and directly the questions which are put to him. He is then asked if he knows where he is, and whether he is aware that he is at present within the walls of the inquisition, and why it is that men are usually detained in the custody of the holy office. He is then desired to recollect himself, and to run over in his mind the events of his past life, and to search out and ascertain, whether he may not, on some occasion, have said or done some one thing or another, contrary to the purity of the Catholic faith, and the authority of the Inquisitorial Court. If he persists in maintaining his ignorance, he is informed that every degree of mercy is shewn towards those who confess, while the obstinate are treated with the utmost severity; he is soothed and threatened by turns; his offence is ascribed rather to his simplicity and the easiness of his disposition, than to any criminal purpose or unusual depravity; he is reminded of the horrors of imprisonment, its hunger, filth, and stench; and something is said about the pure air of heaven, and the blessed light of the sun. The questions are then varied in every possible way; and every art of unrighteous investigation is tried; and if, after all, he should still persist, declaring himself ignorant of any word or action that could be construed into heresy, he is told that he must be carried back to his dungeon, to aid his memory by reflection, to commune with his own heart, and to subject the resolution of a haughty spirit to the dominion of conscience.

The cells of the inquisition are square apartments, each side being about 10 feet in superficial measurement. There is usually one row of them built over another. The cells of the upper row are lighted by means of a small iron grate placed in the cell: those of the under row are sunk beneath the level of the external surface, and are perfectly dark. Each apartment has two doors, one exterior to the other. The inner one is of a massy thickness, and faced with iron, having a grate on the under part of it, and in the upper part an opening, through which his victuals and other necessaries are delivered to the prisoner. The outer door is entire, without grate or opening, and, like the inner one, is exceedingly strong. The walls are commonly about seven or eight feet in thickness. In each apartment there is placed a bed of rushes, together with two pots of water, one to wash in, and the other for drink. There is likewise a larger vessel, which is emptied every third or fourth day. The treatment of the prisoners varies according to their rank or fortune. Those who are poor have half a rial for their daily support allowed them by the king; out of this pittance, however, the provision-buyer, or dispenser, as he is called, the cook, and the jail-keeper, must all be paid; and the proportion claimed by each of these functionaries amounts to nearly one-tenth of the whole. Dr. Geddes mentions a prisoner in the Inquisition at Lisbon, who was allowed no more than three *vintems* a day, or threepence-halfpenny of English money.

The obstinate heretic is consigned to the apartments of the under row. There he sits upon his bed of rushes, in darkness, solitude, and silence, without ever seeing the face of a human creature excepting that of his keeper, or hearing the sound of any voice but his. He is forbidden to make the slightest noise, even to cough or to stir. It were a mockery to allow him the use of books; for, being shut up in total darkness, he could not peruse them. The morning, and the evening, the day, the week, and the month, pass over him, in the same stillness and seclusion. Sometimes the prisoner is doomed to spend whole years in this situation; hot and feverish, amidst the miasmata proceeding from his own body, or putrefying alive in the accumulating filth of his apartment, which, through weakness or disease, he is unable to remove. "As liberty," says the author of the *Letters on the Inquisition*, "is sweet upon any terms, and even the galleys themselves are a paradise when compared with the dreary cells of the inquisition, where every kind of rigour is put in practice which can render life a burden, without any interval, or the least alleviation, nothing is more natural than for one, confined to such a prison, to wish, with the utmost anxiety, for the next *auto da fe*, which, though a bitter remedy, is the only one that can afford him any prospect of relief. But even this miserable comfort is denied him. The wretch sits sighing and pining away within his gloomy dungeon, in expectation of the solemn day when he shall be permitted to behold once more the light of the sun, to breathe the fresh air, and cheer his eyes with the sight of his friends and relations. The long wished-for day at length arrives; it passes away; and the unhappy individual still remains in the same doleful situation." Sometimes, however, the strength of his noble mind is broken; and, worn out by unmitigated and hopeless suffering, he belies his own consciousness of innocence, declares himself guilty, and subscribes any confession which the inquisitors may choose to put in his mouth.

There is nothing in the history of the inquisitorial procedure which has called forth such universal reprobation as the fact, that the prisoner is never confronted either with the informer or the witnesses. He is not even told who they are. If the evidence is given to him in writing, as is sometimes the case, it is prepared in such a way that he can by no means learn from it, how the information against him was communicated, or the proofs of his delinquency have been obtained. The evil of these practices was long ago perceived. In the beginning of the 16th century, the Moors and Jews residing in Spain offered 800,000 pieces of gold to Charles V., who had just succeeded his grand father Ferdinand, King of Castile, provided he would introduce a law, ordaining that the names of the witnesses in the inquisitorial courts should be regularly published. Charles, who was only eighteen years of age, was very strongly tempted to accept of the money; but Cardinal Ximenes, at that time inquisitor-general, represented to the king that irreparable injury would be done to the church, if he permitted the practice, and by reminding him of his grandfather Ferdinand, surnamed the Catholic, he prevailed upon him to refuse the offer. It was this same Cardinal who objected to the translation of the Scriptures into the vulgar tongue, saying, "that the books of the Old and New Testament ought to remain shut up in the three languages which God, not without the greatest mystery, had directed to be placed over the head of his dear Son as he hung upon the cross." Cases, however, have occurred, when it was necessary that the witnesses should see the prisoner, in order to ascertain his personal identity. But even in these cases, the business has been so conducted, that the prisoner was never able to discover who the witnesses were. The usual method has been to introduce the prisoner into the company of several other persons in the same dress with himself, and to permit the informer, or the witnesses, to inspect the whole party, through a small opening, or crevice in the door. And though it has sometimes happened that they have mistaken the guilty individual, and made a wrong choice, even after repeated trials, yet such is the nature of these courts, and so necessary is it that informations, of whatever description, should be communicated, that those false accusers, and deliberate and perjured destroyers of the innocent and the unwary, have been allowed to escape with little more than a very gentle rebuke.

It is no unfrequent occurrence, that while the prisoner refuses to confess, and remains in his dungeon, the inquitor affects to be displeased with his obstinacy, and condemns him to the torture. But first of all, attempts are made to frighten him in various ways. The instruments of torture are shewn him at a distance. He is led, by many windings, and through a succession of doors, into a large room, feebly lighted, where the executioner is pointed out to him, covered with a black linen garment, which reaches down to his feet, and having a long cowl of the same colour drawn over his head and face. This extraordinary figure carries in his hand an iron collar, or a whip, or some other instrument of torture, and he appears to stare in solemn stillness at the prisoner, through two small openings, which are made for that purpose in the cowl. "All this," says Gonsalvius, "is intended to strike the miserable wretch with greater terror, when he sees himself about to be tortured by the hands of one, who thus looks like the very devil."

The degrees of torture formerly in use were five in number. They were inflicted in succession, and have been described at length by Julius Clarus. 1. The threatening of the torture 2. The steps taken when conducting the prisoner to the place of torture. 3. The torture by stripping and binding. 4. Elevation upon the rack or pulley. 5. Squassation, or the sudden precipitation, and sudden suspension of the body. To these may be added, the iron slipper, the colt, or wooden horse, the thumbscrews, and various others. The measure of the severity is indicated by the terms in which the orders of the inquisitors are expressed. If it is said, "let the prisoner be interrogated by torture," he is merely hoisted up upon the rope, but does not undergo the squassation. If the order bears, "let him be tortured," he must undergo the squassation once, being first interrogated as he is hanging upon the cord and engine. If it is said, "let him be well tortured," he must suffer two squassations. If the expression is, "let him be severely tortured," it is understood of three squassations, inflicted at three different times within the space of an hour. If, "very severely," it must be done with twisting, and weights suspended from the feet of the prisoner; and if, "very severely, even unto death," the criminal's life is in immediate danger. Should the prisoner, through the weakness of human nature, or the extremity of the suffering, be forced to confess, his confession is instantly taken down by the notary; and if he adheres to it at his next examination, which commonly takes place in twenty-four hours after the infliction of the torture, and, at the same time, acknowledges his guilt, he is condemned, it is true, as a heretic upon his own confession, but is represented as penitent, and restored to the bosom of the church; though not without undergoing certain punishments, more or less severe, and certain painful varieties of penance. But, should he either retract his confession, or persist in his heresy, he is delivered over to the secular power, and is burnt alive at the next *auto da fe*.

The punishments inflicted by the Inquisition may be regarded as of two sorts, punishments not issuing in death, and punishments which have that issue. Under the first of these heads are comprehended the ecclesiastical punishments, such as penance, excommunication, interdict, and the deprivation of clerical offices and dignities; and under this head, too, are included the confiscation of goods, the disinheriting of children; for no child, though himself a Catholic, can inherit the property of a father dying in heresy; the loss of all right to obedience on the part of kings and other feudal superiors, and a corresponding loss of right to the fulfilment of oaths and obligations, on the part of subjects; imprisonment in monasteries or in jails, whipping, the gallies, and the bann of the empire, or diffidation. Under the second head, or that of punishments issuing in death, there are only two instances, viz. strangling at the stake, and death by fire. These instances may easily be comprehended in a short account of the "*auto da fe*." For the severity of the latter class of punishments, Simancas gives what is called by Limborch, "a merry reason." "We must not contend with heretics," says he, "by Scripture, as by that, our victory will be uncertain and doubtful." *Cathol. Institut.* tit. 59. sect. ii.

In the procession of the "*auto da fe*," the monks of the order of St Dominic walk first. These carry the standard of the Inquisition, bearing on the one side, the picture of Dominic himself, curiously wrought in needle-work, and on the other, the figure of the cross, between those of an olive branch and a naked sword, with the motto "*justitia et misericordia.*" Immediately after the Dominicans come the penitents, dressed in black coats, without sleeves, barefooted, and with wax-candles in their hands. Among these, the principal offenders wear the infamous habit called the *sambenito.* Next come the penitents, who have narrowly escaped the punishment of death; and these have flames painted upon their garments or benitoes, but with the points of the flames turned downwards, importing that they have been saved, "yet so as by fire." Next come the negative, and the relapsed, the wretches who are doomed to the stake; these also have flames upon their habits, but pointing upward. After the negative and the relapsed come the guilty and impenitent, or those who have been convicted of heresy, and who persist in it; and these, besides the flames pointing upwards, have "their picture (drawn for that purpose a few days before) upon their breasts, with dogs, serpents, and devils, all with open mouths, painted about it." This part of the procession is closed by a number of individuals carrying the figures of those who have died in heresy, or large chests, painted black, and marked with serpents and devils, containing their bones dug out of the grave, in order that they may be reduced to ashes. A troop of familiars on horseback follow the prisoners; and after these come the subordinate inquisitors, and other functionaries of the Holy Office, upon mules; and, last of all, comes the Inquisitor-General himself, in a rich dress, mounted upon a white horse, and attended by all the nobility who are not employed as familiars in the procession. The train moves slowly along, the great bell of the cathedral tolling at proper intervals.

We hurry over the rest of this dreadful scene. At the place of execution, stakes are set up according to the number of the sufferers. They are usually about twelve feet in height, and at the bottom of each there is placed a considerable quantity of dry furze. The negative and the relapsed are first strangled at the stake, and afterwards burnt. The convicted and impenitent, or the *professed*, as they are otherwise called, are burnt alive. To these, certain jesuits who are appointed to attend them, address many exhortations, imploring them to be reconciled to the church of Rome, but commonly without effect. The executioner therefore ascends, and turns the prisoners off from the ladder, upon a small board fastened to the stake, within half a yard of the top; and the jesuits having declared, "that they leave them to the devil, who is standing at their elbow," to receive their souls as soon as they have quitted their bodies, a great shout is raised, and the whole multitude unite in crying, "let the dogs' beards be trimmed, let the dogs' beards be trimmed." This is done by thrusting flaming furze, tied to the end of a long pole, against their faces; and the process is often continued till the features of the prisoners are all wasted away, and they can no longer be known by their looks. The furze at the bottom of the stake is then set on fire; but as the sufferers are raised to the height of ten feet above the ground, the flame seldom reaches beyond their knees, so that they are really roasted, and not burnt to death. "Yet, though out of hell," as Dr. Geddes expresses it, "there cannot be a more lamentable spectacle than this," it is beheld by people of both sexes, and of all ages, with the utmost demonstrations of joy,—a bull feast or a farce being dull entertainments compared with an "*auto da fe.*"

In finishing the account which we meant to give of the inquisition, it is distressing to state, that this most detestable tribunal, after having been abolished in Spain by the orders of Napoleon, has been restored under Ferdinand VII. surnamed "*the beloved*,"—a prince, reinstated in his possessions, and established on his throne, by the magnanimous exertions of the British people. The order for the restoration of the Holy Office was dated at Madrid, 21st of July, 1814, and bears the signature of "I the King." It was followed on the 5th of April 1815, by a solemn declaration on the part of D. Francisco Xavier Miary Campillo, the Spanish inquisitor-general, offering a term of grace to those who had fallen into the crime of heresy, and requiring them to purge their consciences by confession, and to be reconciled to the church. Both the king and the inquisitor speak of changes and modifications; and the latter, in particular, takes notice of the "sweetness and charity" which are now to be used in the ecclesiastical procedure. Strange things have happened in our day; but we should hope, that though the secret prisons of the inquisition may remain, and its solitary and hopeless confinement, and the agony of its torture, we shall never again hear of a public "*auto da fe.*" See the *Directorium Inquisitorum*, Fr. Nicolai Eymerici, Rom. 1585. fol. Pegnæ *Instructio seu Praxis Inquisitorum, cum notis.* Cæsaris Carænæ, *Lugd.* 1669. *Lucerna Inquisitorum.* Fr Bernardi *Comensis.* Simancas *De Catholicis Institutionibus.* Royas *De Hæreticis, &c.* Ugolini *Tractat. de Hæreticis.* Gonsalvi *Inquisit. Hispanic. Artes Detectæ.* Du Cange, *Voce Inquisitio.* Limborch's *Hist. of the Inquisition.* Dugdale's *Spanish Inquisition.* Voltaire's *Universal Hist. Supplement* to vol. i. p. 224, and vol. iii. p. 177. Geddes' *View of the Inquisition in Portugal.* Buchanan's *Ecclesiastical Researches*, p. 168. (*h*)

INSANITY. This word ought, from its etymology, to signify "want of soundness," or "want of health." It is applied, in the English language, to denote an unsound state of the mental powers. It is generally used as synonymous with "mental derangement." But it is more proper to consider it as including a greater extent of malady, by comprehending cases in which the mental powers are in themselves deficient, as well as those in which they are disordered.

It is a matter of great importance to fix the definition and characters of insanity with such precision, as to render the practical application of just principles on the subject a matter of certainty. The imputation of insanity to any individual brings after it the most serious consequences; as it subjects him, in the best regulated communities, to the loss of the common privileges of a man and a citizen; and, in certain states of society, and during the prevalence of certain opinions, is followed by subjection to the lowest degradation, to utter contempt, to horror, and even to cruelty. As soon as a man has been declared insane, it has too often happened that he has not only been excluded from the common enjoyments of society, but cut off from all that consideration and tenderness by which comfort is preserved, and has been committed to the custody of persons, who had no interest in his recovery or welfare, and from whom no dutiful line of conduct was exacted or expected. The rash application of such an imputation is an event, the possibility of which, under these circumstances, cannot be thought of without horror. But, even under the prevalence of the most humane principles, and the most considerate and discriminating treatment of the different descriptions of insane subjects, the question does not lose its importance, When ought any individual to be pronounced insane?

Human minds are so differently constituted; their excellencies and defects are so often and so strangely blended, and contrasts so striking present themselves in the mental features of the same individuals; the gradations of mental qualities and mental states are likewise so numerous, and difficult to separate from one another; that this question is as hard as it is momentous to solve.

Practical distinctions, with a view to legal proceedings, therefore, are very properly regulated by the effects which the mental character and state produce on those parts of conduct which are essential to man as a member of society, and the safety and suitableness of allowing him to remain at large, and manage his own property and interests. This is more kept in view than the minute analysis of the mode in which the mental operations are conducted. It is a common adage, that the chief difference between a fool and a wise man is, that the wise man has sufficient art to conceal his deficiencies. We only descend a grade lower, when we distinguish an insane from a sane man, than in describing what we commonly call a fool in contradistinction to a wise man. It is often a flat and total loss of a view of his relationship to other men, in addition to those follies which are common to him with many other persons, that decides a man to be insane.

It often appears an important point, when an atrocious action has been perpetrated, to determine whether it should be ascribed to insanity or to crime. But, it may be observed, that every case in which this point is questionable, is ultimately determined by utility, and the influence of example. Minds so constituted by nature, or distorted by disease, that the common motives of mankind do not reach them, are very different from those in whom an obtuseness to humanity, justice, and rational fear, is the direct effect of a depraved self-indulgence. In the former, common motives are precluded from all operation, and their actions are, in this respect, entirely fortuitous; whereas the latter are cases, by the punishment of which a numerous description of persons are restrained from criminal actions. To prevent crime is the object of criminal legislation, and not to gratify, by the infliction of pain, that just antipathy which the virtuous entertain to moral evil. We by no means assert that this consideration is the sole foundation of the distinctions to be made between the different sources of human actions, and that accountableness has no meaning in itself. In the greater number of cases, the difference between voluntary and involuntary conduct is broadly marked. But wherever a difficulty exists, the principles of utility, and a reference to the ultimate consequences of our decision on the safety of social life, afford the surest aid.—Wherever a due degree of attention has been paid to the aberrations of the human mind, by the parties called on to give their decision before a man is to be treated as insane, and wherever the whole proceedings are subjected to a fair degree of publicity, we have little to apprehend, in an intelligent state of society, from the mere difficulty of the subject. It is from inconsiderateness, rudeness, the toleration of low mercenary motives, the avoidance of a duty foolishly reckoned disagreeable, the unnatural combinations which the false pride of some leads them to form with others who are actuated by the worst motives to cultivate a policy of unmanly concealment, that the most lamentable abuses on the subject of insanity have derived their origin. But it is one of the most animating features of the present age, to find the general mind rising superior to such negligence and mistake. We may probably hail this improvement as a precursor of a sounder mode of thinking on all subjects, and the disappearance of some of the most prevalent moral causes of insanity. To know our duties to those who are really insane, is to be farther removed from a tendency to a participation in their malady, than we should otherwise be.

Insanity, in the most comprehensive acceptation of the term, implies a mental ineptitude for conducting one's self in the management of private concerns and in the relations of social life. Great deficiencies and aberrations, indeed, often exist, which are never denominated insanity. There is generally a difference of physiognomy and manner which, in addition to what may be called unaccountable peculiarities of conduct, authorise us in pronouncing a man insane, and this, though readily recognised by persons of observation, does not admit of definition.

Insanity exists in various forms, as well as various degrees. When we attempt to establish a division of the subject on the forms which it assumes, our subdivisions become too numerous, and we run the risk of substituting symptoms which are liable to great and rapid interchange in the same individuals, for different species and descriptions of disease.

The most convenient division of the subject, is that which is founded on the *origin* of different cases of insanity. There is a marked difference between "congenital" and "supervening insanity." The congenital variety is one from which no recovery is expected. It is generally denominated *idiotism*, and is usually distinguished by a deficiency, rather than a derangement of the mental powers. Some one of the senses is often at the same time dull or abolished. This happens most frequently with that of hearing. The want of a power of giving attention is the most glaring symptom; and this is distinguished from the volatility of lively minds, by being accompanied with a slowness or inability to form combinations among the ideas of perception, or to draw silent practical inferences for the guidance of their actions. It is readily known by a peculiar look and manner, accompanied with an alienation from all the feelings and pursuits of other persons, an insensibility to those impressions which are derived from social intercourse, and an ineptitude to receive instruction. Sometimes the idiot never learns to speak, and his articulation is always imperfect. He seems insensible to the language of others, and only occasionally perceives a rude glimmering of meaning in words or expressions which have received an habitual association with the supply of his natural wants, or the excitement of strong feelings of bodily pleasure or pain. Yet there are remarkable instances of partial idiotism. Monstrous deficiencies are conjoined with great quickness, great address, tenacious memory, and even symptoms of genius. These qualifications are limited, however, to a narrow range of objects.

Yet congenital insanity has sometimes assumed a form more nearly allied to the madness which attacks adults. Children have been known who, without those deficiencies commonly reckoned idiotism, have evinced a degree of estrangement from their species, an insensibility to all kindness and good humour, and a perpetual proclivity to the most unprovoked malice, and to the most violent forms of outrage, in a form equally incorrigible and conspicuous as in the most dangerous maniacs. Two remarkable cases of this kind are described by Mr. Haslam. We also occasionally see natural idiots, who have a degree of activity which assimilates their character more or less to that of other insane persons. On the other hand, an imbecility exactly similar to that of natural idiots has often originated, from various causes, in persons who had previously been in full possession of their faculties. It is only a prevailing, it is not an universal fact, that congenital insanity assumes the form of idiotism, and supervening insanity that to which we give the name of madness.

To trace the connection between deficiencies of mind and defects or disorders of organization, is not an easy task. Nature invites us to it by some prevailing coincidences; but, when we trace these down to their minutiæ, she leaves us in the midst of such mere conjecture and uncertainty, that we find it difficult to determine the point at which our researches become unavailing. Idiots are evidently distinguished from other persons by a peculiarity in the appearance of the head. Most commonly the head is of diminutive size, and that part of the brain which lies between the forehead and the vertex, is small in quantity. At other times, the back part of the head appears deficient; the boundary of the occiput is a vertical line in continuity with that of the cirvix, and the anterior part of the head is towering and heavy. Some who have professed to prosecute the subject extensively, have told us that these were cases in which the ventricles of the brain were distended with a serous secretion, and the cerebral substance both deficient in quantity, and subjected to all the disadvantages arising from dropsical oppression and disorganization. This has been declared to be universally the case with idiots, whose heads either exhibited this particular shape, or were preternaturally large. These observations have not yet been sufficiently extensive, and attested by a sufficient number of observers, to form a part of the ascertained doctrines of science. This is no derogation from the credit due to the enterprise of those who have undertaken them; who, though they may not be trusted as superior to the influence which enthusiasm sometimes exercises over the power of observation, deserve praise for their devotedness to the object, and will be entitled to more lasting honour, if even a few of their positions shall be ultimately established. Casts of the heads of idiots whose cases are minutely described, and whose brains have been dissected after death, if multiplied and well authenticated in different countries, cannot fail ultimately to throw much light on the nervous system, and its connection with the manifestations of the mind. Yet it is possible that the conclusions obtained may widely differ from any that have been hitherto anticipated.

The chief characteristic about the head that is strictly universal, consists in the manner of holding and moving it, and thus, like other points of pure physiognomy, resolves itself into the habits of the moving powers. Yet we cannot deny that there is a deficiency of organization more strictly radical than this, which careful inquiry may be afterwards able in some measure to trace, though we should not indulge the hope that the subject is capable of being thoroughly explored.

The treatment of idiots is not a matter of great difficulty. The duties of humanity are generally in these cases simple, and the events to be expected either from the course of nature, from accident, or from any treatment, admit of very little variety.

The case is far otherwise with those forms of insanity which are not congenital. To such forms of it, therefore, our chief attention is due.

Here, again, science finds herself cramped and embarrassed, wherever the love of an easy and brief accuracy calls on her for a definition, or demands mention to be made of any universal characteristic which is essential to insanity.

Insanity, as thus applied, includes *melancholy* and *madness.* The symptoms of melancholy, however, often alternate with those ascribed to madness, and madness often ends in settled melancholy. When melancholy exists separately, it is found in various degrees. Few persons are at all times exempt from it. It is that state which disappointment and external disadvantages have a uniform tendency to produce. It is when comparatively permanent, and affecting a man's feelings towards every object, that we call the disease *hypochondria*, or, in common language, "habitual discouragement." "Low spirits," and the subsequent "indifference" tending to that abolition of feeling and of interest which we call *melancholia*, are greater degrees of the same mental disease. When symptoms of melancholy exist separately from those of mania, the individual is disposed to decline the common affairs of life in a greater degree that he appears to be unfitted for them; no coercion or confinement is called for; no mischief is to be dreaded, excepting that in some cases a tendency to suicide may be suspected to be present, or that mania may be apprehended as its ultimate consequence.

Our further delineations and remarks shall be confined to mania, by far the most important branch of the subject of insanity.

It is in cases of mania, that the perplexities to which we have already alluded in forming our decisions principally occur.

The difference between the state of the thoughts in maniacs and in others is not easily described or defined; but it is judiciously observed by Cullen, that "it always implies hurry." It appears in the form of false judgments, and irresistable actions; sometimes conjoined, sometimes separate. Aberration of any sensation or intellectual power is so incident to all men, that it cannot constitute insanity. Hence some have made this distinction, that in the insane the aberrations are totally unperceived. Even this, however, fails to afford us a sure diagnostic. Maniacal aberrations of judgment seem only a greater degree, and a more unaccountable form of that ignorance of ourselves, our motives, our character, and the relations in which we stand to others, which abounds among mankind. And with regard to the irresistable aberrations of feeling of the maniac, he is in many cases very far from being unconscious of their existence and influence. Perhaps the following definition, although it does not present to the mind the striking image of madness, will more nearly designate all cases of this malady than any other that has been given: "A continued impetuosity of thought, which totally unfits a man for judging and acting with the composure requisite for the maintenance of the social relations of life." Yet this definition will only apply with propriety, in consequence of the emphasis to be laid on the word "totally." We must profess our dissatisfaction with all definitions. Words are only aids to our minds in giving precision to our observations on phenomena, which must be presented to our actual view before a conception of them can be formed; and this is one of those subjects, on which the words must be numerous, and extend to the length of a historical description, before they can communicate precise information. Even then their deficiency is apparent; and, when we are limited to a short compass, as in the present article, we rather hope to present instructive sketches, than an entire view of this important subject, the study of which is worthy of being much better cultivated.

The impetuosity of mania appears under two leading forms, *furor* and *delirium.* Furor consists in an extreme irascibility, and an invincible propensity to commit indecent or atrocious actions. It is considered as a disease of the will. Delirium consists in an extreme hurry of imagination, sometimes attended with a false perception of objects as present which are not, and always depriving the patient of those just notions of the relations of things around him which he entertains in a state of health. It is, therefore, considered as a symptom of disease in the intellectual powers. Impetuosity, however, is a characteristic in which it agrees with furor. A diseased inclination attaches the patient to those rambling thoughts which derange the operations of his judgment.

Mania has seldom been known to attack any person before the age of puberty, after which period all ages are subject to it. It is sometimes preceded by deep melancholy, or by a slight lowness of spirits. In persons addicted to intemperate drinking, the approach is sometimes indicated by an increase in the extravagance of conduct attending their excesses. The most general mark of decided mania is a total change of feeling towards connections and acquaintances, indicated by a suspiciousness, and a violent hatred towards those persons who at other times are objects of affection and confidence. Very often the patient shews remarkable proofs of penetrating sagacity, brilliant wit, and an imposing eloquence. He seems to understand better than at other times what is going forward around him, but gives an erroneous and generally a malignant construction to every transaction. There have been cases in which he has felt a strong inclination to assault, and even to murder, every person that came in his way, although he could converse rationally, and deplore those ungoverned inclinations by which he felt himself so inevitably swayed. Sometimes there is an inclination to suicide, seeming to arise not so much from a sense of unhappiness, as from a mere tendency to extravagence. The patient is so prone to novelty, and so regardless of consequences, as to grasp eagerly at any opportunity that may be given him, of throwing himself from a dangerous height. Here we have only a greater degree of those nervous feelings which are experienced by some persons in apparent health and soundness of mind. We have known a man of the greatest respectability, who acknowledged that, whenever he passed a particular bridge, he felt a slight inclination to throw himself over, accompanied with a slight dread that this inclination might hurry him away.

The delirious ravings which characterize mania in its perfect form, are as various as the characters and ideas of individuals. Sometimes they are confined to one object, which absorbs an inordinate degree of interest; but most generally there is a false judgment on every subject that occurs.

The cunning of maniacs has often been remarked, as appearing in the uncommon address with which they accomplish their whimsical purposes, and the pertinent questions which they propose in order to obtain satisfactory answers, instead of the evasions practised by inexperienced attendants. A patient in the lunatic asylum of Manchester, when the writer of this article attended that institution, was found one morning to have lost his ear, and, when interrogated about the instrument with which he had thus mutilated himself, he first made a great mystery of it, and then boasted of his address in abstracting a button from his neighbour's coat, sharpening it on a stone, and cutting off his ear with it before any person could observe him. In this instance, we may remark the horrid contrast between the unnatural object which the patient had in view, and the skill which he employed to accomplish it. A similar contrast under a variety of forms is of frequent occurrence. The impressions which objects make on the patient's mind are often extravagant, while the reasonings which he establishes on these impressions are close and strong.

Mania is often subject to intermissions, during which the patient appears as well as previous to the attack, except that, not being engaged in his usual occupations, and being sensible of the existing tendency to disease, he shews less of the regular interest which he used to take in surrounding objects, and a degree of shyness towards those who address him. It is currently supposed by persons not intimately acquainted with the phenomena of mental disease, that the *lucid* interval must be the most horrid of all possible states of mind. They conceive that the temporary return of reason, bringing to the patient's mind a view of his deplorable malady, must continually shock him with much greater violence, than it can affect those who imagine to themselves the same disease in others. This, however, is a mistake. The lucid interval brings with it an exercise of reason less indeed to be depended on, but in some respects more correct than it is found in the generality of persons who never laboured under the disease. The patient becomes resigned to his situation, and feels the propriety of not suffering the thought of it to distress him. Were it not for this reflection, which his experience has taught him, it could not be supposed that mania would have any intermission, or ever terminate in recovery. The sensibility, besides, is often exhausted to such a degree, by the perplexity suffered previous to the attack, that circumstances really gloomy have much less influence than formerly in depressing the mind. The patient also experiences a secret delight in the return of sound impressions, and knows that the best way of cherishing them is to avoid every afflicting thought.

It is seldom that mania returns at regular periods. Of two hundred patients under the care of M. Pinel, in the Bicêtre of Paris, only six were of this description, and their periods were different from one another.

A violent attack of maniacal excitement is sometimes followed by a sudden debility, in which the patient is speedily carried off.

Sometimes persons who have been for a long time in a maniacal state recover composure of intellect, which continues for a year or two without any relapse; but afterwards lose the whole energy of their constitution, and are cut off by that species of decay which is called atrophia.

Very often it happens that a patient, after being for some time recovered from mania, is cut off by an apoplectic attack. It is very common for the disease to degenerate into a chronic idiotism, which continues for life.

The corporeal phenomena of mania are of less uniformity than the mental; but, when they occur, they throw light on the existing state of the constitution, and attention to them becomes necessary in practice. Want of sleep is the most common symptom of this kind. An apparent increase of strength is also very frequent. Fever, constipation, dryness of the skin, and increased heat in the head, are frequent symptoms. It has been supposed, that patients under mania are less sensible to external cold than healthy subjects. This has been denied by Mr. Haslam; and, probably, will only apply to this disease in its acute state, and its earliest stages.

The prognosis of mania is in general difficult. The earlier in life that it comes on after puberty, we, *cæteris paribus*, have better hopes of a recovery. The previous dispositions of the patient are worthy of our attention. In persons naturally shy, and easily discouraged, the prognosis, though not rendered decidedly bad, is rather less favourable than in others. Mania accompanied with mirth, is less hurtful to the health, and less obstinate, than that which is marked by horror and distress.

When this affection has succeeded to a long continued religious melancholy, we have little expectation of a perfect cure, particularly if the patient has been strongly attached to discouraging opinions.

Where the patient's turn of mind has been previously characterized by singularities, and still more where his whole conduct has indicated a want of common prudence and feeling, an attack of mania, though apparently cured, leaves behind it a character of increased folly. In persons of ingenuous dispositions, it is sometimes followed by a character of greater modesty; but the morbid sensibility is increased in proportion to the increase of external prudence, and the patient runs a risk of being carried off by apoplexy.

The disease becomes less hopeful in proportion to the length of its continuance. Hence, in some institutions, patients who have laboured under it for a year, are put in the list of incurable, and curative measures are not in such cases kept in view. In others, two years are allowed for this species of probation. These predictions, however, must not be absolute. Recovery has in many cases taken place, after the patient had laboured under his complaint for several years.

Mania has always been considered as an hereditary disease. This opinion is certainly founded in truth. When we find the features and expression of the countenance so often exactly copied from the parents, we have good reason to conclude that the conformation and character which predispose the constitution to mania, are communicated in the same manner. The fact is also well confirmed in this particular disease by the experience of mankind. We cannot, however, ascribe so much influence to this cause as is generally done. Other causes contribute to the repetition of it in the same family, independently of communication from the parents. It has been sometimes maintained, that the present frequency of mania in this country has proceeded from the intermarriages of persons of sound constitutions with those who have laboured under this hereditary disposition: but we have no reason to suppose that, at the time when mania became so prevalent, such intermarriages were more frequent than formerly, or that these are now more common, in proportion to the cases of mania that exist. Where both parents are predisposed to mania, the predisposition has a chance of being communicated with greater certainty to the children; but where a sound constitution is married to one of an opposite character, there is as great a chance of the offspring being improved as of its being deteriorated, unless other causes of general operation tend to increase the frequency of the disease.

The predisposition to mania is marked by peculiar sensibility, accompanied with a disposition in the person to conceal the manner in which he is affected; and sometimes by absence of mind. A determination to the head, which predisposes to apoplexy, is also a predisposing cause of mania, and probably terminates in the one disease or in the other, according to the conjoined operation of other causes. The same thing may be said of that tendency to inflammation in the brain, which is the predisposing cause of phrenitis. Madness is well known to be sometimes occasioned by organic injuries in the head.

Excessive sensuality, and intemperance in the use of intoxicating liquors, or other narcotics, are frequent causes of this disease. Their immediate operation is, to produce a temporary state nearly allied to it; and, where this is frequently repeated, the tendency becomes at last rivetted in the system. The suppression of various secretions is numbered among the causes of mania, as obstructions of the menses, checks given to the perspiration, and the drying up of a long continued discharge from scrophulous sores. That disturbance of all the functions which is incident to the puerperal state, is a very frequent cause of mania. When we consider the extreme delicacy of many females in the higher and middling rank of society, we cannot be surprised at any effect that follows the shock which all their sensations must sustain in childbirth.

One question has been agitated as of the greatest importance; whether the disease is ever strictly mental, or is always dependent on faults or peculiarities or injuries of organization? The degree of importance attached to this question is in some measure to be regulated by the meaning which we attach to terms. It is evident that it might be so managed as to involve the whole doctrines which relate to the nature of matter and of mind, and might thus lead us into the most unsatisfactory regions of metaphysical discussion. This must be avoided when we are in quest of real information. In so far as the question is practically useful, it may be resolved into this, Whether is insanity, supervening from the application of a mental cause, without any apparent bodily defect or ailment, always the effect of this cause only, or in conjunction with some fixed and very particular predisposition in the organs by which the powers of the mind operate? We do not adopt the latter part of this alternative. We grant, indeed, that insanity owes its origin to certain relations which the external cause has with the state of the subject operated on. But we contend that the predisposition is most commonly founded in a delicacy which is very general among men; that the increase of this delicacy in any individual is chiefly owing to a series of external impressions, and that even the organic peculiarities which are the most strongly marked are the consequences of such impressions, either communicated to the individual or to his progenitors. This susceptibility, which in one nation produces insanity, may, in another, appear to be absent, from being operated on in such a form as prevents variety of mental exercise, and renders the individual entirely the creature of a limited set of habits; and it is questionable, whether any abrupt attempts to change the habits of an individual thus situated would not readily induce insanity. They would certainly occasion unhappiness, or probably death. If insanity were not the effect, he would probably owe this exemption to the want of that sort of mental employment which exists in those tribes among which that malady is common. Very few persons, perhaps none, are exempt from the symptoms of madness during particular moments of their lives. Dreaming is a state of madness. Reverie, or vague musing, is nearly allied to it. The irregularity and imbecility of thought so often experienced while a person disposes himself for sleep is a state which every one understands, and which, if it were perpetual, would constitute madness. The universal liableness of mankind to this state shows that the weaknesses which lead to madness may be regarded as radically universal, and that external circumstances operating on the senses and intellectual powers, and through these on the material organs which lie hid from our view, are by far the most efficient causes of the appearance of this malady.

The mental causes which evidently occasion madness are, restless ambition, jealous love, and frequent or severe disappointments. Harassing changes are well known to be unfavourable to soundness of mind. It has been said that a sudden change of fortune from low to high has occasioned madness more frequently than a change from high to low. This was remarked in the mental effects of the celebrated mercantile speculation called the South Sea scheme, which gave occasion to numerous sudden changes of both kinds. Reverses of fortune are particularly apt to affect persons destitute of all taste for rational occupation, to whom wealth and its attendant honours form the whole interest of existence. The dreadful reverses which took place in France in the course of the revolution, formed a fruitful source of madness; some interesting cases of this sort are described in the treatise of Pinel.

The effect of affronts is often to produce mania in persons acutely sensible to the treatment which they receive from others. Some have been suddenly seized with this disease, in its most dreadful form, immediately after being made the objects of a torrent of ridicule from their companions. This effect often follows a long course of ill treatment in those natives of the East who live in the service of harsh masters. They bear it long with seeming patience, but at last they are suddenly infuriated to such an extreme degree, as to lay hold of a murderous weapon, with which they perpetrate as many outrages as they can, with the certain prospect of terminating their career by an immediate violent death. This is commonly called "running a muck." A person seen in such a state unfortunately excites no commiseration, but is pursued and dispatched as speedily as possible.

The indulgence of anger, whether secret or open, often leads to mania. Moralists define anger to be "a short madness," and madness we sometime know to be nothing more than a lengthened anger. The case of mania which at first sight appeared to the author of this article the worst he had ever seen, was that of a woman in the cells of the

Manchester workhouse, whom the mere sight of her attendants always roused to the utmost extravagance of passion. She loudly accused every person who came near her of the most shocking crimes, denounced every sort of threatening against them, and went over their features and dress, in order to turn every part of them into the most poignant ridicule. All this was done with a rapidity which no interposition of others could interrupt; yet in no one instance did this woman discover any erroneous judgment, farther than what is incident to any irascible person during a fit of displeasure.

Sometimes madness arises from a thoughtfulness concerning a person's own deficiencies in prudence and conduct, which he gradually magnifies, till he imagines that he has been guilty of the worst crimes, and that the most dreadful punishment awaits him. To this succeed many other chimerical terrors, and every kind of extravagance, both of imagination and of will.

Gloomy notions in religion have proved a frequent cause of madness. The rational friends of religion take care to represent it as benignant in its tendency; but in times not far removed from the present, it was customary to array it in the most gloomy colours, and to represent the supreme object of adoration as surrounded with nothing but infinite terrors, and his scanty dispensations of mercy as only accessible through a system of unintelligible metaphysics, so difficult in its practical application, as to leave anxiety, terror, and despondency, predominant in the mind of the worshipper. The mental devastation which this mode of thinking produced was great. The dread of unavoidable evils drove many to madness of the worst kind, which very often terminated in suicide. Although this system is now exploded, or its consequences carefully averted, still that enthusiastic imagery, which is often exhibited to the minds of ignorant persons, has occasionally the effect of deranging their intellects. Those agitations, artfully excited, which are ascribed to the conflicting agency of a good and an evil spirit, divert the mind from the acknowledgment of natural causes; after which no principle can be established for stopping the career of false imagination; and, unless the balance of reason is in some degree maintained by the general influence of external objects, a person thus deluded runs every risk of madness.

Infidelity, or the renunciation of religious sentiments, has also produced in this respect its victims. Pains have sometimes been taken inhumanly to desolate the hopes which religion has inspired; and, at the same time, to inflate the mind with the expectation of much happiness from the indulgence of an ungoverned expansion of thought, and of all the joys of sensual pleasure. On such principles, hopes of a new and happy state of society have been erected. The miserable, gloomy, and unconsoled disappointment, which were the unavoidable result of such a system, have been keenly felt in proportion to the hopes excited. To this cause must undoubtedly be ascribed much of the madness which occurred with uncommon frequency in France during the revolution.

A tendency to mania may be promoted in a certain state of society, by the prevalence of political and moral liberty, accompanied with a general style of thought marked with a spirit of exaggeration and conflict, and a proneness to take an inordinate interest in particular objects. In this way the increasing frequency of the complaint in Britain is accounted for. This prevailing spirit extends not merely to religion and politics, but to literature and to morals. The production of strong impressions is regarded as the most important aim of literature, while adjustment and propriety are considered as safely left to the unaided operation of private thought; and the distraction which is thus generated is not foreseen. Even morality has been treated in a fantastic manner. In the most sober circles, virtue is too often cultivated rather as a passion than an intelligent perception of what is right; and an aversion to vice appears in the form of a strong sensation, rather than a masterly and well-guarded prudence. Among the more ostentatious circles, prudence is confounded with selfishness; and a thoughtless devotedness is plausibly represented as generosity. Among some of the moralists of modern times, moderation is treated as a word destitute of any conceivable meaning, except when synonymous with indifference. Every thing that passes under that name has been stigmatised as the death of the mind; while ambition has been extolled as the only legitimate symptom of activity. The whole of the moral composure which formed the object of the stoical school is represented as an unnatural apathy. By these extravagances, the human mind, instead of being encouraged in cultivating the happiness which belongs to a regular employment of its powers, is hurried abruptly from sensitive pleasure and pampered imaginations to the wailings of listless sorrow, or that agitating discontent, which generates gloom in private life, and clamour in public. In private economy, the transition from distressing want to ostentation leaves but little scope for a region of leisurely enjoyment. A taste for new pleasures too quickly verges into the creation of additional necessities, and becomes a source of unhappiness; and the love of order itself, by becoming fastidious, fatigues itself with the maintenance of plans pregnant with anxiety and fragility. Alienation between persons in different situations in life is connected with the spirit thus fostered, and is promoted by the want of a steady well-understood plan for facilitating social intercourse on terms productive of mutual benefit, and consistent with universal convenience. In so far as important general opinions are concerned, perhaps it is in the nature of things, that, where differences of profession are treated with mutual toleration, a period of mental warfare should precede that of sound liberality; and that the road to the happiest state of the general mind, should only be found by travelling among precipices and thickets, in which many are exposed to trials too severe for human weakness. The influence of these circumstances on the production of madness is disguised by the great plausibility of the hyperbolical spirit; but it ought to be recollected that this plausibility throws a lustre on the manners and expressions of many individuals, till the very instant in which their startling aberrations disclose the matured existence of the malady which has been all along in a train of preparation.

The last mental cause of madness which we shall mention is the principle of involuntary imitation, operating by the frequent sight of persons in similar circumstances. That this has some influence we may infer from the dread which many individuals have of entering a madhouse. That principle which leads us, even against our inclination, to adopt feelings, and repeat motions, which make a strong impression on our senses, is very strong in all men. The same principle which makes a panic, (when once begun,) to spread rapidly through an army, which gives the pathos of the orator, and the performances of the tragedian, a simultaneous power over the whole of their respective audiences, and which has sometimes spread convulsions and enthusiastic visions among large congregations, exerts a similar influence in the production of nervous diseases. In hysteria and epilepsy, the effect is well known. It is not, indeed, so frequently nor so quickly produced in cases of insanity, because this disease, in its decided forms, is more distant from the ordinary state of any sane mind than these casual motions.

On this principle, assisting the hereditary disposition, the repetition of mania in the same family may be partly accounted for. People think with particular frequency and seriousness of any glaring mental aberrations that affect their near connections. It has sometimes happened that the parent of a person who has become deranged has acknowledged that he felt an apprehension of falling immediately into a similar state. When the mind is weakened by sorrow, it is more easily operated on by sympathetic imitation; and the influence of this principle would be more frequently seen than it is, were it not counterbalanced by those efforts to maintain fortitude, which are dictated by a sense of the necessity of exertion for diminishing the evils with which a family is afflicted. Even those who have had relations whom they had never seen, who were subject to mania, especially if they died under the disease, must, if they know the fact, be led to think at times of that part of their family history, and certain expressions of countenance and manner, arising from such circumstances, may be communicated from one relation to another, and may thus contribute to cherish a diseased train of feeling tending to mania. We often find two or more individuals in a family becoming deranged at the same time. This we can attribute only to the influence which the progress of the morbid feelings of each has produced upon the other.

Physicians sometimes differ in their treatment of mania, according to their opinions regarding the comparative influence of bodily and of mental causes. Those who have supposed that some sort of organic fault is always the cause of mania, and that the apparent causes of it are merely occurrences slightly contributing to develope the disease, place their chief dependence on the resources of the Materia Medica; they trust to blood-letting, blistering, purging, antispasmodics, and the application of cold. This branch of the subject must be allowed to be of great importance; but for the details we refer to our article MEDICINE.

We confine ourselves under the present article to the moral treatment, or general management. It is well known that, even after the diseased state has been corrected, and the symptoms alleviated by the judicious use of medicine, a slight occurrence tending to irritate the mind is sufficient to destroy in one moment all the benefit produced, and to give rise to an immediate increase of violence in the symptoms. Moral circumstances must be attended to from the very beginning. The first and most important step is, to remove the patient from his own home, and from all the objects which he has been accustomed to see. His false notions and harassing impressions are associated in his mind with the objects exposed to his senses during the approach of the disease. His relations have become to him, in the first place, stale and uninteresting, and afterwards causes of angry irritation. The places where he has been accustomed to feel perplexity of thought cannot be seen without in some measure reviving it. It can seldom be expected, that in a private family individuals are to be found qualified for so difficult a charge as the care of a maniac. The most favourable situation is a retirement, where the patient will be surrounded by objects which have a composing influence. It is seldom, and only in the most violent form of the disease, that confinement in a dark room is advisable. In ordinary cases, the darkness of night brings with it an increase in the symptoms. The patient should, even for some time after he is apparently well, be kept at a distance from his friends. His importunities, and those of his connections, for a premature restoration to his family, ought to be firmly resisted till his recovery is well established. From the too frequent neglect of this precaution, many violent relapses take place. Dr. Cullen judiciously recommends that, where the patient cannot be removed, the furniture of his room should be changed. In the Bicêtre at Paris, religious mania was often increased by the presence of the emblems of the Catholic worship, and it was made a serious question, whether or not all such emblems ought to be removed from the hospital. The propriety of removing all such objects ought not to be doubted. A patient might be hurt by an insult offered to his opinions, but not by a step purely negative in its nature.

Disputes have often been agitated on the utility of harsh measures, compared with those of a milder kind. Tyrannical principles, aided by the same passion for the extraordinary which in former ages led to a harsh treatment of almost all diseases, have been in some measure the causes of the cruel severities often practised with this description of patients. They have, for the most part, had the effect of inflaming and irritating the disease. In more enlightened times, iron fetters, tight ropes, cruel floggings, and blows, have given place to the use of the straight waistcoat, which is at once milder and more efficacious. There is no doubt, however, that a mild treatment has sometimes failed, or even appeared to be hurtful. Some writers, on comparing these facts, have contented themselves with observing, that harsh or mild measures ought to be employed, according to the state of the patient, and our experience of the effect of each method upon him. We must, however, beware of suffering a mixed practice of this sort to degenerate into an ambiguous and immethodical empiricism. The principle which we should follow is, to practice uniform decision without harshness or indignity, and to allow the patient, within a certain range, a liberal degree of freedom without trifling. In the management of a lunatic, talents of the same sort are required as in conducting the moral education of children, or the political affairs of nations. The general principles to be adopted are the same, and the difference in their application is less in reality than in appearance. A keeper should shew the patient that he is so completely in his power as to render all resistance on his part vain, and at the same time convince him that his power is not to be exercised under the influence of passion or caprice; that it is to be confined to salutary restraint, and not extended to the infliction of severities. The boundaries of indulgence ought, however, to be clearly understood; the patient's requests, when improper, must be refused with a mild firmness, and no vague hopes held out to him which are not to be fulfilled. The mild character of the treatment must always appear to be that in which the patient's attendants take the greatest pleasure.

The plan of treatment, with respect to severity or mildness, requires to be adapted to the former habits of the patient. A man who has lived in polished society, in which deference has been shewn to his feelings, will be greatly injured by a degree of harshness which would be productive of no harm to a person who has been used to submit tamely to severities. As instances of the latter, Pinel particularizes the negroes of Jamaica; but it may be doubted, considering the former history of a great part of these individuals, how far their minds are subdued to their situation. In the Russian boor, who is accustomed to feel the master's lash as a necessary incitement to his daily labours, we probably have a better example of a person to whom, in a state of a mania, a certain degree of harshness would be of service. If a person, of these habits were to be treated with all the mildness that is used in a French lunatic asylum, he would be rendered unfit for returning to his former situation. Universal experience shews the danger of habituating any person for a time to indulgences, which cannot be secured to him for the remainder of his life.

Any sort of reasoning with a maniacal patient ought to be very sparingly employed. Pinel mentions a case of religious mania, which he attempted to cure by reasoning the patient out of his irrational opinions; but the attempt only served to rouse him to the most furious indignation against the impiety of the person who disputed the sacredness of his favourite doctrines. Reasoning even on more indifferent affairs only gives the patient an opportunity to gratify his vanity by displaying his eloquence in reply. Our object is, not to improve his accuracy in the application of language, but to restore that solidity of thought which is independent of the use of words, and that mental composure which no words can represent. Verbal reasoning shews too much *haste* to accomplish the recovery of our patient. Silent and steady means, accompanied with frankness, and free from all sullen affectation of taciturnity, will enable us, by much surer steps, to conduct a favourable case to a complete recovery.

Pinel and others mention instances in which a little fraud has been resorted to with marked advantage: it is not, however, void of danger. If the fraud is suspected, it not only loses its effect, but excites the patient's indignation. Instances have happened in which, after an apparent recovery produced in this manner, an explanation of the deception has created reflections which have been followed by a complete relapse. Perhaps this is less liable to occur with the French than with the British; as the former, setting more value on the politeness of the moment, and less on plain dealing, are probably less affected by a slight deception where no other serious consequences are produced by it.

Regular labour is often of great use in assisting the recovery of maniacs; but in public establishments in this country, a general provision for that object has not been made. It requires very exact precautions to find employment for such as are fit for it, and at the same time to prevent any of the patients from having access to tools of which they might make a dangerous use. For this purpose, the separation of the patients, according to a judicious classification of their cases, is indispensable; and provision will undoubtedly be made for this in the arrangement of all new public establishments for the treatment of the insane.

When the high symptoms of mania have subsided, it will be proper to allow the patient to see a little of society; hence those who are in a mild or convalescent state in an hospital are allowed to associate together, and those who are farther advanced associate with the servants and superintendants of the house. There are certain states in which an opportunity may be allowed for the return of the former sympathies of life, by gradually permitting the patient to receive frequent visits from his near relations. One instance, in which sympathy operated in the cells of the Manchester Workhouse, forcibly struck the writer of this article as one of those fortunate occurrences which it is not easy to repeat by any contrivance. A maniac was visited by his wife and two children, one of whom gave him an apple: this circumstance awakened his sensibility, and made him melt into tears. The scene was observed by the worst patient in the house, the furious woman who has been already mentioned; her ferocity was immediately subdued, and she wept along with that unfortunate parent, recollecting, no doubt, the children whom she herself left at home. From that day she made speedy advances to a state of perfect composure, and in a few weeks was dismissed cured. In this instance it was apparent that, though the incident was in itself fortunate, it was equally fortunate that she had not, in the first instance, seen any of her own children. In that case, the association of ideas might have recalled to her mind those feelings of passionate irritation with which she was affected in the beginning of the disease; whereas the feelings of maternal affection, being excited free from such associations, had time to acquire greater influence, till they became sufficiently powerful to fortify her against those passions by which they had been supplanted.

It appears from the view which Dr. Powel gives of the returns made in different years since 1775, that insanity is on the increase in Britain, and that this increase is in greater proportion than that of the progressive population of the country. This fact must arise from the more extensive operation of the moral causes of the disorder already specified, and others analogous to them, and might suggest to the politician and the moralist matter of important reflection.

According to the returns lately furnished, in obedience to the act of parliament, from all the parishes of Scotland, in number 992, with the exception of 259, the number of insane persons was 3489.

Of these, there were at large			2840
confined			649
			3489
Males	1643	Furious	622
Females	1761	Fatuous	2688
Sex not mentioned .	85	State not specified .	179
	3489		3489
Adult	2769	Maintained by parish	533
Non-adult	576	Partly by ditto . .	944
Age not specified .	164	Wholly by relations .	1020
		These circumstances not specified	992
	3489		3489

According to these returns, the proportions of the two sexes preponderate towards the females. This circumstance varies in different places. We are informed by Dr. Halliday, who at an early period made extensive inquiries on this subject, by collecting statements from the parishes of Scotland, that the proportion of natural idiots was greatest among males, while that of maniacal cases was greatest among females. The parishes from which he obtained statements were 788. In these, the number of idiots going at large was 1976, of whom 1145 were males, and 831 females. That of maniacs under restraint was 1676, of whom 727 were males, and 949 females.

The objects of legislative enactment on the subject of insanity comprise three particulars.

1. The prevention of wrongous confinement on a false plea of insanity. During a relaxed state of the law on this point, such confinement has very frequently been practised by selfish and depraved individuals, for the purpose of obtaining possession of the property of a rich relation. For this purpose false representations have been made to a medical practitioner, and the lure of emolument at the same time held out, and thus a certificate of insanity has been obtained, which was sufficient to authorise the confinement of any individual as a lunatic. Such a power ought not to be vested in any person whose qualifications are not well accredited; and the certificate of one individual should never be held sufficient to authorize the continuance of a person in confinement beyond a very few days. All such cases

ought to be speedily reported to a plurality of official men. This is necessary for ascertaining, to the reasonable satisfaction of all parties, whether the insanity is evident; and cases will sometimes occur that bear a very questionable aspect, and require frequent visits, and the minute observation of a sagacious and experienced person, before that point can be determined. On this account facilities should be afforded for obtaining information, from respectable neighbours, of all the previous circumstances that are likely to throw light on such cases. Wherever motives to unjust confinement might be supposed possible, the case should be investigated with particular care. Persons of property, being most liable to cruel imposition in this particular, should be provided with the best legal protection.

2. Another object is, to provide for the confinement of all those persons whose mental condition renders that measure necessary. On this point, delicacy towards persons who show symptoms of incipient derangement, and towards their friends, requires that much should be left to private discretion. There is no doubt, however, that wandering lunatics ought to be attended to; that the mischievous should be placed under restraint; and that, for obvious reasons, no females in this unfortunate situation should be allowed to go at large.

3. A third object is, to secure the best treatment to the insane who are placed in confinement. Even those who are really insane, especially persons of superior rank, are liable to be treated with studied carelessness from mercenary motives operating upon those in whose charge they are placed, and from the base antipathies or the rapacity of relations. Carelessness, mean resentment, and a brutal disposition to abridge, as much as possible, the business of a receptacle for the insane, have too often been productive of inhuman usage towards all descriptions of insane persons. These evils can only be prevented by an assiduous system of thorough and frequent inspection. Much advantage has arisen from some recent enactments providing for the inspection of such houses. But this inspection, in order to produce the desired effect, ought to be at least weekly, and the inspectors ought to have, without giving warning, immediate access to all parts of such establishments.

The arrangements required in lunatic hospitals have recently become a subject of attentive study, and it is hoped will be soon perfectly understood. The comfort of the situation, the security of the patients, and the prevention of mischief, are requisites in them all. More particular care is required in those intended for the reception of recent cases, which admit of some hopes of recovery. An hospital for the curable insane requires, besides the circumstances now mentioned, much more assiduous medical attendance, greater address on the part of the keeper, and various arrangements for separating the different classes of patients, for presenting to their feelings and thoughts only those objects which have an unexceptional tendency, and providing them with salutary employment. Perhaps such institutions ought not to be committed exclusively to the care of one medical person. Or, if this is thought necessary for preventing jarrings, provision should be made for extended communications on the progress of each case, and frequent consultations on the minutiæ of the treatment. Without this, the due interest in the object is apt to decline, and the practice is in danger of degenerating into an indolent routine.

Insanity is treated in the works of Hippocrates, Celsus, Aretæus, Van Swieten, Cullen, and the greater part of ancient and modern systematic writers on Medicine. See more particularly Arnold *on Insanity*. Battie's *Treatise on Madness*. Haslam *on Madness and Melancholy*. *Illustrations of Madness*, by ditto. Rush *on Mental Derangement* Cox's *Observations on Insanity* Crichton *on Mental Derangement*. Perfect's *Select Cases of Insanity* Mons. Pinel *sur l'Aliénation Mentale*. Halloran *on Insanity*. G. N. Hill *on the Prevention and Cure of Insanity*. Spurzheim *on Insanity*. The article *Folie* in the Dictionnaire des Sciences Medicales. Dr. Powell's paper on the *Transactions of the London College of Physicians*. Also the Reports of the Committee of the House of Commons for considering the regulation of mad-houses; and the pamphlets of Stark, Tuke, and others, on Lunatic Asylums. *The Annual Reports of the Glasgow Lunatic Asylum*, being generally interesting and instructive, may be perused with advantage. (*H. D.*)

INSECTA.

For the external anatomical structure, &c. see Zoology.

Order DIPTERA.

The characters of this order, and of the tribes of which it is composed, were given under the article Entomology.

Sect. I. Proboscidea.

Tribe I. Tipularides.

A. *Antennæ filiform or setaceous, longer than the head.*

Stirps 1. Ocelli none; antennæ very hairy; eyes large; rostrum tubular, long.

Genus DCLXXXI. Culex, of authors.

Sp. 1 *Pipiens* of authors. The common gnat.

Stirps 2 Ocelli none; antennæ very hairy; eyes large; rostrum very short, terminated by two lips. Two anterior legs at a distance from the others.

Genus DCLXXXII. Corethra, Meig. Illig. Latr.

Antennæ fourteen-jointed; the basilar joints conicovoid; of the male with fasciculi of hairs; with simple hairs on the females; the two last joints attenuated, elongated.

Sp. 1. *Culiciformis.* Meig.

Genus DCLXXXIII. Tanypus, Meig. Illig. Latr.

Antennæ fourteen jointed, very plumose, moniliform.

their extremities filiform: of the male, almost entirely moniliform, their last joint larger and ovoid in the female.
Sp. 1. *Cinctus.* Meig.

Genus DCLXXXIV. Chironomus, Meig. Latr. Illig. Fabr.

Antennæ twelve jointed, very plumose, moniliform, with filiform extremities in the male; seven jointed, the last joint elongate, cylindric in the female.
Sp. 1. *Plumosus.* Meig.
Inhabits Europe.

Stirps 3. Ocelli, none, antennæ very hairy, eyes large, rostrum very short, legs at an equal distance from each other.

Genus DCLXXXV. Culicoides, Latr.

Wings deflexed; rostrum conic, larger than the head; antennæ fourteen jointed, downy.
Sp. 1. *Punctata.* Latr.
Inhabits France and England.

Genus DCLXXXVI. Psychoda, Latr. Fabr. Tinearia, Schell. Trichoptera, Meig.

Wings deflexed, rostrum shorter than the head, antennæ with fifteen or sixteen joints, of a globular form, covered with bundles of hairs.
Sp. 1. *Phalænoides.* Latr.
Inhabits Europe.

Genus DCLXXXVII. Ceratopogon, Meig. Illig. Latr. Pauz.

Wings incumbent; lower joints of the antennæ ovoid or subglobular, the upper ones longer and cylindrical; the lower joints of the male with long bundles of hair.
Sp. 1. *Femoratus.* Fabr.

Genus DCLXXXVIII. Cecidomyia, Latr. Illig. Meig. Oligotrophus, Latr.

Wings incumbent; antennæ moniliform, hairy.
Sp. 1. *Lutea.* Meig.

Stirps 4. Ocelli none: antennæ with short hairs; eyes oval, entire; palpi with their last joint very long; lips not inclined.

Genus DCLXXXIX. Ctenophora, Meig. Illig. Latr. Fabr. Taniptera, Latr.

Antennæ filiform, pectinated in the males, serrated in the females: the second joint short, the third elongate.
Sp. 1. *Atrata.* Meig.

Genus DCXC. Pedicia, Latr. Limonia, Meig.

Antennæ subsetaceous, simple; the two first joints larger, elongate; the three following turbinated, the three next globular, and the seven last slender, cylindric.
Sp. 1. *Rivosa.*
Tipula Rivosa. Linné.
Inhabits Europe.

Genus DCXCI. Tipula, of authors.

Antennæ subsetaceous, simple; the first joint largest, ylindric; the second subglobose; the next cylindric; the third elongate.
Sp. 1. *Oleracea.* Linné, &c.
Inhabits Europe.

Genus DCXCII. Nephrotoma, Meig, Latr.

Antennæ subsetaceous, simple; the joints for the most part cylindric; those of the male arched.
Sp. 1. *Dorsalis*, Meig.

Stirps 5. Ocelli none; antennæ with short hairs; eyes oval, entire; palpi with their last joint very long; lips very long, inclined.

Genus DCXCIII. Ptychopteryx. Ptychoptera, Meig. Illig. Latr. Fabr.

Antennæ subsetaceous, simple; the first joint sub-obconic, third very long; the tenth and three or four following joints subovate.
Sp. 1. *Contaminata.* Fabr.

Stirps 6. Ocelli none; antennæ with short hairs; eyes oval, entire; palpi with their last joint very long, and always simple.

Genus DCXCIV. Limonia, Meig. Illig. Latr.

Antennæ moniliform, fourteen or sixteen jointed wings with three perfect discoidal cells.
Sp. 1. *Picta.* Meig.

Genus DCXCV. Trichocera, Meig.

Antennæ setaceous, sixteen or fifteen jointed, the two first joints thick, subequal, shorter than the third; wings with three perfect discoidal cells.
Sp. 1. *Hiemalis.* Meig.

Genus DCXCVI. Eriopteryx. Erioptera, Meig.

Antennæ subsetaceous, fifteen jointed, all the joints except the first quite moniliform; wings with two perfect discoidal cells.
Sp. 1. *Altra.* Meig.

Genus DCXCVII. Hexatoma, Latreille.

Antennæ six jointed, subsetaceous, the two first joints shortest, the four others very long, cylindric.
Sp. 1. *Nigrum.*
Hexatoma nigra. Latr.
Inhabits the vicinity of Paris.

Stirps 7. Ocelli distinct; rostrum cylindric, elongate.

Genus DCXCVIII. Asindulum, Latr. Platyura, Meig. Illig.

Eyes within and behind notched; proboscis much longer than the head.
Sp. 1. *Nigrum.* Latr.

Genus DCXCIX. Rhyphus, Latr. Anisopus, Meig. Illig.

Eyes entire; proboscis porrect, a little shorter than the head.
Sp. 1. *Fenestrarum.* Latr.
Inhabits Europe.

Stirps 8. Ocelli distinct; rostrum short, terminated by two lips.

Genus DCC. Ceroplatus, of authors.

Palpi very short; ovoid conic, obscurely uniarticulate; antennæ compressed, fusiform.
Sp. 1. *Tipuloides.* Bosc. &c.

Genus DCCI. Molobrus, Latr. Sciava, Meig. Fabr. Illig. Macrocera, Meig.

Palpi subfiliform, distinctly jointed; antennæ subsetaceous; eyes sublunulate; ocelli very distinct, placed near each other on the vertex.
Sp. 1. *Thomæ.* Latr.

Genus DCCII. Mycetophila, Meig. Illig. Fabr. Latr.

Palpi subfiliform, distinctly jointed; antennæ subsetaceous; eyes entire, oval; ocelli very minute, distinct, the lateral ones placed one behind each eye.

Sp. 1. *Lunata.* Meig.

B. *Antennæ massive or fusiform, and perfoliated.*

Stirps 9. Ocelli three; antennæ nine-jointed.

Genus DCCIII. Bibis, Geoff. Schæf. Latr. Lam. &c. Hirtæa, Fabr. Meig. Illig.

Thorax without spines on its anterior part; hinder tibiæ produced into a strong hook.

Sp. 1. *Hortulanus.* Latr.
Inhabits Europe.

Genus DCCIV. Dilophus, Meig. Illig. Latr.

Thorax with its anterior and posterior margins pectinated; anterior tibiæ with their apex and middle externally pectinate-dentate.

Sp. 1. *Febrilis.* Meig.
Inhabits Europe.

Stirps 10. Ocelli three; antennæ eleven-jointed.

Genus DCCV. Penthetria, Meig. Latr.

Eyes oval, entire,

Sp. 1. *Funebris.* Meig.

Genus DCCVI. Scathopse, of authors. Ceria, Scop.

Eyes reniform or lunate.

Sp. 1. *Nigra.* Geoffroy.

Stirps 11. Ocelli none.

Genus DCCVII. Cordyla, Meig. Latr.

Antennæ twelve-jointed; eyes entire.

Sp. 1. *Fusca.* Meig.

Genus DCCVIII. Simulium, Latr. Atractocera, Meig.

Antennæ eleven jointed; eyes lunulate.

Sp. 1. *Reptans.* Latr.

Tribe II. Stratiomydes.

A. *Antennæ not terminated by a seta.*

Stirps 1. Antennæ with their last joint having eight rings.

Genus DCCIX. Hermetia, Latr. Fabr.

Antennæ with their last joint much compressed, its middle strangulated.

Sp. 1. *Illucens.* Latr.

Genus DCCX. Xylophagus, Meig. Fabr. Latr.

Antennæ cylindric, the last joint cylindric-conic, elongate; scutellum without spines; palpi longer than the proboscis.

Sp. 1. *Maculatus.* Meig.

Genus DCCXI. Actina, Meig.

Antennæ cylindric, the last joint cylindric-conic, elongate; scutellum with six spines; palpi not longer than the proboscis.

Sp. 1. *Chalybea.* Meig.

Genus DCCXII. Beris, Latr.

Antennæ cylindric, the last joint cylindric-conic, elongate; scutellum with four or six spines; palpi very much shorter than the proboscis.

Sp. 1. *Nigritarris.* Latr.

Stirps 2. Antennæ, with their last joint having from four to six rings, fusiform, cylindric-conic, or conic.

Genus DCCXIII. Stratiomys, of authors.

Antennæ very much longer than the head, the first and third joints very long, the latter subfusiform, compressed, with five rings; thorax bispinose.

Sp. 1. *Strigata.* Fabr.
Inhabits Europe.

Genus DCCXIV. Odontomyia, Meig. Illig. Latr.

Antennæ a little longer than the head, the last joint cylindric-conic, with six rings; thorax bispinose.

Sp. 1. *Furcata.* Meig.
Inhabits Europe.

Genus DCCXV. Clitellaria, Meig. Illig. Ephippium Latr.

Antennæ a little longer than the head, with their last joint conic, six-ringed, the two last forming a little style; thorax bispinous, the spines erect.

Sp. 1. *Ephippium.* Meig.
Inhabits Europe.

DCCXVI. Nemotelus, of authors.

Antennæ half the length of the head, the third joint fusiform, four-ringed; scutellum without spines; proboscis sheathed beneath a rostelliform process, on which the antennæ are inserted.

Sp. 1. *Uliginorus.* Fabr.
Inhabits Europe.

B. *Antennæ terminated by a style or seta.*

Stirps 3. Scutellum spinous.

Genus DCCXVII. Oxycera,* Meig. Illig. Latr.

Antennæ with their first and second joints forming a subfusiform club, the third styliform.

Sp. 1. *Hydroleon.* Meig.
Inhabits Europe.

Stirps 4. Scutellum without spines.

Genus DCCXVIII. Vappo, Latr. Fabr. Pachygaster, Meig.

Antennæ, with their two first joints transverse, the second with the third joints forming a sub-hemispheric head.

Sp. 1. *Ater.* Fabr.
Inhabits Germany and England.

Genus DCCXIX. Sargus, of authors.

Antennæ terminated by a seta longer than the antennæ, their second joint elongate; abdomen generally oblong.

Sp. 1. *Xanthopterus.* Fabr.

Tribe III. Tabanides.

Stirps 1. Wings incumbent; scutellum spinous.

Genus DCCXX. Oxnomyia, Latr.

Antennæ shorter, or scarcely longer than the head; the second joint subobconic, short; the third longer, elongate-conic, distinctly eight-ringed: ocelli three.

Sp. 1. *Ferruginea.* Latr.

Stirps 2. Wings divaricating; scutellum without spines; antennæ as long as, or a little longer, than the head.

Genus DCCXXI. Pangonia, Latr. Fabr. Tanyglossa, Meigen.

Proboscis siphunculiform, coriaceous, very long, subporrected or subnutant: antennæ scarcely as long as the head; the second joint sub-transverse; the third longer, elongate-conic, sub-arcuate, distinctly eight-ringed: ocelli three.

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* This genus probably ought to be placed in the second Stirps.

Sp. 1. *Maculata.* Fabr.

Genus DCCXXII. Tabanus, of authors.

Proboscis a little shorter than the head, terminated by large lips; antennæ as long as the head, the second joint cup-shaped, the third lunate-subulate, five-ringed; ocelli obsolete or wanting.

Sp. 1. *Bovinus.* Linné. &c.

Stirps 3. Wings divaricating; scutellum without spines; antennæ remarkably longer than the head.

Genus DCCXXIII. Hæmatopota, Meigen, Illig. Latr. Fabr.

Antennæ with their first joint elongate, incrassate; the second very short, cup-shaped; the third elongate-conic, (longer than the first,) tubulated, four-ringed; ocelli obsolete or wanting.

Sp. 1. *Pluvialis.* Meig.

Inhabits Europe.

Genus DCCXXIV. Heptatoma, Meig. Illig. Latr. Fabr.

Antennæ formed of cylindric joints; the second shortest; the third very long, four-ringed: ocelli obsolete or wanting.

Sp. 1. *Bimaculata.* Meig.

Genus DCCXXV. Chrysops, Meig. Illig. Latr. Fabr.

Antennæ, with the two first joints of nearly an equal length, the third joint as long as both the others, cylindric-conic, five-ringed; ocelli three.

Sp. 1. *Cæcutiens.* Meig.

Inhabits Europe.

Tribe IV. Rhagionides.

Genus DCCXXVI. Pachystomus, Latr.

Antennæ cylindric; third joint three-ringed, without a seta.

Sp. 1. *Syrphoides.* Latr.

Inhabits Germany.

Genus DCCXXVII. Rhagio, Oliv. Ross. Cuv. &c. Leptis, Fabr.

Antennæ moniliform, the third joint not ringed, but terminated by a seta; palpi porrect.

Sp. 1. *Scolopaceus.* Latr.

Inhabits Europe.

Genus DCCXXVIII. Atherix, Meig. Latr.

Antennæ moniliform, the third joint not ringed, but terminated by a seta; palpi erect.

Sp. 1. *Maculata.* Meig.

Inhabits Europe.

Genus DCCXXIX. Ortochile, Latr.

Antennæ terminated by a globose head, bearing a terminal seta.

Sp. 1. *Nigro cæruleus.* Latr.

Inhabits the vicinity of Paris.

Tribe V. Dolychopides.

Genus DCCXXX. Platypeza, Meig.

Antennæ as long as the head, their last joint very long, terminated by a seta; hinder tarsi compressed-dilated, the third joint largest.

Sp. 1. *Fasciata.* Meig.

Inhabits Europe.

Genus DCCXXXI. Callomyia, Meig.

Antennæ as long as the head, their last joint very long, terminated by a seta; hinder tarsi filiform, the first joint largest.

Sp. 1. *Elegans.* Meig.

Genus DCCXXXII. Dolychopus, Latr. Fabr. Walc.

Antennæ half the length of the head, the third joint trigonal, bearing a seta on its hinder part.

Sp. 1. *Nobilitatus.* Fabr.

Tribe VI. Mydasides.

Genus DCCXXXIII. Mydas, Fabr. Latr.

Antennæ longer than the head; the last joint very long, its point ovate-clavate, truncate, concave; the concavity including an obscure little style.

Sp. 1. *Filata.* Fabr.

Inhabits North America.

Genus DCCXXXIV. Thereva, Latr.

Antennæ as long, or longer, than the head; the last joint ovoid-conic, with a distinct style, terminated by a seta.

Sp. 1. *Plebeia.* Latr.

Inhabits Europe.

Tribe VII. Asilides.

Stirps 1. Tarsi terminated by two claws, and two pulvilli; antennæ as long, or not much longer, than the head.

Genus DCCXXXV. Laphria, Meig. Illig. Lat. Fabr.

Antennæ with their first joint longer than the second; the last suboval, without a style.

Sp. 1. *Gibbosa.* Fabr.

Genus DCCXXXVI. Asilus, of Authors. Erax, Scopoli.

Antennæ with their first joint longer than the second; the last elongate-conic, terminated by a very distinct style.

Sp. 1. *Crabroniformis.* Fabr.

Inhabits Europe.

Genus DCCXXXVII. Dasypogon, Meig. Illig. Latr. Fab.

Antennæ with their two first joints nearly equal; the last subcylindric, terminated by a minute, articuliform, conic style.

Sp. 1. *Punctatus.* Meig.

Inhabits Europe.

Stirps 2. Tarsi terminated by two claws and two pulvilli; antennæ much longer than the head, inserted in a common footstalk.

Genus DCCXXXVIII. Dioctria, Meig. Illig. Latr. Fabr.

Sp. 1. *Oclandica.* Fabr.

Inhabits Europe.

Stirps 3. Tarsi terminated by three claws; pulvilli wanting.

Genus DCCXXXIX. Gonypes, Latr. Leptogaster, Meig.

Abdomen very long, slender, thicker towards its extremity
Sp. 1. *Tipuloides.* Latr.
Inhabits Europe.

Tribe VIII. Empides.

Stirps 1. Proboscis perpendicular.

Genus DCCXL. Empis, of Authors.

Antennæ three-jointed, the last joint terminated by a seta; palpi erect.
Sp. 1. *Borealis.* Fabr.

Genus DCCXLI. Sicus, Latr. Tachydromyia, Meig. Fabr.

Antennæ two-jointed, the last joint terminated by a seta; palpi porrect.
Sp. 1. *Raptor.* Latr.
Inhabits Europe.
Stirps 2. Proboscis porrected.

Genus DCCXLII. Hybos, Meig. Fabr. Latr. Acromyia, Bonelli.

Antennæ two-jointed, the last joint terminated by a seta; palpi porrect.
Sp. 1. *Asiliformis.* Latr.

Tribe IX. Anthracides.

Genus DCCXLIII. Nemestrina, Latr. Rhynocephalus, (Act. Soc. Hist. Nat Moscov.)

Palpi exserted; proboscis very much longer than the head.
Sp. 1. *Reticulata.* Latr.
Inhabits Egypt and Syria.

Genus DCCXLIV. Mulio, Latr. Cytherea, Meig. Fabr.

Palpi received into the cavity of the mouth; proboscis generally elongate, porrect.
Sp. 1. *Obscura.* Latr.

Genus DCCXLV. Anthrax, of Authors.

Palpi received into the cavity of the mouth; proboscis short, not porrect.
Sp. 1. *Hottentotta.* Fabr.
Inhabits Europe.

Tribe X. Bombylides.

Stirps 1. Proboscis never longer than the head, its point incrassated; antennæ with their first joint longest, and thicker than the third.

Genus DCCXLVI. Cyllenia, Latr.

Antennæ shorter than the head, first joint not very thick; abdomen elongate.
Sp. 1. *Maculata.* Latr.
Inhabits France.

Genus DCCXLVII. Ploas, Latr. Fabr. Conophorus, Meig.

Antennæ rather longer than the head, the first joint very large, cylindric-conic; abdomen short.
Sp. 1. *Hirticornis.* Latr.
Inhabits Montpellier.
Stirps 2. Proboscis always longer than the head, pointed; antennæ with the third joint larger than the first.

Genus DCCXLVIII. Bombylius, of Authors.

Palpi distinct; antennæ with their first joint much longer than the second.
Sp. 1. *Major*, of authors.
Inhabits Europe.

Genus DCCXLIX. Phthiria, Meig. Latr.

Palpi distinct; antennæ with their two first joints short and equal.
Sp. 2. *Fulva.* Meig.

Genus DCCL. Usia, Latr.

Palpi not distinct; antennæ with their two first joints short and equal.
Sp. 1. *Ænea.* Latr.

Tribe XI. Acrocerides.

Stirps 1. Proboscis distinct; antennæ two or three jointed, with or without a terminal seta.

Genus DCCLI. Panops, Lam. Latr.

Antennæ longer than the head; three-jointed, the last joint elongate, cylindric, without a terminal seta.
Sp. 1. *Baudini.* Lam.
Inhabits New Holland.

Genus DCCLII. Cyrtus, Latr.

Antennæ very small, two-jointed; the last joint ovoid, with a terminal seta.
Sp. 1. *Acephalus.* Latr.
Stirps 2. Proboscis obscure; antennæ three-jointed, not terminated by a seta.

Genus DCCLIII. Astomella, Dufour, Latr.

Sp. 1. *Marginata.* Dufour.
Inhabits Spain.
Stirps 3. Proboscis obscure; antennæ two-jointed, the last joint terminated by a seta.

Genus DCCLIV. Acrocera, Meig. Latr.

Antennæ inserted on the vertex.
Sp. 1. *Sanguinea.* Meig.

Genus DCCLV. Ogcodes, Latr. Henops, Illig. Walck. Meig. Fabr.

Antennæ inserted anteriorly over the cavity of the mouth
Sp. 1. *Gibbosus.* Latr.
Inhabits Germany and England.

Tribe XII. Syrphides.

Stirps 1. Head anteriorly conic-produced. Antennæ much shorter than the head, placed in a common elevation. Oval cavity on the nasal prominence. Wings divaricating.

Genus DCCLVI. Rhingia, of authors.

Head anteriorly much produced, terminated by the proboscis.
Sp. 1. *Rostrata*, of authors.
Inhabits Europe.

Genus DCCLVII. Sericomyia, Latr.

Antennæ with their seta plumose, inserted at the dorsal juncture of the second and third joints; last joint of the antennæ suborbicular.

Sp. 1. *Lapponum.* Latr.
Inhabits Europe.

Genus DCCLVIII. Volucella, Geoff. Schæff. Latr. Pierocera, Meig.

Antennæ with their last joint elongate; seta plumose, inserted at the dorsal juncture of the second and third joint.

Sp. 1. *Pellucens.* Latr.
Inhabits Europe.

Genus DCCLIX. Eristalis, Latr. Fabr. Heliophilus, Meig. Illig.

Antennæ contiguous at their base, their last joint broader than long; seta (simple or slightly plumose) inserted beyond the dorsal junction of the second and third joints; head anteriorly distinctly rostriform.

Sp. 1. *Narcissi.* Fabr.

Genus DCCLX. Helophilus. Elophilus, Meig. Illig. Latr.

Antennæ contiguous at their base; their third joint longer than broad; seta (simple or slightly plumed) inserted beyond the dorsal juncture of the second and third joints; head anteriorly distinctly rostriform.

Sp. 1. *Tenax.* Latr.
Inhabits Europe.

Genus DCCLXI. Syrphus, of authors.

Antennæ separate at their base; their last joint suborbiculate; seta inserted beyond the dorsal junction of the second and third joints; abdomen elongate-subquadrate, gradually somewhat narrower towards its extremity.

Sp. 1. *Variabilis.* Panz.
Inhabits Europe.

Genus DCCLXII. Doros, Meig. Illig.

Antennæ separate at their base; their last joint suborbiculate; seta inserted beyond the dorsal juncture of the second and third joints; abdomen clavate, contracted at each side of its base.

Sp. 1. *Conopseus.*
Milesia conopsea. Fabr.
Syrphus coarctatus. Panz.
Inhabits Europe.

Genus DCCLXIII. Scæva, Fabr.

Antennæ separate at their base; their last joint subovate; seta inserted beyond the dorsal juncture of their second and third joints; abdomen subovate trigonal; the length double the breadth.

Sp. 1. *Pyrastri.* Fabr.
Inhabits Europe.

Stirps 2. Head not anteriorly conic-produced; antennæ about the length of the head, placed in a common elevation; oval cavity on the nasal prominence; wings deflexed or slightly divaricating.

Genus DCCLXIV. Paragus, Latr.

Antennæ separate at their base; their two first joints subequal; seta simple, not distinctly articulated.

Sp. 1. *Bicolor.* Latr.

Genus DCCLXV. Psarus, Latr. Fabr.

Antennæ inserted on a common elevation; the second joint larger than the first; seta thick, styliform, distinctly biarticulate.

Sp. 1. *Abdominalis.* Fabr.

Stirps 3. Head not anteriorly conic-produced; antennæ very much longer than the head; placed on a common elevation; oval cavity on the nasal prominence; wings deflexed.

Genus DCCLXVI. Chrysotoxum, Meig. Latr.

Antennæ subcylindric; their last joint having a seta at its base.

Sp. 1. *Arcuatum.* Latr.
Inhabits Europe.

Genus DCCLXVII. Ceria, Fabr. Latr. Illig. Meig.

Antennæ with their first and second joints forming an oval mass terminated by a style.

Sp. 1. *Vespiformis,* Latr.
Inhabits Italy and Barbary.

Genus DCCLXVIII. Callicera, Meig. Panz.

Antennæ with their first and second joints forming an elongate mass, terminated by a style.

Sp. 1. *Ænea.* Meig.
Inhabits Europe.

Stirps 4. Head not anteriorly produced; nasal part straight, not prominent; antennæ inserted separately, very much longer than the head; wings deflexed.

Genus DCCLXIX. Aphritis, Latr. Microdon, Meig.

Antennæ with their third joint conic, elongate, its base bearing a seta.

Sp. 1. *Auro-pubescens.* Latr.
Inhabits Europe.

Stirps 5. Head not anteriorly produced, nasal parts concave or straight; antennæ inserted separately, very much shorter than the head.

Genus DCCLXX. Merodon, Meig. Fabr. Latr.

Hinder thighs (of the male at least) large, very thick, arcuated, points produced into a strong tooth; antennæ with their joints trigonal.

Sp. 1. *Clavipes.* Meig.
Inhabits Europe.

Genus DCCLXXI. Eumenos, Meig.

Hinder thighs (of the males at least) large, very thick, elongate-ovate, denticulated beneath; antennæ with their last joint much compressed; abdomen cylindric.

Sp. 1. *Pipiens.*
Mielesia pipiens. Fabr.
Inhabits Europe.

Genus DCCLXXII. Milesia, Latr. Leach.

Hinder thighs (of the males at least) large, very thick, elongate-ovate, denticulate beneath; antennæ with their last joint much compressed; abdomen trigonate.

Sp. 1. *Annulatus.*
Syrphus annulatus. Fabr.
Inhabits Europe.

Genus DCCLXXIII. Spilomyia, Meig. Heliophilus, Meig.

Hinder thighs (of the males at least) large, thick, elongate, subcylindric; antennæ with their last joint short, subovate, much compressed.

Sp. 1. *Impigera.*
Syrphus Impiger. Rossi.
Inhabits Europe.

Genus DCCLXXIV. Chrysogaster, Meig.

Hinder thighs not different from the others; antennæ with their last joint elongate-conic, much compressed.

Sp. 1. *Æneus.*

Erastalis æneus. Fabr.

Inhabits Europe.

Tribe XIII. Conopsides.

Stirps 1. Antennæ with their second joint as long, or longer than the third, forming with it a fusiform, or subobvate compressed club; body elongate.

Genus DCCLXXV. Conops, of authors.

Proboscis porrect; ocelli none; antennæ very much longer than the head, apex fusiform.

Sp. 1. *Aculeata.* Fabr.

Inhabits Europe.

Genus DCCLXXVI. Zodion, Latr.

Proboscis porrect; ocelli three; antennæ shorter than the head, apex subovoid.

Sp. 1. *Conopsoides.* Latr.

Inhabits Italy and France.

Genus DCCLXXVII. Myopa, of authors. Stomoxoides, Schœffer.

Proboscis very long, filiform geniculated beneath twice.

Sp. 1. *Dorsalis.* Fabr.

Inhabits Europe.

Stirps 2. Antennæ with their second joint much smaller than the last, which is patelliform; body short.

Genus DCCLXXVIII. Bucentes, Latr.

Proboscis geniculated twice.

Sp. 1. *Cinereus.* Latr.

Inhabits France and England.

Genus DCCLXXIX. Stomoxys, of authors.

Proboscis geniculated once.

Sp. 1. *Calcitrans*, of authors.

Inhabits Europe.

Tribe XIV. Muscides.

Stirps 1. Antennæ inserted near the mouth; palpi external.

Genus DCCLXXX. Phora, Latr. Trineura, Meig. Noda, Schellenberg.

Antennæ with the two first joints very minute, obsolete, the third thick, subglobose, furnished with a long seta.

Sp. 1. *Aterrima.* Latr.

Inhabitants Europe.

Stirps 2. Antennæ inserted near the front, setigerous; palpi internal; halteres visible; anterior legs simple; head subglobose; hinder legs very large.

Genus DCCLXXXI. Sphærocera, Latr. Borborus? Meig.

Antennæ almost completely exserted, last joint semiorbicular.

Sp. 1. *Curvipes.* Latr.

Inhabits Europe.

Genus DCCLXXXII. Thyreophora, Meig. Illig. Latr.

Antennæ almost entirely concealed within a deep excavation in the front, last joint globular.

Sp. 1. *Cynophila.* Meig.

Inhabits Europe.

Stirps 3. Antennæ inserted near the front, setigerous; palpi internal; halteres visible; anterior legs simple; head not subglobose; hinder legs not larger than the rest; wings horizontal; eyes sessile.

Genus DCCLXXXIII. Lauxania, Latr. Fabr. Panz.

Antennæ very much shorter than the head; head transversely compressed.

Sp. 1. *Rufitarsis.* Latr.

Inhabits Europe.

Genus DCCLXXXIV. Mocillus, Latr.

Antennæ shorter than the head; head hemispheric.

Sp. 1. *Cellarius.* Linnè.

Inhabits Europe.

Stirps 4. Antennæ inserted near the front, setigerous; palpi internal; halteres visible; anterior legs simple; head not subglobose; hinder legs not longer than the rest; wings divaricating; eyes simple; vertex narrow.

Genus DCCLXXXV. Micropeza, Meig. Latr.

Body long; legs long; thorax subovoid; abdomen with its base attenuated.

Sp. 1. *Cynipsea.* Latr.

Genus DCCLXXXVI. Tephritis, Latr. Fabr. Illig Trypeta, Meig. Dacus, Fabr.

Thorax cylindric; proboscis entirely retractile.

Sp. 1. *Cardui.* Latr.

Inhabits Europe.

Genus DCCLXXXVII. Platystoma, Meig. Latr. Dictya, Fabr.

Thorax cylindric; proboscis very much thickened, much exserted.

Sp. 1. *Transversa.* Meig.

Inhabits Europe.

Stirps 5. Antennæ inserted near the front, setigerous; palpi internal; halteres visible; anterior legs simple; head not subglobose; hinder legs not larger than the rest; wings deflexed; eyes pedunculated; vertex broad.

Genus DCCLXXXVIII. Achias, Fabr. Latr.

Antennæ inserted on the front.

Sp. 1. *Oculatus.* Fabr.

Genus DCCLXXXIX. Diopsis, of authors.

Antennæ inserted under the eyes, on their peduncle.

Sp. 1. *Ichneumonea.* Linnè.

Stirps 6. Antennæ inserted near the upper part of the head, setigerous; palpi internal; halteres visible; anterior legs simple; head not often subglobose: hinder legs not larger than the rest; wings deflexed; eyes ressile; vertex broad.

Genus DCCXC. Calobata, Meig. Illig. Latr. Fabr.

Antennæ very much shorter than the head; the third joint longer than the second; body long, filiform; legs long, filiform.

Sp. 1. *Filiformis.* Latr.

Inhabits France and England.

Genus DCCXCI. Oscinis, Latr. Fabr. Chlorops, Meig. Illig. Panz. Otites? Latr. (obsolete.) Chamæmyia? Meig.

Antennæ very much shorter than the head, the third joint longer than the second; legs not long, or filiform.

Sp. 1. *Elegans.* Latr.

Inhabits Europe.

GENUS DCCXCII. TETANOCERA, Duméril, Latr.

Antennæ of the length of the head; the second and third joints nearly equally long.
Sp. 1. *Marginata.* Latr.
Inhabits Europe.

GENUS DCCXCIII. SEPEDON, Latr. BACCA, Fabr. MULIO, Schellenberg.

Antennæ very much longer than the head, inserted on an elevation; the second joint very long, cylindric.
Sp. 1. *Palustris.* Latr.
Inhabits Europe.

GENUS DCCXCIV. LOXOCERA, Meig. Illig. Latr. Fab.

Antennæ very much longer than the head; last joint linear; abdomen narrow, linear.
Sp. 1. *Ichneumonia.* Meig.
Inhabits Europe.

GENUS DCCXCV. SCATOPHAGA, Meig. Latr. PYROPA, Illig.

Antennæ shorter than the head; head round, subglobose; vertex horizontal; body very much elongated.
Sp. 1. *Merdaria.* Latr.
Inhabits Europe.

GENUS DCCXCVI. ANTHOMYIA, Meig. Illig. Latr.

Antennæ shorter than the head; head hemispheric, transverse; vertex inclined; body not much lengthened.
Sp 1. *Pluvialis.* Latr.
Inhabits Europe.

Stirps 7. Antennæ inserted near the upper part of the head, not setigerous; palpi internal; halteres visible; anterior legs differing in form from the others.

GENUS DCCXCVII. PIPUNCULUS, Latr.

Antennæ two-jointed, the last joint subulated at its extremity; anterior legs simple.
Sp. 1. *Campestris.* Latr.
Inhabits Europe.

GENUS DCCXCVIII. SÆNOPINUS, Latr. Fabr. CONA, Schellenberg.

Antennæ three-jointed; anterior legs simple.
Sp. 1. *Niger.* Latr.
Inhabits Europe.

GENUS DCCXCIX. OCHTHERA, Latr. MACROCHIRA, Meig.

Anterior legs raptorious; antennæ terminated by a bearded seta.
Sp 1 *Mantis.* Latr.
Inhabits Europe?

Stirps 8. Antennæ frontal; palpi internal; halteres entirely or partly concealed; wings deflexed.

GENUS DCCC. LIPSE, Latr.

Legs all alike.
Sp. 1. *Tentaculata.* Latr.

Stirps 9. Antennæ frontal, very short; palpi internal; halteres entirely or partly concealed; wings divaricating.

GENUS DCCCI. MELANOPHORA, Latr.

Antennæ contiguous at their base, diverging, last joint lenticular.
Sp. 1. *Rivalis.* Latr.

GENUS DCCCII. METOPIA, Latr.

Antennæ contiguous at their base, diverging, last joint oblong.
Sp. 1. *Leucophthalmus.* Latr.
Inhabits Europe.

GENUS DCCCIII. PHASIA. Latr. Leach. THEREVA, Fabr Walck. Meig. Panz.

Antennæ distant, sub-parallel, last joint subquadrate, with a biarticulate seta. (Body short; abdomen depressed, semicircular; wings large.)
Sp. 1. *Variabilis* Leach.
Musca hemiptera. Linn.
Inhabits Europe.

Stirps 10. Antennæ frontal, as long as the face; palpi internal; halteres entirely or partly concealed; wings divaricating.

GENUS DCCCIV. MUSCA, of authors.

Antennæ with the third joint very much longer than the others; abdomen moderately long, subacuminate.
Sp 1. *Vomitoria.* Latr.
Common blue-bottle fly.
Inhabits Europe.

GENUS DCCCV. OCYPTERYX, Leach. OCYPTERA. Latr. EXORISTA. Meig. ERIOTHRIX, Meig.

Antennæ with their last joint longer than the others; abdomen distinctly annulated, rounded.
Sp. 1. *Lateralis.* Leach.
Inhabits Europe.

GENUS DCCCVI. GYMNOSOMA, Meig. Leach.

Antennæ with their last joint longer than the others; abdomen semicircular, subuniarticulate.
Sp. 1. *Rotundata.* Meig.
Inhabits Europe.

GENUS DCCCVII. ECHINOMYIA, Dumeril, Latr. TACHINA, Meig. Fabr.

Antennæ with their second joint longer than the others; abdomen subglobose, and very bristly.
Sp. 1. *Grossa.* Latr.
Inhabits the European woods.

GENUS DCCCVIII. TACHINA.

Antennæ with their second joint longer than the others; abdomen ovate, rather bristly.
Sp. 1. *Fera.*
Musca fera. Linné.
Inhabits the European woods.

TRIBE XV. OESTRIDES.

The larvæ of all the insects composing the present family reside in the frontal sinuses, under the skin, or in the stomachs, of graminivorous mammalia. Their curious economy has been admirably detailed in the third volume of the *Transactions of the Linnean Society of London*, by Mr Bracy Clark, who has lately republished his Dissertation, under the title, *An Essay on the Bots of Horses and other animals*. London, 1815.

GENUS DCCCIX OESTRUS, of authors.

Wings, with the two exterior hinder cells complete, the other hinder cells terminal. Thorax with its surface unequal. Abdomen with its point deflexed; of the female acuminate. Eyes distant; of the male closer than those of the female.

** Thorax roughish, with elevated points.*

The larvæ of the species of this division of the genus inhabit the frontal sinuses.

Sp. 1. *Ovis. Oestrus ovis.* Clark, Trans. Lin. Soc. iii.

Inhabits the frontal sinuses of the sheep in the larva state; the perfect insect is found on walls and stones in the vicinity of sheep-folds.

*** Thorax with square shining naked spots.*

The larvæ of this section reside beneath the skin of herbivorous mammalia.

Sp. 2. *Bovis.*

Oestrus Bovis. Clark, Trans. Lin. Soc. iii.

The larvæ of this species, named by the peasants Warbles or Wornils, "are found beneath the skin on the backs and loins of oxen, causing tumors as large as pullets' eggs." The perfect insect, or gadfly, is found about the end of summer, and is much dreaded by oxen.

GENUS DCCCX. GASTEROPHILUS, Leach. OESTRUS, of authors.

Wings, with all the hinder cells terminal. Thorax, with its surface smooth. Abdomen, with its extremity inflexed; of the female, very much elongated and attenuated. Eyes, in both sexes, equally distant.

The larvæ of the Gasterophili, as their name imports, inhabit the stomach of herbivorous quadrupeds, and are called bots; the perfect insects bot-flies.

Sp. 1. *Equi.* Leach, Mem. Wern. Nat. Hist. Soc. vol. ii.

Oestrus Bovis. Linné.

Oestrus Equii. Clark, Trans. Lin. Soc. vol. iii.

The larva inhabits the horse.

SECT. II. EPROBOSCIDEA.

The larvæ are nourished within the abdomen of the mother, and, when full grown, are passed in the form of an oviform pupa, covered with the indurated skin of the larva. We have described the species in the second volume of the Memoirs of the Wernerian Natural History Society of Edinburgh.

Stirps 1. Wings, two; the hinder cell only commenced. Thorax anteriorly entire, acuminated.

GENUS DCCCXI. HIPPOBOSCA, of authors.

Ocelli, none.

Sp. 1. *Equina.* Linné.

Inhabits the horse, and is vulgarly called Forester.

Stirps 2. Wings, two; the hinder cells complete. Thorax anteriorly notched for the reception of the head.

** Wings of nearly an equal breadth throughout.*

GENUS DCCCXII. OLFERSIA. FERONIA, Leach.

Ocelli, none.

Sp. 1. *Spinifera.* Leach, Mem. Wern. Soc. vol. ii.

GENUS DCCCXIII. ORNITHOMYIA. Latr. Oliv. Leach.

Ocelli, three, situated in foveolæ.

Sp. 1. *Avicularia.*

Hippobosca Avicularia. Linné.

Inhabits the black grouse and tit pipit.

*** Wings acuminated.*

GENUS DCCCXIV. STENEPTERYX, Leach.

Ocelli, three.

Sp. 1. *Hirundinis.*

Hippobosca hirundinis. Linné.

Inhabits the nests and bodies of the house-swallow.

GENUS DCCCXV. OXYPTERUM, Kirby, MSS. Leach.

Ocelli, none.

Sp. 1. *Kirbyanum.*

Oxypterum Kirbyanum. Leach, *Mem. Wern. Soc.* vol. ii.

Inhabits England.

Stirps 3. Wings, none. Thorax anteriorly notched for the reception of the head.

GENUS DCCCXVI. MELOPHAGUS, Latr. Leach.

Ocelli, none.

Sp. 1. *Ovinus.*

Hippobosca ovina. Linné.

Inhabits the sheep.

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pellucens	758	1
X		
Xylophagus	710	
maculatus	710	1
Z		
Zodion	776	
conopsoides	776	1

INSECTS. See Bee, Crustaceology, Entomology, Physiology, and Zoology.

INSTINCT. See Moral Philosophy.

INSTITUTE, National, *of France*, or, as it is now called, the Institute of France, was established, on the suggestion of Condorcet, in the year 1795, and was opened on the 7th of December of that year, by Benezech, the Minister for the Home Department. It was formed out of the Royal Academy of Sciences, the French Academy, the Academy of Inscriptions and Belles Lettres, and the Academy of Painting and Sculpture, &c. It was re-organized in 1806, during the consulship of Bonaparte, and it again experienced considerable changes in the year 1816, after the second return of the Bourbons.

In order to understand the changes which this distinguished body has recently undergone, we shall first lay before our readers an account of the National Institute as it existed in the time of Bonaparte.

The National Institute consisted of four classes, viz. 1. Class of physical and mathematical sciences. 2. Class of French language and literature. 3. Class of history and foreign literature. 4. Class of the fine arts.

II. The first class shall be formed of the ten sections which at present compose the first class of the institute, with a new section of geography and navigation, and eight foreign associates.

The sections shall be composed and named as follows:

		Members.	Corresponding Members.
Mathematical Sciences.	Geometry	6	6
	Mechanics	6	6
	Astronomy	6	16
	Geography and Navigation	3	8
	General Physics	6	6
Physical Sciences.	Chemistry	6	12
	Mineralogy	6	8
	Botany	6	10
	Rural Economy and the Veterinary Art	6	10
	Anatomy and Zoology	6	10
	Medicine and Surgery	6	8

The first class shall appoint, with the approbation of the First Consul, two perpetual secretaries, one for the mathematical sciences, the other for the physical sciences. The perpetual secretaries shall be members of the class, but shall not form a part of any section.

The first class may elect six of its members from the other classes of the institute.

It may name an hundred correspondents, selected from the learned men of France and foreign countries.

III. The 2d class shall be composed of 40 members.

It is particularly charged with the composition of the dictionary of the French language. It shall examine, with respect to language, the important works of literature, history, and the sciences. The collection of its critical observations shall be published, at least, four times in a year.

It shall name from its own body, and with the approbation of the First Consul, a perpetual secretary, who shall continue to be of the number of the forty members which compose it.

It may elect twelve of its members from the other classes of the institute.

IV. The third class shall be composed of forty members and eight foreign associates.

The object of its researches and labours shall be learned languages; antiquities and monuments; history, and all the moral and political sciences connected with history. It shall particularly apply itself to the enriching of French literature with the works of Greek, Latin, and Oriental authors, which have not yet been translated.

It shall employ itself in the continuation of diplomatic collections.

It shall name from its own body, under the approbation of the First Consul, a perpetual secretary, who shall be of the number of the forty members which compose the class.

It may elect nine of its members from the other classes of the institute.

It may name 60 correspondents, natives or foreigners.

V. The fourth class shall be composed of twenty-eight members and eight foreign associates.

They shall be divided into sections, as follows:

Painting	10 members.
Sculpture	6 ditto.
Architecture . . .	6 ditto.
Engraving . . .	3 ditto.
Musical composition . .	3 ditto.

It shall appoint, with the approbation of the First Consul, a perpetual secretary, who shall be a member of the class, but shall not be a part of a section.

It may elect six of its members from the other classes of the institute.

It may name 36 correspondents, national or foreign.

VI. The foreign associated members shall have a deliberative voice only on subjects of science, literature, and the arts; they shall not form part of any section, nor interfere in any usage.

VII. The present actual national associates of the institute shall form part of the one hundred and ninety-six correspondents attached to the classes of the sciences, belles lettres, and fine arts.

Correspondents may not assume the title of members of the institute.

They shall lose that of correspondent when they shall be domiciliated at Paris.

VIII. Nominations to vacant places shall be made by each class in which the vacancy happens; the persons elected shall be confirmed by the First Consul.

IX. The members of the four classes shall enjoy a reciprocal right to assist at the particular sittings of each class, and may deliver lectures when they are requested.

They shall re-unite four times in a year into one body, to communicate their proceedings.

They shall elect in common the librarian and under librarian of the institute, as well as all those agents who belong to the institute in common.

Each class shall present, for the approbation of the government, the particular statutes and regulations of its internal police.

X. Each class shall hold one public sitting every year, at which the other three shall assist.

XI. The institute shall receive annually from the public treasury 1500 fr. for each of its non-associated members, 6000 fr. for each of its perpetual secretaries; and for its expences, a sum which shall be fixed every year, upon the demand of the institute, and comprised in the estimates of the minister of the interior.

XII. There shall be an administrative committee of the institute, composed of five members, two from the first class, and one from each of the others, named by their respective classes.

This committee shall regulate in the general sittings prescribed by art IX. all that relates to the administration, to the general expences of the institute, and to the division of its funds between the four classes.

Each class shall afterwards regulate the application of the funds assigned to it for its expences, as well as all that concerns the printing and publishing its memoirs.

XIII. The classes shall annually distribute prizes, thus regulated:

The first class, a prize of 3000 francs.

The 2d and 3d class, each a prize of 1500 francs.

The fourth class, grand prizes of painting, sculpture, architecture, and musical composition. Those who gain one of the grand prizes shall be sent to Rome, and maintained at the expence of government.

On the 21st March, 1816, an order was issued by Louis XVIII. for new-modelling the Institute, of which the following is an abstract:

1. The INSTITUTE shall be composed of *four academies*, viz.

The French Academy.
The Royal Academy of Inscriptions and Belles Lettres.
The Royal Academy of Sciences.
The Royal Academy of the Fine Arts.

2. The academies are under the direct and special protection of the king.

3. Every academy shall have an independent regime, and the free disposal of the funds which belong to it.

4. The agency, the secretariat, the library, and the other collections of the Institute, shall remain common to the four academies.

5. The property common to the four academies, and the common funds which belong to them, shall be managed under the authority of the Secretary of State for the Interior, by a commission of eight members, of which two shall be taken from each academy. These commissioners shall be elected annually, and shall be always re-eligible.

6. The property and funds of each academy shall be managed in its name by the boards or commissions, instituted for this purpose.

7. The academies shall hold a common public sitting on the 24th April, the day on which the Bourbons returned to France.

8. The members of each academy may be elected to the three other academies.

9. The FRENCH ACADEMY shall reserve its ancient statutes, with such modifications as may be thought necessary.

10. It shall be composed of *thirty-eight* members.

11. The Academy of Inscriptions and Belles Lettres shall preserve the organization of the actual rules of the third class of the Institute.

12. It shall be composed of thirty-seven members.

13. The Royal Academy of Sciences shall preserve the organization and the distribution into sections of the first class of the Institute.

14. The Royal Academy of the Fine Arts shall preserve the organization and the distribution into sections of the fourth class of the Institute.

15. It shall be composed as follows:

Painting	14 members.
Sculpture	8 members.
Architecture	8 members.
Engraving	4 members.
Musical composition,	6 members.

16 There shall be added to the Royal Academy of Inscriptions and Belles Lettres, and to the Royal Academy of Sciences, a class of free academicians to the number of 10 to each of these two academies.

17. The free academicians shall have no other privilege than that of the right of attendance. They shall enjoy the same rights as the other academicians, and shall be elected according to the usual forms.

18. The ancient honorary members and academicians, both of the Royal Academy of Sciences and of the Royal Academy of Inscription and Belles Lettres, shall be free academicians of the academy to which they belong.

These academicians shall make the necessary elections for completing the number of ten free academicians in each.

19. The Royal Academy of Fine Arts shall likewise have a class of free academicians, of which the number shall be determined by a particular regulation upon the proposition of the academy itself.

20. The Minister of the Interior shall submit to the king for his approbation, the modifications which may be thought necessary in the regulations of the first, third, and fourth classes of the Institute, for adapting the said regulations to the Royal Academy of Sciences, to the Royal Academy of Inscriptions and Belles Lettres, and to the Royal Academy of the Fine Arts.

21. All the decrees and regulations which contain nothing contrary to the regulations of the present ordonnance shall be maintained.

The following is a correct statement of the volumes of memoirs published by the Institute of France:

Number of volumes published from the foundation of the Institute till 1806, by the three classes	16 in 4to.
Number of volumes published from 1806 to 1812.	
Volumes published by the Academy of Sciences	7
Academy of Inscriptions	4
Memoires de Savans Etrangers	2
Systeme Metrique	3
Etat du Science et des Lettres	2
Prix Decennaux	1
Total	35 vols.

The volumes of memoirs for 1813, 1814, 1815, and 1816, have not yet appeared.

INSTITUTION, African, a society for promoting the civilization of Africa, established in London in the spring of 1807. It may be considered as a continuation of the Abolition Society; and owes its origin to a few of the most indefatigable opponents of the slave trade, who were nobly bent upon following up every practicable measure for the utter extirpation of that execrable traffic, and for compensating, by every benefit in their power, the injuries which it had so long entailed on the African continent. It was readily and cordially befriended from the first, by the leading members of that administration, who had accomplished the measure of abolition in parliament; and who, though dispossessed at the time of all official power, were consistently persevering in the prosecution of a cause, which ought ever to have reigned paramount over all party views and feelings. These, however, proved too powerful for a time, for the calls of common humanity and of Christian principle; and the keen political contests which then agitated the kingdom, prevented that concurrence of the abolitionists, which might have been expected in the objects of the institution. Hence it was almost entirely neglected, till the return of more peaceable times, and till the appearance of the first report of its committee in midsummer of 1807 brought its claims more effectually before the public. To that report, generally understood to have been drawn up by Mr. Stephen, we must refer for an able statement of the objects of the institution, and the means proposed to be pursued for their attainment, and content ourselves with extracting the resolutions adopted at the same meeting, as containing the best summary of its general views.

1. That this meeting is deeply impressed with a sense of the enormous wrongs which the natives of Africa have suffered in their intercourse with Europe; and, from a desire to repair those wrongs, as well as from general feelings of benevolence, is anxious to adopt such measures as are best calculated to promote their civilization and happiness.

2. That the approaching cessation of the slave trade, hitherto carried on by Great Britain, America, and Denmark, will, in a considerable degree, remove the barrier which has so long obstructed the natural course of social improvement in Africa; and that the way will be thereby opened for introducing the comforts and arts of a more civilized state of society.

3. That the happiest effects may be reasonably anticipated from diffusing useful knowledge, and exciting industry among the inhabitants of Africa, and from obtaining and circulating throughout this country more ample and authentic information concerning the agricultural and commercial faculties of that vast continent; and that, through the judicious prosecution of these benevolent endeavours, we may ultimately look forward to the establishment, in the room of that traffic, by which Africa has been so long degraded, of a legitimate and far more extended commerce, beneficial alike to the natives of Africa, and to the manufactures of Great Britain and Ireland.

4. That the present period is eminently fitted for prosecuting these benevolent designs; since the suspension during the war of that large share of the slave trade, which has commonly been carried on by France, Spain, and Holland, will, when combined with the effect of the abolition laws of Great Britain, America, and Denmark, produce nearly the entire cessation of that traffic along a line of coast extending between two and three thousand miles in length, and thereby afford a peculiarly favourable opportunity for giving a new direction to the industry and commerce of Africa.

5. That, for these purposes, a Society be immediately formed, to be called "The African Institution."

6. The society, disclaiming all projects of a colonial or commercial nature, and likewise all schemes of religious instruction, (though neither indifferent nor hostile, but rather subservient and friendly, to that important object,) proposed to adopt the following means for promoting the civilization and improvement of Africa.

1. To collect and diffuse throughout this country accurate information respecting the natural productions of

Africa, and in general respecting the agricultural and commercial capacities of the African continent, and the intellectual, moral, and political condition of its inhabitants.

2. To promote the instruction of the Africans in letters and in useful knowledge, and to cultivate a friendly connection with the natives of that continent.

3. To endeavour to enlighten the minds of the Africans with respect to their true interests, and to diffuse information amongst them respecting the means, whereby they may improve the present opportunity of substituting a beneficial commerce in place of the slave trade.

4. To introduce amongst them such of the improvements and useful arts of Europe, as are suited to their condition.

5. To promote the cultivation of the African soil, not only by exciting and directing the industry of the natives, but by furnishing, where it may appear advantageous to do so, useful seeds, and plants, and implements of husbandry.

6. To introduce amongst the inhabitants beneficial medical discoveries.

7. To obtain a knowledge of the principal languages of Africa, and, as has already been found to be practicable, to reduce them to writing, with a view to facilitate the diffusion of information among the natives of that country.

8. To employ suitable agents, and to establish correspondences, as shall appear adviseable; and to encourage and reward individual enterprise and exertion in promoting any of the purposes of the institution."

As a general, rather than particular mean of promoting the whole views of the institution, its members devote their individual attention, and united influence, to the enforcement of the abolition laws, and the exposure of every attempt to evade their efficacy.

Among the foremost of this society's patrons may be mentioned the Duke of Gloucester; who presided as president at its first establishment: and its original committee, which consisted of the following persons, namely, Earls Spencer, Moira, and Easton; Viscounts Howick and Valentia; the Bishops of London, Durham, Bath, Wells, and St David's; Lords Grenville, Ellenborough, Erskine, Holland, Teignmouth, Headley, and Henry Petty; the Chancellor of the Exchequer (Mr. Perceval.) the Right Hon. T. Grenville, G. Canning, J. C. Villiers, Sir J Newport, J. Foster, J. Smith, and N. Vansittart, Sir P. Francis, Sir S. Romilly, General Vyse, Messrs. Bankes, Babbington, Baring, J. H. Browne, Barry, Grant, Huskisson, Lushington, Montague, W. M. Pitt, Roscoe, Sharp, Simeon, R. Thornton, H. Thornton, Whitbread, and Wilberforce, (members of parliament); and Messrs. Bernard, Barclay, Brougham, Clarkson, Gisborne, (Rev.) Martin, Morrit, Macaulay, G. Sharp, W. Smith, Stephen, and Venn (Rev.) Mr. Macaulay undertook, in the interim, and for several years most ably discharged, the laborious office of secretary, in which he has been succeeded by T. Harrison, Esq. The income of the society amounted at the end of 1808 to 4374*l.*, of which 531*l.* arose from annual contributions; and though its funds have subsequently been much augmented by subscriptions and donations, (one of which, to the amount of five hundred guineas, was transmitted anonymously from a member of the Society of Friends,) they have by no means been proportionate to the extent and interest of its objects.

Of its well directed and generally successful proceedings, a very slight sketch only can here be presented; but its reports may be recommended to our readers, as most interesting to the friend of humanity, by the importance of their topics—attractive to the man of taste, by the ability and eloquence with which they are executed—and even amusing to the idler, by the variety and curious nature of their contents. In the course of the first two years of their existence, the institution sent out to Sierra Leone three African youths, instructed by Dr. Bell and Mr. Lancaster; and directed the governor of the settlement to select other young men to be sent to England, for the purpose of being qualified to act as teachers in such branches of knowledge as might be most beneficial in Africa,—particularly to engage proper persons to teach in that country the Arabic and Sowsoo languages: conveyed to various parts of the coast, large quantities of the best kinds of cotton seed, to be distributed among the natives for cultivation, and also a number of machines for cleaning the cotton, with printed directions for its whole culture and management: sent a press, on a new construction, for expressing the oil of the castor nut, with a number of plants of the white mulberry tree, to ascertain the possibility of raising silk in Africa; besides the seeds and plants of other valuable productions, such as the genuine Peruvian bark, camphor, tea-tree, and tobacco: offered premiums for the importation of cotton, wool, rice, and indigo from Africa, and for the growth of coffee in that country; while, at the same time, they exerted their influence with government to procure a modification of the heavy duties on articles from the African coast: counteracted, with considerable effect, the numerous nefarious attempts to infringe the abolition laws, and both by public representations, and the circulation of suitable tracts in French, Dutch, Portuguese, and Spanish, have endeavoured to induce foreign powers to abandon the traffic in slaves. Upon finding that the culture of the mulberry tree had proved successful on the African coast, they transmitted silk worms for raising silk. They have also conveyed to the same country a variety of Indian plants and seeds, such as hemp and flax, teak tree, and that which yields the cajaputta oil. They also sent commissioners to Africa, for the purpose of inquiring into the objects of the society. But their principal and permanent occupation has been, to watch over the execution of the abolition acts, and to engage the same measures to be adopted by other powers. In these views they have accomplished much, particularly in bringing a bill before parliament, which was passed unanimously in both houses, for declaring the slave trade a felonious crime; in preparing the way for establishing in the West Indies a registry of slaves, for the purpose of checking all illicit importation of new negroes, as well as for securing the better treatment of those already in bondage; and in standing forward as the advocates of oppressed Africans, both at home and abroad. "After the universal expression of the public feeling, which we have witnessed," says one of these able advocates, (referring to the petitions presented to parliament in 1814, on the negociations for procuring the abolition of the slave trade by foreign powers,) "it is with surprise and concern we perceive, how very inadequate to the variety and immensity of its objects the funds of this admirable institution still are. Its recent invaluable efforts have nearly exhausted them; and its permanent income falls at present (1815) considerably short of *L.*5 0 *per annum.* This circumstance would undoubtedly be somewhat opprobrious to the British name, and especially to the religious part of the community, if it did not proceed, as we feel confident it does, from ignorance of the real state of the case. It cannot be, that those, who have stood forward so nobly to vindicate the national character from all participation in the guilt of sanctioning either the continuance or the revival of the slave trade, should suffer a society to languish, for want of pecuniary support, on whose vigilance and exertions, we have no hesitation in saying, it mainly depends, not only whether our policy in respect to Africa shall be generally adopted by other nations, but whether our own abolition laws shall be any thing more than a dead letter." See *The Annual Reports of the African Institution*; and the reviews of these Reports in the *Christian Observer* and the *Edinburgh Review*. (*q*)

INSTRUMENTS. See Arithmetic, Astronomy, Barometer, Burning Instruments, Dialling, Drawing Instruments, Goniometer, Graduation, Hygrometry, Kaleidoscope, Micrometer, Microscope, Music, Optics, Surgery, Telescope, Thermometer, and various other articles in our Work.

INSURANCE, or Assurance, in mercantile concerns, is a contract or engagement, by which one party becomes bound, for a specified sum, to insure, during a limited time, the property of another against certain risks to which it is peculiarly exposed.

The party who engages to indemnify for the loss that may be sustained, is called the ***Insurer*** or ***Underwriter***; the compensation paid for the risk, the *premium*; and the document containing the obligation, the *policy*.

Goods insured are said to be *covered*, when not only their value, but the premium and other charges, are insured. The term *average*, of which there are two kinds, is applied to goods insured against sea risk: *General average*, is a proportionable contribution paid by all the proprietors of a ship and cargo, for losses incurred with a view to guard against a total shipwreck; and *particular average*, is a contribution for such losses as may arise from ordinary accidents at sea, and is payable by the proprietors of the articles which suffer the damage. In computing general average for masts, rigging, &c. cut away for the security of the ship and cargo, it is usual to deduct a third of the expence of refitting, as the new articles may in general be considered so much better than the old; but goods thrown overboard are estimated at the value they would have brought at the place of destination. When a ship, cargo, and freight, are fully insured, the underwriters are responsible for general and particular averages. During a period of war, when there is a risk of capture, the insurers commonly stipulate for a certain premium; but agree, in the event of the ship sailing with convoy, and arriving safe, to return so much *per cent.* As the insured is not fully indemnified, in case of a total loss, unless his property be covered, it is inferred that he should only be indemnified for a partial loss in the same proportion; and if his property is not fully insured, he is considered as insurer himself for the part not covered.

Insurance transactions are commonly executed by brokers, whose business it is to extend the policy, and procure the subscriptions of underwriters, who seldom engage for more than *L.*200 on the same vessel. The premium is paid to the broker, who accounts to each underwriter for his proportion, after retaining a suitable allowance for his trouble. The various questions connected with insurance are solved by the rule of proportion, and require no elucidation.

INTAGLIOS. See our article Gems.

INTEGRAL CALCULUS. See Fluxions.

INTEGUMENTS. See Anatomy, *Human*, and Anatomy, *Comparative*.

INTERCOLUMNIATION. See Civil Architecture.

INTEREST, is a certain allowance paid by the borrower to the lenders of money, for the use of it during some specified time. The sum lent is called the ***Principal***; the sum paid by the borrower, the ***Interest***; and both conjoined, the ***Amount***. If interest, after it becomes due, be incorporated with the principal, and interest be afterwards charged on the successive amounts, it gives rise to what is called *Compound Interest*, to distinguish it from simple interest, in which the interest, though foreborne, is charged only on the sum originally lent.

I. *Simple Interest.*

Let p denote the principal, r the interest of *L.*1 for a year, t the number of years the interest is due, and a the amount for the same time; then it is obvious that

$$a = p + p\,r\,t, \text{ or } a = p\,(1 + r\,t),$$

$$p = \frac{a}{1 + r\,t},\; r = \frac{a - p}{p\,t},\; t = \frac{a - p}{p\,r}.$$

Since r is the rate of *L.*1 for a year, $\frac{r}{365}$ will be the rate for a single day; and therefore, if d be the number of days, $\frac{d\,r}{365}$ will be the interest of *L.*1 for the same time. If the rate be 5 *per cent.* or $\frac{1}{20}$, the interest of p pounds, for d days, will become $\frac{\frac{1}{20}\,p\,d}{365}$, or $\frac{p\,d}{7300}$.

The interest of p for any other rate r', will evidently be $\frac{r'}{5} \times \frac{p\,d}{7300}$, or $\frac{2\,r'\,p\,d}{73000}$. Hence we obtain the two following practical rules for computing simple interest.

1\. When the rate is 5 *per cent.* multiply the principal by the number of days, and divide the product by 7300.

2\. When the rate is any other than 5 *per cent.* multiply the principal by twice the rate, and then by the number of days, and divide the product by 73000.

Ex. 1. What is the interest of *L*456 for 85 days, at 5 *per cent.*

$$\text{Interest} = \frac{456 \times 85}{7300} = L5 : 6 : 2\tfrac{1}{4}.$$

Ex. 2. What is the interest of *L.*560 for 240 days, at $4\frac{1}{2}$ *per cent.*

$$\text{Interest} = \frac{560 \times 2 \times 4\frac{1}{2} \times 240}{73000} = L16 : 11 : 4\tfrac{3}{4}.$$

When interest is calculated on a debt, discharged by partial payments, it is reckoned on the several sums due, from the time of the preceding to that of the last payment. This is done most conveniently by multiplying the original sum, and each successive balance, in order, by the number of days intervening between the times of payment, and then dividing the amount of the several products by 7300. The quotient is the interest at 5 *per cent.*

Ex. A bill of *L.*625, due March 2, was paid up in the following manner: April 10, *L.*182; June 8, *L.*250; August 21, *L.*96; and the balance, Dec. 5; what interest was due at 5 *per cent.*

$$\begin{array}{lllrcrcr}
 & & & L. & & \text{Days} & & \text{Products.} \\
\text{March 2} & . & \text{Due} & 625 & \times & 39 & = & 24375 \\
\text{April 10} & . & \text{Paid} & 182 & & & & \\
\cline{4-4}
 & & \text{Due} & 443 & \times & 28 & = & 12404 \\
\text{June 8} & . & \text{Paid} & 250 & & & & \\
\cline{4-4}
 & & \text{Due} & 193 & \times & 74 & = & 14282 \\
\text{Aug. 21} & . & \text{Paid} & 96 & & & & \\
\cline{4-4}
 & & \text{Due} & 97 & \times & 106 & = & 10282 \\
\text{Dec. 5} & . & \text{Paid} & 97 & & & & \\
\cline{8-8}
 & & & & & & 7300) & 61343 \\
\cline{8-8}
 & & & & & & & L\,8 : 8 : 0\tfrac{3}{4}.
\end{array}$$

In computing interest on accounts current, or cash accounts, the sums on the debtor and creditor side of the account are added and subtracted, in the order of their dates as they fall due; the several balances are then multiplied by the days as formerly, and if the balance be sometimes due to one party, and sometimes to the other, the products are extended in separate columns.

II. *Compound Interest.*

Let the amount of *L.*1 for a year, or 1 + *r*, be represented by E; then, since *L.*1 is to its amount for a year, as any other sum is to its amount for the same time.

$1 : R :: R : R^2$, the amount of *L.*1 for 2 years.

Also $1 : R^2 :: R^2 : R^3$, ... 3 years.

Hence, it is obvious that R^t is the amount of *L.*1 for *t* years. If the amount of P pounds, for the same time, be denoted by A, we obtain

$$A = PR^t,\ P = \frac{A}{R^t},$$

$$t = \frac{\text{Log. } A - \text{Log. } P}{\text{Log. } R},\ R = \left(\frac{A}{P}\right)_{t}.$$

The quantity P, or the sum which, laid out at compound interest during *t* years, would amount to A, is sometimes called the *present value* of A. Thus, R^t being the amount of *L.*1 for *t* years, *L.*1 is the present value of R^t for the same time. Since it has been already shewn that $P = \frac{A}{R^t}$, if A be unity, or *L.*1, we obtain

$$P = \frac{1}{R^t}.$$

Hence the present value of *L.*1 for any time *t*, is the reciprocal of the amount of *L.*1 for the same time.

Calculations connected with compound interest are usually performed by help of tables, containing the amount and present value of *L.*1 for the requisite number of years. (A)

INTERMITTING, or RECIPROCATING SPRINGS. See HYDRODYNAMICS, vol. xi. p. 486.

INTERPOLATION is a branch of mathematical analysis, that treats of the methods by which, when a series of quantities succeeding each other, and formed all according to some determinate law, are given, others subject to the same law may be interposed between them.

Thus, to take a simple instance, the given quantities may be the cube roots of the numbers 2, 3, 5, 6, 7, and it may be required to find from these, by *interpolation*, the cube root of the number 4. Again, the given quantities may be the logarithms of any series of numbers, 2, 4, 6, 8, 10, &c., and it may be required to find the logarithms of the intermediate numbers 3, 5, 7, 9, &c. Or the given quantities may be the place of some celestial phenomenon, a comet, for instance, at midnight, on four successive days, to find its place at any proposed time on any one of these days. Or, taking one example more, having given the expansive force of steam at certain temperatures; by interpolation, its expansive force at any temperatures intermediate between these, or a little greater or less, may be found.

From these examples, it will easily be understood that the theory of interpolation must be of great practical importance, not only in pure mathematics, but also in astronomy and every branch of physics, in which the result of a series of experiments can be expressed by numbers.

The method of interpolation is altogether a branch of modern mathematics. It appears to have been for the first time employed by Henry Briggs, the ingenious improver of logarithms, in the construction of these numbers, (Hutton's *Math. Tables*, Introd. p. 69;) this was before the year 1624. Dr. Wallis, by interpolation, and a most happy application of the method of induction, found a remarkable expression for the area of a circle, (see his *Arithmetica Infinitorum*, 1656), and soon afterwards, Gabriel Mouton, an astronomer of Lyons, applied the theory to the construction of astronomical tables; he had, however, proposed to himself a problem which he could not resolve, and he gives the honour of the solution to his friend Regnault. Mouton's labours appeared in a book of observations on the diameters of the sun and moon, published in 1670.

The first general solution of the problem of interpolation was given by Sir Isaac Newton, but without demonstration, in his *Principia*, lib. iii. lem. 5. He afterwards gave a solution, with a demonstration, in his *Methodus Differentialis*, a small tract, which was published, along with others, by W. Jones, the author of *Synopsis Palmariorum Matheseos*. The problem has since been discussed by every writer on the *theory* of differences, and series, and particularly by Mr. J. Stirling in his *Methodus Differentialis, sive Tractatus de Summatione et Interpolatione Serierum Infinitorum*, published in 1753. The principal works on this branch of mathematics, we believe, are contained in the following list.

Briggs, *Arithmetica Logarithmica*, Lond. 1624.

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THE THEORY OF INTERPOLATION.

Let x and y be two variable quantities, having some determinate relation to each other, so that y may be what is called a *function* of x. (See FLUXIONS, Art. 2. also the word FUNCTION.) If the form of the function be known, we can find the value of y, corresponding to any value of x whatever. For example, let the relation between x and y be such, that

$$y = 3 + x + 2x^2;$$

then, when $x = 0$, we have $y = 3$, when $x = 1$, $y = 6$, when $x = 2$, $y = 13$, and so on, as is shewn in the two following sets of corresponding values,

$$x = 0,\ 1,\ 2,\ 3,\ 4,\ 5,\ \&c.$$
$$y = 3,\ 6,\ 13,\ 24,\ 39,\ 58,\ \&c.$$

The values of y being thus formed all according to the same law, they constitute a regular *series*, and the corresponding values of x are the *indices* of the terms, that is, they shew their place, or distance from the beginning of the series. When a series is formed in this manner, by substituting successive values of x in y, some function of x, that function is called the *general term* of the series, it is analogous to the equation of a curve, and it serves to characterize the series, and to distinguish it from all others. Thus, as from the general term $y = \frac{(x+1)(x+2)}{2}$, we get these corresponding values of x and y,

$$x = 0,\ 1,\ 2,\ 3,\ 4,$$
$$y = 1,\ 3,\ 6,\ 10,\ 15,\ \&c.$$

so, on the other hand, when this last series is put under this form

$$\frac{1.2}{2},\ \frac{2.3}{2},\ \frac{3.4}{2},\ \frac{4.5}{2},\ \frac{5.6}{2},\ \&c.$$

we may infer that its general term is $\frac{(x+1)(x+2)}{2}$; and that it can be no other expression.

It is easy to conceive that between every two adjoining terms of a series formed in this way, there may be any number of others interposed, forming, upon the whole, a series of the same nature as before, but consisting of more terms. Thus, in the series 1, 3, 6, 10, &c. of which the general term is $\frac{(x+1)(x+2)}{2}$, we may interpose three terms between every adjoining two, by making $x = \frac{1}{4}, \frac{2}{4}, \frac{3}{4}$, also $= 1\frac{1}{4}, 1\frac{2}{4}, 1\frac{3}{4}$, &c. The terms of the series and their indices will then be

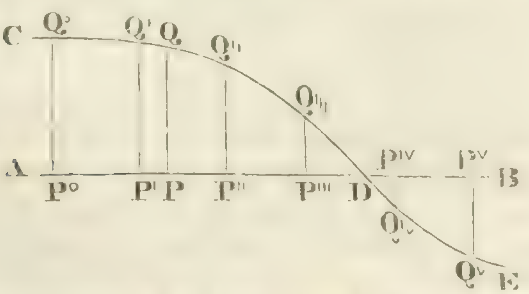
$$x = 0,\ \tfrac{1}{4},\ \tfrac{2}{4},\ \tfrac{3}{4},\ 1,\ 1\tfrac{1}{4},\ \&c.$$
$$y = 1,\ \tfrac{45}{32},\ \tfrac{15}{8},\ \tfrac{77}{32},\ 3,\ \tfrac{117}{32},\ \&c.$$

When new terms are thus interposed between the terms of a given series, they are said to be *interpolated.*

If the law of formation, or general term of a series be given, there is no difficulty in interpolating any term, of which the index is given: however, in the application of this theory, it for the most part happens, that the general term is unknown, and only some particular values of it are given, by which it is to be found, or at least some approximation to it.

As the general term and its index are perfectly analogous to the ordinate and abscissa of a curve, the analytical problem to be resolved is manifestly the same as this geometrical one: *Having given a determinate number of ordinates and the corresponding abscissæ, to find the equation of the curve; or to describe a curve through a certain number of given points.* It was under this form that Newton first proposed and resolved the problem.

Let P° Q°, P′ Q′, P″ Q″, P‴ Q‴, P^iv Q^iv, P^v Q^v, &c. (in the annexed Figure,) be the given ordinates, or particular values of the general term y, which may stand either at equal or unequal distances from each other, the positive values P° Q°, P′ Q′, being supposed to lie on one side of the axis AB, and the negative values P^iv Q^iv, P^v Q^v, &c. on the other; and let AP°, AP′, &c. be the given corresponding abscissæ, or particular values of the variable x. Also let PQ $= y$ be any indefinite ordinate, or term to be interpolated, and AP $= x$ the corresponding abscissa, or variable index of that term, and, lastly, let CDE be the curve, passing through the tops of all the ordinates. The thing to be done is, to express y in terms of x, or to find the nature of the curve.



If there be no *datum*, in addition to the condition, that the curve pass through the given points Q°, Q′, Q, &c. the problem is manifestly indeterminate, because by varying the species, any number of curves may be conceived to pass through the given points. However, in the applications, the ordinates are in general near each other, the distances between them not very unequal, and the curve is known to have no considerable inflection between adjacent ordinates. Under these circumstances, we may assume that between P′, Q′, and P″, Q″, any two adjacent given ordinates, the indefinite ordinate $y =$ PQ may be expresed by a series composed of the powers of the abscissa P′ P, thus,

$$y = a + b \times (\mathrm{P}'\,\mathrm{P}) + c \times (\mathrm{P}'\,\mathrm{P})^2 + d \times (\mathrm{P}'\,\mathrm{P})^3 + \&c.$$

the quantities a, b, c, &c. being supposed constant; and as the series will converge, because P′ P is small, a few terms at the beginning will be a near enough approximation to its value: Or, since AP $= x$ is equal to AP′ + P′ P, therefore, P′P $= x -$ AP′: Substituting now this last quantity instead of P′ P, and remarking that AP′ is a given quantity, by hypothesis, we shall have

$$y = A + B\,x + C\,x^2 + D\,x^3 + \&c.$$

A, B, C, &c. being put for constant quantities: Curves having their equation of this form are called *parabolic*, from its analogy with the equation of the common parabola.

This expression for the ordinate y in the geometrical problem is considered, analytically, the *general term* of the series to be interpolated, or at least an approximation to it, which will be sufficiently near in the ordinary cases to which interpolation is applied.

The form of the expression for the ordinate or general term being settled, we are now to find the constant co-efficients, A, B, C, D, &c.

Let the given terms, or values of y, which in the curve are represented by the ordinates P° Q°, P′ Q′, P″ Q″, &c.: be denoted by the symbols

$$y_0,\ y_1,\ y_2,\ y_3,\ y_4,\ \&c.$$

and their indices, or the corresponding values of x, which in the curve are the abscissæ AP°, AP′, AP″, &c. by

$$x_0,\ x_1,\ x_2,\ x_3,\ x_4,\ \&c.$$

since the general equation

$$y = A + B\,x + C\,x^2 + D\,x^3, + \&c.$$

holds true for every pair of corresponding values of y and x, we have, by substituting in it y_0, and x_0, then y_1 and x_1, &c.

$$y_0 = A + B\,x_0 + C\,x_0^2 + D\,x_0^3 + \&c.$$
$$y_1 = A + B\,x_1 + C\,x_1^2 + D\,x_1^3 + \&c.$$
$$y_2 = A + B\,x_2 + C\,x_2^2 + D\,x_2^3 + \&c.$$
$$y_3 = A + B\,x_3 + C\,x_3^2 + D\,x_3^3 + \&c.$$

The number of these equations must be equal to the number of constant, but indeterminate co-efficients A, B, C, D, &c. and as only the simple powers of these enter the equations, they may be all determined as follows.

By subtracting successively the first equation from the second, then the second from the third, and so on; and afterwards dividing the respective results by $x_1 - x_0$, $x_2 - x_1$, $x_3 - x_2$, &c. we obtain

$$\frac{y_1 - y_0}{x_1 - x_0} = B + C(x_1 + x_0) + D(x_1^2 + x_1\,x_0 + x_0^2) + \&c.$$
$$\frac{y_2 - y_1}{x_2 - x_1} = B + C(x_2 + x_1) + D(x_2^2 + x_2\,x_1 + x_1^2) + \&c$$
$$\frac{y_3 - y_2}{x_3 - x_2} = B + C(x_3 + x_2) + D(x_3^2 + x_3\,x_2 + x_2^2) + \&c$$

Putting now, in order to abridge,

$$\frac{y_1-y_0}{x_1-x_0}=Y_0\ \frac{y_2-y_1}{x_2-x_1}=Y_1, \text{ \&c.}$$

we have these equations

$$\begin{array}{l} Y_0=B+C(x_1+x_0)+D(x_1^2+x_1\,x_0+x_0^2)+\text{ \&c.} \\ Y_1=B+C(x_2+x_1)+D(x_2^2+x_2\,x_1+x_1^2)+\text{ \&c.} \\ Y_2=B+C(x_3+x_2)+D(x_3^2+x_3\,x_2+x_2^2)+\text{ \&c.} \end{array}$$

Subtracting now Y_0 from Y_1, Y_1 from Y_2, and so on, and putting

$$\frac{Y_1-Y_0}{x_2-x_0}=Y_0', \frac{Y_2-Y_1}{x_3-x_1}=Y_1'', \text{ \&c.}$$

we find,

$$\begin{array}{l} Y'_0=C+D(x_2+x_1+x_0)+\text{ \&c.} \\ Y'_1=C+D(x_3+x_2+x_1)+\text{ \&c.} \end{array}$$

Hence again we find

$$Y'_1-Y'_0=D(x_3-x_0)+\text{ \&c.}$$

and putting $\frac{Y'_1-Y'_0}{x_3-x_0}=Y''_0$, we have $Y''_0=D+$ &c.

If, for the sake of distinct ideas, we suppose the function y to consist of four terms only, the operation will terminate with this last equation. Taking now the value of D, and returning to those of C, B, A, by means of the expressions for Y_0' Y_0, and y, we find

$$\begin{array}{l} D=Y_0'', \\ C=Y_0'-Y_0''(x_2+x_1+x_0) \\ B=Y_0-Y_0'(x_1+x_0)+Y_0''(x_2x_1+x_2x_0+x_1x_0) \\ A=y_0-Y_0x_0+Y_0'x_1x_0-Y_0''x_2x_1x_0. \end{array}$$

These expressions being substituted in the value of y, we get

$$y=y_0+Y_0(x-x_0)+Y_0'(x_2-(x_1+x_0)x+x_1x_0) \\ +Y_0''\left\{\begin{array}{l} x_3-(x_2+x_1+x_0)x_2 \\ +(x_2x_1+x_2x_0+x_1x_0)x-x_0x_1x_2 \end{array}\right\}$$

It is easy to see that the co-efficients of Y_0. Y_0', Y_0'' &c. may be decomposed into simple factors, and this being done, whatever be the number of ordinates, the general term or expression for y may be put under this very simple form:

(1)

$$\begin{array}{l} y=y_0+Y_0(x-x_0) \\ \quad +Y_0'(x-x_0)(x-x_1) \\ \quad +Y_0''(x-x_0)(x-x_1)(x-x_2) \\ \quad +Y_0'''(x-x_0)(x-x_1)(x-x_2)(x-x_3) \\ \quad +\text{ \&c.} \end{array}$$

The law of the series being evident, and, in this expression,

$$Y_0=\frac{y_1-y_0}{x_1-x_0},\ Y_1=\frac{y_2-y_1}{x_2-x_1},\ Y_2=\frac{y_3-y_2}{x_3-x_2},$$

$$Y_3=\frac{y_4-y_3}{x_4-x_3}, \text{ \&c.}$$

$$Y_0'=\frac{Y_1-Y_0}{x_2-x_0},\ Y_1'=\frac{Y_2-Y_1}{x_3-x_1},\ Y_2'=\frac{Y_3-Y_2}{x_4-x_2}, \text{ \&c.}$$

$$Y_0''=\frac{Y_1'-Y_0'}{x_3-x_0},\ Y_1''=\frac{Y_2'-Y_1'}{x_4-x_1}, \text{ \&c.}$$

$$Y_0'''=\frac{Y_1''-Y_0''}{x_4-x_0}, \text{ \&c.}$$

This formula resolves the most general case of the problem.

The general expression we have found for y admits of another very elegant form, due to Lagrange, and which has the advantage of being well adapted to logarithmic calculation. If, in the expression for Y_0' we substitute the values of Y_1 and Y_0, we get

$$Y_0'=\frac{y_2(x_1-x_0)-y_1(x_2-x_0)+y_0(x_2-x_1)}{(x_1-x_0)(x_2-x_0)(x_2-x_1)}$$

which, by putting α, β, γ, for the co-efficients of y_0, y_1, and y_2, takes the form

$$\alpha y_0+\beta y_1+\gamma y_2.$$

In like manner Y'_1, Y_2', &c. are found to be of the form

$$\alpha' y+\beta' y_2+\gamma y_3,\ \alpha'' y_2+\beta'' y+\gamma'' y_4, \text{ \&c.}$$

Again, if these results be put in the expression for Y_0'', it will take the form

$$\alpha y_0+\beta y_1+\gamma y_2+\delta y_3,$$

and so on, α, β, γ, δ, &c. being put generally for certain co-efficients, independent of y_0, y_1, y_2, &c. and consisting of various combinations of x_0, x_1, &c. If, now, these values be written for Y_0, Y_0', &c. in the general expression for y, it will take the form

$$y=ay_0+by_1+cy_2+\ \ldots\ +ky_{n-1},$$

where a, b, c, are co-efficients depending on the quantities x_0, x_1, x_2 .... x_{n-1}, x, and entirely independent on y_1, y_2, &c. The values of a, b, c, &c. may be easily determined for any particular case, by following the above process of substitution; but they may also be discovered, as it were, by inspection, if we recollect that, when the indefinite abscissa x, by increasing gradually from *Zero* (or 0) becomes x_1, then the indefinite ordinate y becomes y_1. In this case, all the terms after the first ought to vanish; so that $a=1$, $b=0$, $c=0$, ... $k=0$. But the quantities b, c, d, &c. can only vanish by reason of some common factor becoming $=0$. Now, we know that, in this particular case, $x-x_0=0$; therefore $x-x_0$ must be a factor of all the co-efficients, except a. In like manner, it will appear that $x-x$ must be a factor of all the co efficients, except b; also, that $x-x_2$ must be a factor of all, except c, and so on. This putting A to denote some constant quantity, we must have

$$a=\text{A}\times(x-x_1)(x-x_2)\ \ldots\ (x-x_{n-1});$$

and supposing that x becomes x_0, so that $a=1$,

$$1=\text{A}\times(x_0-x_1)(x_0-x_2)\ \ldots\ (x_0-x_{n-1}):$$

and hence

$$\text{A}=\frac{1}{(x_0-x_1)(x_0-x_2)\ \ldots\ (x_0-x_{n-1})},$$

and,

$$a=\frac{(x-x_1)(x_0-x_2)\ \ldots\ (x-x_{n-1})}{(x_0-x_1)(x_0-x_2)\ \ldots\ (x_0-x_{n-1})}.$$

in like manner,

$$b=\frac{(x-x_0)(x-x_2)\ \ldots\ (x-x_{n-1})}{(x_1-x_0)(x_1-x_2)\ \ldots\ (x-x_{n-1})}, \text{ \&c.}$$

for none of the co-efficients can contain any power of x higher than $n-1$. Substituting, therefore, these values, we get

(2)

$$\begin{array}{l} y=\dfrac{(x-x_1)(x-x_2)\ \ldots\ (x-x_{n-1})}{(x_0-x_1)(x_0-x_2)\ \ldots\ (x_0-x_{n-1})}y. \\ \quad +\dfrac{(x-x_0)(x-x_2)\ \ldots\ (x-x_{n-1})}{(x_1-x_0)(x_1-x_2)\ \ldots\ (x_2-x_{n-1})}y_1 \\ \quad +\text{ \&c.} \end{array}$$

each term of which may be easily calculated by means of logarithms.

We have now resolved the problem in its most general form, and have found two different expressions for the indefinite ordinate y; it is, however, desirable when the nature of the case will admit, to have the ordinates, or particular values of y, at equal distances, and then the differences x_1-x_0, x_2-x_1, x_0-x_1, &c. are all equal. In this case, let y_1-y_0, y_2-y_1, &c. the differences of y_0, y_1, y_2, y_3, y_4, &c. be taken in their order, and then the difference of each of these differences, and so on, as in the adjoining table, where α° is the difference between y_0, and y_1, α_1, the difference between y_1 and y_2, and so on; and, similarly, β_0 is the difference between α_0 and α_1, and γ_0 the difference between β_0 and β_1, δ_0 the difference between γ_0 and γ_1, &c. If we now put h for the equal differences x_1-x_0, x_2-x_1, &c. it is evident that

$$\begin{array}{ccccccccc}
y_0 & & y_1 & & y_2 & & y_3 & & y_4, \text{ \&c.} \\
& \alpha_0 & & \alpha_1 & & \alpha_2 & & \alpha_3 & \\
& & \beta_0 & & \beta_1 & & \beta_2 & & \\
& & & \gamma_0 & & \gamma_1 & & & \\
& & & & \delta_0 & & & &
\end{array}$$

$$Y^\circ=\frac{\alpha^\circ}{h},\ Y_1=\frac{\alpha_1}{h},\ Y_2=\frac{\alpha_2}{h},\ Y_2=\frac{\alpha_3}{h},\text{ \&c.}$$

$$Y'_0=\frac{\beta_0}{2h_2},\ Y'_1=\frac{\beta_1}{2h^2},\ Y'_2=\frac{\beta_2}{2h_2},\text{ \&c.}$$

$$Y''_0=\frac{\gamma_0}{2.3h^3},\ Y''_1=\frac{\gamma_1}{2.3h^3},\text{ \&c.}$$

$$Y'''_0=\frac{\delta_0}{2.3.4h^4},\text{ \&c.}$$

these values of Y_0, Y'_0, Y''_0, Y'''_0, &c. being substituted in formula (1), it becomes

$$y=y_0+\frac{x-x_0}{h}\alpha_0+\frac{(x-x_0)(x-x_1)}{1\cdot 2h_2}\beta^\circ$$
$$+\frac{(x-x_0)(x-x_1)(x-x_2)}{1.2.3h_3}\gamma_0+\text{ \&c.}$$

here the law of continuation is evident.

If we suppose the abscissa x to begin at P°, in the above figure, the bottom of P° Q°, the first ordinate, then $x_0=o$, $x_1=h$, $x_2=2h$, $x_3=3h$, &c.; and the last expression may be put under this form,

$$y=y_0+\frac{1}{1}.\frac{x}{h}\alpha_0+\frac{1}{1.2}.\frac{x}{h}\left(\frac{x}{h}-1.\right)\beta_0$$
$$+\frac{1}{1.2.3}.\frac{x}{h}\left(\frac{x}{h}-1\right)\left(\frac{x}{h}-2\right)\gamma_0$$
$$+\frac{1}{1.2.3.4}\frac{x}{h}\left(\frac{x}{h}-1\right)\left(\frac{x}{h}-2\right)\left(\frac{x}{h}-3\right)\delta_0+\text{ \&c.}$$

We have hitherto employed only the notation of the Elements of Algebra; but there is one particularly well suited to this branch of analysis, which is in common use, when the quantities which enter into an investigation are the successive differences of the terms of a series.

To understand the nature of this notation, let u be some variable quantity, and u_1, u_2, u_3, a series of consecutive values, which it acquires, either by varying itself, or else, in consequence of a change in the values of some variable quantity on which it depends: (For instance, u may be the abscissa of a curve, or else the ordinate.) Then u_1-u is expressed by the symbole Δu, the Greek letter Δ being prefixed, not as a co-efficient, but as a characteristic, to denote the difference between two consecutive values of the variable u. In like manner,

$$u_2-u_1=\Delta u_1$$
$$u_3-u_2=\Delta u\ ,$$

and in general,

$$u_n-u_{n-1}=\Delta u_{n-1}.$$

If the function u vary by equal increments, the differences Δu, Δu_1, Δu_2, &c. will be all equal; but if it does not, these constitute a new series of quantities, the differences of which may be expressed by the same notation, thus,

$$\Delta u_1-\Delta u=\Delta\,\Delta u=\Delta^2 u$$
$$\Delta u_2-\Delta n_1=\Delta\cdot\Delta u_1=\Delta_2 u_1$$
$$.\ .\ .\ .\ .\ .$$
$$\Lambda u_n-\Delta u_{n-1}=\Delta\,\Delta u_{n-1}=\Delta^2 u_{n-1};$$

and here the figure placed over the Δ is to be understood, not as the index of a second power, but as indicating a term of a *second order of differences*, originating from the variable function u.

In like manner, by taking the differences between the terms of the second order of differences, a *third order* is formed, which are expressed thus,

$$\Delta^2 u_1-\Delta^2 u=\Delta^3 u,$$
$$\Delta^2 u_2-\Delta^7 u_1=\Delta^3 u_z,$$
$$.\ .\ .\ .\ .\ .$$
$$\Delta^2 u_n-\Delta^2 u_{n-1}=\Delta^3 u_{n-1},$$

and so on, to differences of a *fourth* and higher *orders.*

By attending to the manner in which the quantities

$$\alpha_0,\ \alpha_1,\ \alpha_2,\ \alpha_3,\text{ \&c.}$$
$$\beta_0,\ \beta_1,\ \beta_2,\text{ \&c.}$$
$$\gamma_0,\ \gamma_1,\text{ \&c.}$$
$$\delta_0,\text{ \&c.}$$

have been formed from the series

$$y_0\ y_1\ y_2\ y_3\ y_4,\text{ \&c.}$$

the successive values of the function y, it will immediately appear that

$$\alpha_0=\Delta y_0,\ \alpha_1=\Delta y_1,\ \alpha_2=\Delta y_2,\ \alpha_3=\Delta y_3,\text{ \&c.}$$
$$\beta_0=\Delta^2 y_0,\ \beta_1=\Delta^2 y^1,\ \beta_2=\Delta^2 y_2,\text{ \&c.}$$
$$\gamma_0=\Delta^3 y_0\ \gamma_1=\Delta^3 y_1,\text{ \&c.}$$
$$\delta_0=\Delta^4 y_0,\text{ \&c.}$$

so that, by employing the notation of differences to the last general expression in both its forms, we shall have

(3)

$$y=y_0+\frac{x-x_0}{1.h}\Delta y_0+\frac{(x-x_0)(x-x_1)}{1.2h^2}\Delta^2 y_0$$
$$+\frac{(x-x_0)(x-x_1)(x-x_2)}{1.2.3h^3}\Delta^3 y_0+\text{ \&c.}$$

also, supposing the abscissa to begin at the bottom of the first ordinate,

(4)

$$y=y_0+\frac{1}{1}.\frac{x}{h}\Delta y_0+\frac{1}{1.2}.\frac{x}{h}\left(\frac{x}{h}-1\right)\Delta^2 y_0$$
$$+\frac{1}{1.2\,3}.\frac{x}{h}\left(\frac{x}{h}-1\right)\left(\frac{x}{h}-2\right)\Delta^3 y_0$$
$$+\frac{1}{1.2.3.4}.\frac{x}{h}\left(\frac{x}{h}-1\right)\left(\frac{x}{h}-2\right)\left(\frac{x}{h}-3\right)\Delta^4 y_0+\text{ \&c.}$$

The law of this series is evident, its terms being manifestly the first of the successive orders of differences multiplied by the co-efficients of a binomial raised to the power $\frac{x}{h}$.

There is another form under which this expression may be put, which is at once concise and elegant. The symbol Δy_0 having been used to denote y_1-y_0, the difference between two successive values of y, let us now put $\overset{\prime}{\Delta} y_0$ to denote $y-y_0$, which is the whole increment that the function y receives by changing from y_0, its first particular value, to its present magnitude. The foregoing expression may now be put under the form

$$1+\overset{\prime}{\Delta} y_{o}=(1+\Delta y^{\circ})^{\frac{x}{h}} \quad . \quad . \quad . \quad . \qquad (5)$$

observing that in the development of the second member by the binomial theorem, we must transfer the exponents of the powers of the quantity Δy_{o} to characteristic Δ; that is, we must write $\Delta^{2} y_{o}$ for $(\Delta y_{o})^{2}$, and $\Delta^{3} y_{o}$ for $(\Delta y_{o})^{3}$, and so on.

Application of the Theory.

We shall give some examples of the application of the theory of interpolation.

Ex. 1. Let it be required to find the common logarithm of 3.1415926536, by means of a table containing the logarithms of numbers from 1 to 1000 to 10 decimals.

In this case, we may regard the numbers as the successive values of the abscissa x, and their logarithms, as the corresponding values of the ordinate y. If we take

$$x_{0}=3.14,\ x_{1}=3\ 15,\ x_{2}=3.16,\ x_{3}=3.17,\ x_{4}=3.18,$$

we shall have the following corresponding values of y, and their differences:

Particular Values of y.	1st Diff.	2d Diff.	3d Diff.	4th Diff.
$y_0=0.4969296481$				
	13809057			
$y_1=0.4983105538$		—43769		
	13765288		+277	
$y_2=0.4996870826$		—43492		—3
	13721796		+274	
$y_3=0.5010592622$		—43218		
	13678578			
$y_4=0.5024271200$				

Here it appears, that the differences of the successive orders are alternately positive and negative; and that

$$\Delta y_{0}=+0.0013809057$$
$$\Delta^{2} y_{0}=-0.0000043769$$
$$\Delta^{3} y_{0}=+0.0000000277$$
$$\Delta^{4} y_{0}=-0.0000000003$$

We have also $x = 3.1415926536$

$$x-x_{0}= 0.0015926536$$
$$x-x_{1}=-0.0084073464$$
$$x-x_{2}=-0.0184073464$$
$$x-x_{3}=-0.0284073464$$
$$x_{1}-x_{0}=h = 0.01$$

These values being substituted in the formula,

$$y=y_{0}+\frac{x-x_{0}}{1.h}\Delta y_{0}+\frac{(x-x_{0})(x-x)}{1.2h^{2}}\Delta^{2} y_{0}$$
$$+\frac{(x-x_{0})(x-x_{1})(x-x_{2})}{1.2.3\,h^{3}}\Delta^{3} y_{0}+\&c.$$

it will be found, after executing the arithmetical operations, that

$$y=\log.\ 3.14152926536=0.4971498726.$$

This is not the easiest way of finding the logarithm of a number consisting of a great many figures; but it serves very well as an example of the *interpolation* of a term in a series.

Ex. 2. Let it be required to find the moon's longitude, Nov. 18, 1817, at $16^{h.}\ 22^{m.}\ 16^{s.}$, having given, from the Nautical Almanac,

1817.	Moon's Longitude.
Nov. 18, Noon	$11^{s.}\ 26^{\circ}\ 52'\ 0''$
Midnight	0 2 57 11
19, Noon	0 8 59 32
Midnight	0 14 59 28

Questions of this nature continually occur in practical astronomy. The tables give the calculated places of a phenomenon at equal intervals, and from these its place at some intermediate instant is to be found. From our general expression, (4,) the rule for four calculated places is this:

Call $y_{0}, y_{1}, y_{2}, y_{3}$, four succeeding given places of the phenomenon at equal intervals of time, and h the common interval; put x for any indefinite intermediate time, reckoned from the instant for which the first place is given, and y for the corresponding place of the phenomenon; then

$$y=y_{o}+\frac{1}{1}\frac{x}{h}\Delta y_{o}+\frac{1}{1.\,2.}\frac{x}{h}\left(\frac{x}{h}-1\right)\Delta^{2} y_{o}$$
$$+\frac{1}{1.2.3}.\frac{x}{h}\left(\frac{x}{h}-1\right)\left(\frac{x}{h}-1\right)\Delta^{3} y_{o}.$$

In the present example, $h=12$ hours, and $x=16^{h.}\ 22^{m.}\ 16^{s.}$, hence

$$\frac{x}{h}=1.36426,\ \frac{x}{h}-1=.36426,\ \frac{x}{h}-2=-.63574.$$

The particular values of y and their differences, are

	1st Diff.	2d Diff.	3d Diff
$y_0=11^{s.}\ 26^{\circ}\ 52'\ 0''$			
	21911″		
$y_1=$ 0 2 57 11		—170″	
	21741		+25
$y_2=$ 0 8 59 32		—145	
	21596		
$y_3=$ 0 14 59 28			

Hence it appears, that

$$\Delta y_{o}=+21911,\ \Delta^{2} y_{o}=-170,\ \Delta^{3} y=+25.$$

The first term of the value of y, is $11^{s.}\ 26^{\circ}\ 52'\ 0''$

the second, +29892″

the third, —42.4″

the fourth, — 1.3

—44″

29848 = 0 8 17 28

Moon's Long. Nov. $18^{d.}\ 16^{h.}\ 22^{m.}\ 16^{s.}$ is 0 5 9 28

Ex. 3. The calculated distances of the moon's centre from the star Aldebaran, are

1817. Nov. 1.	Noon	53° 20′ 16″	
	Midnight	59 33 47	
Nov. 2.	Noon	65 52 58	
	Midnight	72 18 10	

Find, by interpolation, the distances at the IIId, VIth, and IXth hour of the first interval.

As in the last example, let $y_{0}, y_{1}, y_{2}, y_{3}$, denote the given distances, and y the required distance at each interval, then in all cases $h=12$, and at the IIId hour $x=3$; therefore, in this case, $\frac{x}{h}=\frac{1}{4}$; and by the formula put down in the last example,

$$y=y_{0}+\frac{1}{4}\Delta y_{o}-\frac{3}{32}\Delta^{2} y_{o}+\frac{7}{128}\Delta^{3} y_{o}.$$

In like manner for the VIth hour, we have $\frac{x}{h}=\frac{1}{2}$, and

$$y=y_{0}+\frac{1}{2}\Delta y_{o}-\frac{1}{8}\Delta^{2} y_{o}+\frac{1}{16}\Delta^{3} y_{o}.$$

And for the IXth hour, $\frac{x}{h}=\frac{3}{4}$, and

$$y=y_0+\frac{3}{4}\Delta y_0-\frac{3}{32}\Delta^2 y_0+\frac{5}{128}\Delta^3 y_0.$$

Now, to find the differences,

	1st Difference.	2d Difference.	3d Difference
$y_0=53°\ 20'\ 16''$			
	$+22411''$		
$y_1=59\ \ 33\ \ 47$		$+340''$	
	$+22751$		$+21''$
$y_2=65\ \ 52\ \ 58$		$+361$	
	$+23112$		
$y_3=72\ \ 18\ \ 10$			

Hence, we have $\Delta y_0=22411''$, $\Delta^2 y_0=340$, $\Delta^3 y=21$, and these being substituted in the formulæ, we have for the

IIId hour . . . . $y=54°\ 53'\ 8''$

In like manner for the VIth . . . . $y=56\ \ 26\ \ 20$

and for the IXth . . . . $y=57\ \ 59\ \ 53$

In this way, tables of any kind may be constructed, by computing accurately the values of the ordinates at equal intervals, and interpolating any number of intermediate ordinates.

Ex. 4. Giving a correct distance from the sun on the four following days at 12 at night, to find its distance Dec. 20.

Dec. 12. Distance 301

21. 620

24. 715

26. 772

This case, in which the intervals between the given successive values are unequal, may serve to exemplify formula (2). By employing the usual notation, and reckoning x the time from Dec. 12. we have

$$\begin{array}{ll} x_0=0, & y_0=301, \\ x_1=9, & y_1=620, \\ y_2=12, & y_2=715, \\ y_3=14, & y_3=722, \\ y=8, & y \text{ is required.} \end{array}$$

From the values of x we get

$x=x_0=8$, $x-x_1=-1$, $x-x_2=-4$, $x-x_3=-6$. $x_0-x_1=-9$. $x_0-x_2=-12$. $x_0-x_3=-14$ $x_1-x_0=9$ $x_1-x_2=-3$ $x_1-x_3=-5$. $x_2-x_0=12$, $x_2-x_1=3$, $x_2-x_3=-2$. $x_3-x_0=14$, $x_3-x_1=5$, $x_3-x_2=2$.

These differences, and the values of y being substituted in the expression

$$y=\frac{(x-x_1)\,(x-x_2)\,(x-x_3)}{({}_0x-x_1)\,(x-x_2)\,(x_0-x_3)}y_0,$$
$$+\frac{(x-x_0)\,(x-x_2)\,(x-x_3)}{(x_1-x_0)\,(x_1-x_2)\,(x_1-x_3)}y_1,$$
$$+\frac{(x-x_0)\,(x-x_1)\,(x-x_3)}{(x_2-x_0)\,(x_2-x_1)\,(x_2-x_3)}y_2,$$
$$+\frac{(x-x_0)\,(x-x_1)\,(x-x_2)}{(x_3-x_0)\,(x_3-x_1)\,(x_3-x_2)}y_3,$$

It becomes after abbreviation,

$$y=\frac{1}{63}\times 301+\frac{64}{45}\times 620-\frac{2}{3}\times 715+\frac{8}{35}\times 772 \text{ or } y=586.3,$$ the distance of the comet from the sun, Dec. 20.

Ex. 5. In the year 1500, Bernard Walther at Nuremberg observed the chord of the sun's distance from the zenith by a large parallactic instrument of Ptolemy, as follows.

June 2. O. S.	45467	June 12. O. S.	44883
8.	44975	16.	44990
9.	44934		

From these observations it is required to find the true instant of the summer solstice.

In this example, we might make the given chords the ordinates of a curve, and the corresponding times, reckoned from some fixed instant, the abscissæ; we would then have five ordinates, and their abscissæ, to find the abscissæ corresponding to the *least* ordinate; so that the problem requires for its solution, besides the theory of Interpolation, that of *maxima* et *minima*; which is given, FLUXIONS, Art. 61—66.

If we employ the five given ordinates at once, the function to be made a *minimum* will be of the fourth degree, in respect of the variable x; and the problem, in general, will lead to the solution of a cubic equation. To avoid this, it will be better to take only three of the five; and then the curve will be a common parabola, having its axis perpendicular to the abscissa x; in fact, the problem, from its nature, admits of this simplification, for it is evident, that the values of y must be equal at equal distances from its least value, which is a property of the parabola. As there are five given ordinates, there may be various sets of three formed from them, and those may be selected which are most suitable, and a mean taken among the results.

Let us now suppose that x and y are any indefinite values of the co-ordinates. Then, the given values of the abscissæ being x_0, x_1, x_2, and of the ordinates y_1, y_2, y_3, the general formula, in the case of three ordinates, gives

$$y=\frac{(x-x_1)\,(x-x_2)}{(x_0-x_1)\,(x_0-x_2)}y_0+\frac{(x-x_0)\,(x-x_2)}{(x_1-x_0)\,(x_1-x_2)}y_1$$
$$+\frac{(x-x_0)\,(x-x_1)}{(x_2-x_0)\,(x_2-x_1)}y_2;$$

which, by taking away the denominators, and developing the terms, so that they may be arranged according to the powers of x, becomes

$$\mathrm{A}y=\Big[({}_1-x_2)y_0-(x_0-x_2)y_1+(x_0-x_1)y_2\Big]y^2$$
$$-\Big[(x_1^2-x_2^2)y_0-(x_0^2-x_2^2)y_1+(x_0^2-x_1^2)y_2\Big]x$$
$$+\mathrm{C}.$$

And here, A and C denote constant quantities made up of the particular values of x and y.

Now as y, and consequently A y, is to be a minimum, the fluxion of the second member of this equation, after the terms are divided by the fluxion of x, must be $=0$ (FLUXIONS, Art. 63.) Hence, taking the fluxions, (Rule A, Art. 26,) and transposing, &c. we get,

$$x=\frac{(x_1^2-x_2^2)y_0-(x_0^2-x_2^2)y_1+(x_0^2-x_1^2)y_2}{2(x_1-x_2)y_0-(x_0-x_2)y_1+(x_0-x_1)y_2}$$

Or we may arrange the expression thus,

$$x=\frac{x_0^2\,(y_1-y_2)-x_1^2\,(y_0-y_2)+x_2^2\,(y_0-y_1)}{2x_0(y_1-y_2)-x_1\,(y_0-y_2)+x_2\,(y_0-y_1)}$$

and under either form, we have the value of x, which corresponds to the least, or greatest value of y.

Dr Halley, in the *Phil. Trans.* for the beginning of the year 1695, resolved Walther's observations into two sets, viz.

June 2.	45467.	June 8.	44975.
9.	44934.	12.	44883.
16.	44990.	16.	44990.

From the first set, if we reckon the time from June 2, we have,

$$\begin{array}{ll} x_0=0 & y_0=45467 \\ x_1=7 & y_1=44934 \\ x_2=14 & y_2=44990 \end{array}$$

and hence, by the second formula,

$$x=\frac{28\times533-7\times477}{4\times533-2\times477}=9.834=9^{\text{d.}}\ 20^{\text{h.}}\ 1^{\text{m.}}$$

To this, add the two days in June, preceding the first observation, and we have $11^{\text{d.}}\ 20^{\text{h.}}\ 1^{\text{m.}}$ O. S. for the time of the solstice.

According to the second set of observations, reckoning from June 8, we have

$$x_0=0 \qquad y_0=44975$$
$$x_1=4 \qquad y_1=44883$$
$$x_2=8 \qquad y_2=44990$$

Hence, by substituting in the second formula,

$$x=\frac{2\times15+8\times92}{15+2\times92}=3.849=3^{\text{d.}}\ 20^{\text{h.}}\ 23^{\text{m.}}$$

This period, added to 8th June, gives $11^{\text{d.}}\ 20^{\text{h.}}\ 23'$ for the time of the solstice, differing from the former determination by only 22 minutes.

Another application of the Formula.

Gassendus, at Marseilles, in the year 1636, observed the summer solstice, by a Gnomon 55 feet in height, and he found, that of such parts as the gnomon contained 89428,

June 19. N. S. the shadow was	31766
June 20.	31753
June 21.	31751
June 22.	31759

These being divided into two sets, viz. the 19th, 20th, 22d; and 19th, 21st, 22d, we have,

1st Set.		*2d Set.*	
$x_0=0$	$y^0=31766$	$x_0=0$	$y^0=31766$
$x_1=1$	$y^1=31753$	$x_1=2$	$y^1=31751$
$x_2=3$	$y^2=31759$	$x_2=3$	$y^2=31759$

The first gives $x=\frac{55}{32}=1^{\text{d.}}\ 17^{\text{h.}}\ 15^{\text{m.}}$

The second $x=\frac{107}{62}=1^{\text{d.}}\ 17^{\text{h.}}\ 25^{\text{m.}}$

So that we may conclude the moment of the solstice to have been June $20^{\text{d.}}\ 17^{\text{h.}}\ 20^{\text{m.}}$ in the meridian of Marseilles. These conclusions, deduced from real observations, have been of great importance in astronomy.

The formulæ, by which we have determined the solstices, will equally apply to other cases, in which the values of y at equal distances from its maximum or minimum value are equal.

We shall have occasion to advert to this subject again under the article Series.* (ξ)

INTERVAL in Music, is the distance of two sounds, as to acuteness and graveness; what, however, is here called distance, is, as Dr Robison has observed, purely figurative and analogical, and not real; but the analogy is very good, and the observation of it has led to the discovery of precise measures of the intervals between defined or musical sounds. These last are such as preserve, for a sufficient period of observation, or comparison with other sounds, the same identical *pitch*, or degree of acuteness. The multiplied and greatly varied experiments of philosophers have shewn, that this stability of pitch is accompanied by, and, indeed, occasioned by the pulses or vibrations of some elastic body, repeated at very quick and exactly equal intervals of time.

From the pitches of two given sounds, or the numbers of their Vibrations, (see that article and Concert Pitch,) in a given short interval of time, as one second for instance, the interval between them is, therefore, to be somehow measured; but it will be found, that this cannot be done by considering the vibrations as lineal, and taking their simple difference by subtraction as the measure of the interval, because in this way all sorts of absurdities or disagreements with the most simple and obvious experiments would follow in different cases.

But if we consider each particular pitch or velocity of vibration to be a *logarithm*, or measure of a ratio, instead of a lineal dimension, or mere numeral quantity, we shall then find, that the differences of these logarithms, which are themselves also logarithms, naturally and correctly represent the intervals of sounds. Every interval, therefore, may be considered as the modules or unit of a particular logarithmic scale, as has been shewn under the articles Binary, Common, and Hyperbolic *Logarithms*; and every logarithm, of whatever species, as the measure or representation of some interval of sound.

Since the number of vibrations of simple elastic strings of equal magnitudes, densities, and tensions, are found to be in the direct ratio of their length, it follows, that the *ratios* of these lengths of vibrating strings are also correct representations of the intervals yielded by the vibrations of these strings. And this, although rather an unnatural and forced way of considering the measure, and effecting the calculation of musical intervals, was the earliest, and continued through several centuries to be the only mode which mathematical musicians had, of representing and calculating intervals; because in those days logarithms were unknown, and the intervals then known, (even the *Comma*, having the ratio $\frac{80}{81}$, the least of them,) were too considerable in magnitude, to be used in the convenient or natural representation of other intervals.

But within a few years past, since the labours of the late Mr Marmaduke Everard and others have brought to light and shewn the relations of several intervals very many times *smaller than the comma*, or least interval of the ancients, Mr Farey has been enabled to adopt a notation, which in terms of three (at the most, and often of two,) of these very small intervals, is calculated in a correct and natural way without negative signs, (except in a few and unimportant instances,) to represent all musical intervals whatever, as has been shewn in our article Farey's *Notation*, and exemplified under the names of all the intervals which have hitherto occurred in our work.

Great as were the number of intervals, or rather the numbers of names by which the numerous writers on music had denominated them, prior to the appearance of the Rev. Henry Liston's *Essay on perfect Intonation*, as we have endeavoured to explain them in the progress of our work, the numbers of well-defined and perhaps of useful intervals are, by Mr. Liston's labours and discoveries, very greatly extended, even to the number of 220 within the octave, as Mr. Farey has recently shewn in a paper in the

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* The application of interpolation to astronomical problems may be found in Vince's Astronomy, vol. 2d. and Garnett's Nautical Almanac for 1818.

Philosophical Magazine, vol. xlix. p. 362, wherein he has sketched out the principles of Nomenclature, by which each one of these Listonian intervals may be clearly denominated.

The NUMERALS major and minor, which practical musicians use, as the common mode of expressing or reckoning the intervals of the scale, viz. 1, I, 2, II, 3, III, 4, IV, 5, V, 6, VI, 7, VII, 8 and VIII, furnish the sixteen generic terms, whence, by means also of the specific terms *Comma* and *Diesis* variously compounded, Mr Farey proposes to distinguish each of these 220 intervals.

In practice, musicians use still more commonly another mode of defining intervals, viz. by the LITERALS, viz. F, C, G, D, A, E, B; which thus arranged, are each at the distance of a true fifth (V) apart, except D and A, between which is a grave fifth ($V^{\backprime}$), each of these 7 literals being at times (successively from F upwards) raised a chromatic half note or sharp $\sharp$, (which sometimes is of the value S, and sometimes only 𝒮); and at other times these literals (successively from B downwards) are lowered a chromatic half note or flat $\flat$ (S or 𝒮).

Besides which, Mr Liston occasionally raises each of these 7 literals, and sharpened or flattened notes, (in the succession above named,) a major comma (*c*) or acute ($'$); or lowers each of them, (in the reverse order,) a major comma (*c*) or grave ($^{\backprime}$). And when occasion requires, these sharps and the flats, together with the acutes and the graves, are by Mr Liston and Mr Farey respectively doubled, trebled, &c. ($\sharp\sharp$, $\sharp^{3}$, $\sharp^{4}$; $\flat\flat$, $\flat^{3}$, $\flat^{4}$; $''$, $'^{3}$, $'^{4}$; $^{\backprime\backprime}$, $^{\backprime 3}$, $^{\backprime 4}$), in connection with the literals in all their varieties of combinations: by which means a literal notation is formed, comprehensive enough for expressing each of the 220 notes above alluded to, and even a much greater number, which are next to be mentioned.

Mr Liston's scale of 59 notes in the octave, tuned by means of perfect Vths, IIIrds, and VIIIths, as described in pages 7, 44, and 45 of his *Essay*, and to which the most extended of his EUHARMONIC ORGANS yet made have been adapted, contains no doubly acuted or graved notes, and only four double sharps, viz. F, F′, C, and C′, and two double flats, viz. B, and B′; but the principles of his tuning process admit of being extended, as Mr Farey has recently shewn, (in the *Philosophical Magazine*, vol. xlix. p. 443.) to produce 612 notes in the octave, placed, as to acuteness and graveness, nearly enough at *equal distances* from each other, to admit of being so considered, for all of the common purposes of harmonics, or musical calculations, and according to the artificial commas (Σ's) of Mr Farey's notation.

Mr Farey, in the paper last referred to, has minutely described his extended Listonian Tuning Table, which contains each of the 612 notes above alluded to, expressed in *artificial commas* above C. viz. 0, 1, 2, 3, 4, &c. to 612; and in *literals*, with their proper marks or signatures, viz. C, $B''\sharp$, $D^{\backprime 5}\flat$, $C^{\backprime 4}\sharp$, $B^{\backprime\backprime}\sharp\sharp$, &c. to *c*; forming thus a more complete and systematic table of musical intervals than was ever before communicated to the public, or perhaps formed.

We have been enabled, by another arrangement of the materials of this Tuning Table into thirteen divisions, to bring it within the compass of our pages, and are happy in the opportunity of thus presenting our musical readers with it, as an important acquisition to the science of harmonics.

A Table of Listonian Intervals, extended, by Mr Farey, to a nearly equal Scale of 612 *Notes in the Octave.*

	F	C	G	D	A	E	B
$'^{6}$	320	—	—	—	517	—	—
$'^{6}\flat$	—	19	377	123	481	—	574
$'^{6}\flat\flat$	—	—	—	—	434	—	—

	F	C	G	D	A	E	B
$'^{5}\sharp$	356	102	449	195	—	—	—
$'^{5}$	309	55	413	159	506	252	610
$'^{5}\flat$	273	8	366	112	470	216	563
$'^{5}\flat\flat$	226	584	330	76	423	169	527
$'^{5}\flat^{3}$	—	—	—	—	—	—	480

	F	C	G	D	A	E	B
$'^{4}\sharp\sharp$	381	127	—	—	578	—	—
$'^{4}\sharp$	345	91	438	184	542	288	23
$'^{4}$	298	44	402	148	495	241	599
$'^{4}\flat$	262	609	355	101	459	205	552
$'^{4}\flat\flat$	215	573	319	65	412	158	516
$'^{4}\flat^{3}$	—	526	272	18	376	122	469
$'^{4}\flat_{4}$	—	—	—	—	329	75	433

	F	C	G	D	A	E	B
$'^{3}\sharp\sharp$	370	116	474	220	567	313	59
$'^{3}\sharp$	334	80	427	173	531	277	12
$'^{3}$	287	33	391	137	484	230	588
$'^{3}\flat$	251	598	344	90	448	194	541
$'^{3}\flat\flat$	204	562	308	54	401	147	505
$'^{3}\flat^{3}$	168	515	261	7	365	111	458
$'^{3}\flat^{4}$	121	479	225	583	318	64	422
$'^{3}\flat^{5}$	—	432	—	—	—	—	375

	F	C	G	D	A	E	B
$''\sharp^{4}$	442	188	546	—	27	385	—
$''\sharp^{3}$	406	152	449	245	603	349	84
$''\sharp\sharp$	559	105	463	209	556	302	48
$''\sharp$	323	69	416	162	520	266	1
$''$	276	22	380	126	473	219	577
$''\flat$	240	587	333	79	437	183	530
$''\flat\flat$	193	551	297	43	390	136	494
$\flat^{3}$	157	504	250	608	354	100	447
$''\flat^{4}$	110	468	214	572	307	53	411
$''\flat^{5}$	74	421	167	525	271	17	364
$''\flat^{6}$	—	—	—	—	—	582	328

	F	C	G	D	A	E	B
$'\sharp^{5}$	478	224	571	317	—	—	—
$'\sharp^{4}$	431	177	535	281	16	374	120
$'\sharp^{3}$	395	141	488	234	592	338	73
$'\sharp\sharp$	*348	*94	452	198	545	291	37
$'\sharp$	*312	*58	*405	*151	*509	*255	*602
$'$	*265	*11	*369	*115	*462	*208	*566
$'\flat$	*229	*576	*322	*68	*426	*172	*519
$'\flat\flat$	182	540	286	32	379	125	*483
$'\flat^{3}$	146	493	230	597	343	89	436
$'\flat^{4}$	99	457	203	561	296	42	400
$'\flat^{5}$	63	410	156	514	260	6	353

	F	C	G	D	A	E	B
$\sharp^5$	467	213	560	306	—	—	—
$\sharp^4$	420	166	524	270	5	363	109
$\sharp^3$	384	130	477	223	581	327	62
$\sharp\sharp$	*337	*83	441	187	534	280	26
$\sharp$	*301	*47	*394	*140	*498	*244	*591
	*254	*0	*358	*104	*451	*197	*555
$\flat$	*218	*565	*311	*57	*415	*161	*508
$\flat\flat$	171	529	275	21	368	114	*472
$\flat^3$	135	482	228	586	332	78	425
$\flat^4$	88	446	192	550	285	31	389
$\flat^5$	52	399	145	503	249	607	342
$\flat^6$	—	—	—	—	—	—	306

For the advantage of having in the Table *the complement* of every note to the octave, 306 is twice inserted; but in reality D$\sharp^5$ + 2 f — m = B$\flat^6$.

	F	C	G	D	A	E	B
$^{\backprime}\sharp^5$	456	202	549	—	—	—	—
$^{\backprime}\sharp^4$	409	155	513	259	606	352	98
$^{\backprime}\sharp^3$	373	119	466	212	570	316	51
$^{\backprime}\sharp\sharp$	326	72	430	176	523	269	15
$^{\backprime}\sharp$	*290	*36	383	129	*487	*233	580
$^{\backprime}$	243	*601	*347	*93	440	186	544
$^{\backprime}\flat$	*207	554	300	46	*404	*150	497
$^{\backprime}\flat\flat$	160	518	264	10	357	103	461
$^{\backprime}\flat^3$	124	471	217	575	321	67	414
$^{\backprime}\flat^4$	77	435	181	539	274	20	378
$^{\backprime}\flat^5$	41	388	134	492	238	596	331
$\flat^6$	—	—	—	—	—	—	295

	F	C	G	D	A	E	B
$^{\backprime\backprime}\sharp^5$	445	191	538	284	30	—	—
$^{\backprime\backprime}\sharp^4$	398	144	502	248	595	341	87
$^{\backprime\backprime}\sharp^3$	362	108	455	201	559	305	40
$^{\backprime\backprime}\sharp\sharp$	315	61	419	165	512	258	4
$^{\backprime\backprime}\sharp$	279	25	372	118	476	222	569
$^{\backprime\backprime}$	232	590	336	82	429	175	533
$^{\backprime\backprime}\flat$	196	543	289	35	393	139	486
$^{\backprime\backprime}\flat\flat$	149	507	253	611	346	92	450
$^{\backprime\backprime}\flat^3$	113	460	206	564	310	56	403
$^{\backprime\backprime}\flat^4$	66	424	170	528	263	9	367
$^{\backprime\backprime}\flat^5$	—	—	—	—	227	585	—

	F	C	G	D	A	E	B
$^{\backprime 3}\sharp^5$	—	180	—	—	—	—	—
$^{\backprime 3}\sharp^4$	387	133	491	237	—	—	—
$^{\backprime 3}\sharp^3$	351	97	444	190	548	294	29
$^{\backprime 3}\sharp\sharp$	304	50	408	154	501	247	605
$^{\backprime 3}\sharp$	268	14	361	107	465	211	558
$^{\backprime 3}$	221	579	325	78	418	164	522
$^{\backprime 3}\flat$	185	532	278	24	382	128	475
$^{\backprime 3}\flat\flat$	138	496	242	600	335	81	439
$^{\backprime 3}\flat^3$	—	—	—	553	299	45	392

	F	C	G	D	A	E	B
$^{\backprime 4}\sharp^3$	340	86	—	179	539	283	—
$^{\backprime 4}\sharp\sharp$	293	39	397	143	490	236	594
$^{\backprime 4}\sharp$	257	3	350	96	454	200	547
$^{\backprime 4}$	210	568	314	60	407	153	511
$^{\backprime 4}\flat$	174	621	267	13	371	117	464
$^{\backprime 4}\flat\flat$	—	485	231	589	324	70	428
$^{\backprime 4}\flat^3$	—	—	—	—	—	34	—

	F	C	G	D	A	E	B
$^{\backprime 5}\sharp\sharp$	282	28	386	132	—	—	—
$^{\backprime 5}\sharp$	246	604	339	85	443	189	536
$^{\backprime 5}$	199	557	303	29	396	142	500
$^{\backprime 5}\flat$	163	510	256	2	360	106	453
$^{\backprime 5}\flat\flat$	—	—	—	—	—	—	417

	F	C	G	D	A	E	B
$^{\backprime 6}\sharp$	285	593	—	—	—	178	—
$^{\backprime 6}$	—	—	292	38	—	131	489
$^{\backprime 6}\flat$	—	—	—	—	—	95	—

The above table is throughout divided into eight vertical columns, in the latter seven of which, the *literals*, in the order of consecutive fifths, are placed at the heads of each of the thirteen divisions of the Table. These divisions are made and arranged, according to the number of *grave* and *acute* marks in the signatures of the intervals, in the first column; the graves, decreasing in number, through the several divisions, from 6 to 0, and the acutes, increasing in number, through them, from 1 to 6.

In each division of the Table, the *sharps*, in the first column, are first placed, in a decreasing series, to 0 sharp (or flat); and the *flats* follow, in an increasing series, from 1. The numbers in the squares of the Table, are *artificial commas*, of Farey, each one of these answering to the literal at the top of its column, with the signature annexed, which is set at the beginning of its line.

Thus, the first note in the Table, is to be read, F six times acuted, containing 320 artificial commas, or schismas, and wrote thus, F^{-6}, or 320Σ: The first note of the seventh division is to be read, F five times sharpened, and marked F$\sharp^5$, or 467Σ: the last note in the Table is to be read, E six times graved and once flattened, and marked E$^{\backprime 6}\flat$, or — 95Σ, &c.

On examining the *numbers* of artificial commas in each horizontal line of the Table, the *differences* of each adjunct note therein, proceeding from left to right, will be found to be, either + 358, (answering to V, = 358Σ + 7 f + 31m) or, — 254; (V — VIII, = — 4, = — 254Σ — 5 f — 22 m) —except, that in a rarer number of instances, this *difference* will be found, either + 347 (V$^{\backprime}$ = 347Σ + 7 f + 30 m), or, 265 (— 4$^{\backprime}$, = — 265Σ — 5 f — 23 m).

In like manner, on examining the *differences* in the vertical columns of each division, from the top downwards, it will be found, that there are, *alternately*, either — 47 (answering to — S, = — 47Σ — f — 4 m), but where the addition of an octave (VIII, = 612Σ + 12 f + 53 m) becomes necessary; or, — 35, (— 𝒻, = — 36Σ — f — 3 m); so that the *difference* between every alternate number is, — 83 (— S — 𝒻, = — 83Σ — 2 f — 7 m), or, an octave different from this; except, that in the C column alone, in that line of each division where no *sharp* or *flat* occurs in the signature, these *differences* are not alternately S and 𝒻, or 𝒻 and S, but are both alike, or S; and this sum is, 94Σ + 2 f + 8 m;—a curious anomaly of the scale, which Mr. Farey has pointed out; and, in a note to p. 445, in his paper already quoted, has ascribed it to the practice of turning both ways from C, upwards to G and downwards to F, in forming the scale.

We shall now be enabled to give rules of very useful application, by which any note being *given*, either by its literal designation, or in Mr. Farey's notation, or by its ratio of vibrating strings, either of the other two expressions for the same note may be quite *correctly* obtained, more than the artificial commas can show, which are approximate numbers.

1st, *When the Literal designation of the Note is given.*—It will be necessary to premise the following Table of the values of the literals, in the other two modes of notation, with the addition of the numerals in the last column, viz.

	Σ	f	m	2	3	5	
C	612 +	12 +	53	—1	0	0	VIII.
B	555 +	11 +	48	3	—1	—1	VII.
A	451 +	9 +	39	0	1	—1	VI.
G	358 +	7 +	31	1	—1	0	V.
F	254 +	5 +	22	—2	1	0	IV.
E	197 +	4 +	17	2	0	—1	III.
D	104 +	2 +	9	3	—2	0	II
C	0	0	0	0	0	0	I.

It will also be necessary to bear in mind the following value of the signatures, viz.

′	+ 11 + 0 + 1	4 — 4 1	c
‵	— 11 — 0 — 1	— 4 + 1 — 1	—c
♯ or ♭ or	±36±1± 3	± 3±1± 2	𝒮
♯ or ♭	±47±1± 4	± 7±3± 1	S
♯♯ or ♭♭ or ✠	±83±2± 7	±10±2± 3	✠ —

Rule. To the given literal note, or its proper octave, apply, as the signs indicate, the values of the given number of graves or of acutes, and of *pairs* of sharps or of flats (✠); and if there be an odd one in such, apply S for it, and the required result will be had; either true, or a major comma (c) too great or too small, which the artificial commas in the great Table will show and detect.

For example, if $B^{-5}\flat^{6}$ be given, then, for Σ, f and m, we have 555Σ + 11 f + 48 m, + 5 (11Σ + m), — 83Σ — 2 f — 7 m, — 47Σ — f — 4 m, equal to 480Σ + 8 f + 42 m. For the indices of the primes in its ratio, we have 3 — 1 — 1, + 20 — 20 + 5, — 10 + 2 + 3, — 7 + 3 + 1, equal to 6 — 16 — 8, or $\frac{2^6}{3^{16}5^8}$, the interval above C.

Again, if $B\sharp^3$ be given, then, as B must be taken an octave lower, we have — 57Σ — f — 5 m, + 83Σ + 2 f + 7 m, + 47Σ + f + 4 m, equal to 73Σ + 2 f + 6 m; but 62 appearing to be the artificial comma, answering to this note in the large Table, we have 62Σ + 2 f + 5 m for the interval required above C; and + 4 — 1 — 1, + 10 — 2 — 3, + 3 + 1 — 2 (or ♉), is equal 17 — 2 — 6, $= \frac{2^{17}}{3^2\ 5^6}$ $\frac{131072}{140625}$.

2d, *When Farey's Notation of a Note is given.*—*Rule.* Search through the great Table for the artificial comma, which answers to the number of Σ0 given, and take out the literal designation answering thereto, as that sought; then from the rule above given, calculate the numbers of Σ f, and m, which should agree with those given, unless the given note falls without the limits of Mr. Farey's tuning table, mentioned above; in which case, this rule fails. At a future time, we may, perhaps, be able to supply one which does not. The ratios will be found by the rule already given. For example, if 306Σ + 5 f + 27 m be given, on searching through the Table, we find, in the first line of its 7th division, that the note should be $D\sharp^5$. In order to try whether this be correct, on applying the first rule, we have 104Σ + 2 f + 9 m, + 166Σ + 4 f + 14 m, + 36Σ + f + 3 m, = 306Σ + 7 f + 26 m, which happens not to be the note given; but $B\flat^6$, as will be seen from the last note in this division, and from the following process, viz. 555Σ + 11 f + 48 m, — 249Σ — 6 f — 21 m, = 306Σ + 5 f + 27 m, as given. For the ratio of the last interval, we have 3 — 1 — 1, — 30 + 6 + 9, = — 27 + 5 + 8.

3d, *When the Ratio of a Note is given.*—*Rule.* If the ratio is given in numbers, find their component primes by division, by 5, 2, and 3, successively; then, from the Table and rule, in p. 8 of vol. ix. find the numbers of Σ, f, and m, and apply the 2d and 1st rules above, for finding and proving the literal designation.

After what has been done above, farther examples are, perhaps, unnecessary.

From the ratio of an interval above C of the tenor cliff line, it is easy to deduce correctly its number of *vibrations*; from the circumstance of 240, the vibrations per 1″ of this C (see our article CONCERT *Pitch*,) happening to be composed of the musical primes 2, 3, and 5, viz. $2^4 \times 3 \times 5$, or 4 + 1 + 1.

Rule. From the constant indices of primes, 4 + 1 + 1, deduct those of the given interval (or add them with contrary signs,) and the primes composing the number of vibrations will be had.

If, for example, the fourth of Mr. Farey's Temperament, in p. 7 of vol. ix. be given, viz. 357 Σ + 7 f + 31 m, whose ratio is — 14 + 7 + 1; we have 4 + 1 + 1, + 14 — 7 — 1, = 18 — 6 — 0, or $\frac{426214}{729}$, = 359.5940, the vibrations per 1″, which were required.

Intervals have been considered in our work, or are in the course of being so treated, under various classes, as follows, viz.

Acute, or such as are raised a major comma, and are marked (′).

Close. See that article.

Commensurable. Ditto.

Composed, according to Euler, are greater than VIII.

Compound. See that article.

Concinnous. See that article.

Concordant. See our article CONCORD.

Defective. See that article.

Deficient. Ditto.

Diminished. Ditto.

Discordant. See our article DISCORD.

Double. Besides those intervals, which are a *multiple* of some other, by 2, and probably called double: some practical musicians, as Holden, Calcott, &c. on some occasions denominate those intervals double which have a major eighth added to them, and fall between VIII. and XV. Euler calls these Composed Intervals.

Excessive. See that article.

Extreme. See that article.

Flattened. See our article FLAT.

Grave. See that article.

Great. Ditto.

Imperfect. Ditto.

Incommensurable, or prime intervals, are such, the terms of whose ratios are not equal powers of any other numbers whatever; and whose notation, whether in indices of primus Σ, f, and m, or any others, is not divisible by any number.

Incomposite. See that article.

Inconcinuous. See ACUTE and GRAVE.

Irregular. See vol. ix. p. 8.

Multiple, such as are not incommensurable, as above.

Perfect Intervals, according to some writers on the practice of music, are only the 4th, Vth, and VIIIth: but any interval, particularly the concords, when truly and correctly adjusted, if not tempered, is said by most writers to be *perfect*.

Prime, or *Incommensurable*. See above.

Redundant. See that article.

Regular. See vol. ix. p. 8.

Sharpened. See our article SHARP.

Simple, according to Euler, are less than VIII.

Superfluous. See that article.

Tempered, are any such intervals as approach near to any of the concords. See vol. vii. p. 603. See also our article TEMPERAMENT.

Triple, according to some writers, are such intervals as have two octaves joined to them, or fall between XV. and XXII. (*g*)

INTESTINA. The history of intestinal worms was involved in the greatest obscurity, until Redi, towards the end of the 17th century, endeavoured to direct the attention of naturalists to their examination. It was not, however, until the middle of the 18th century, that these animals were studied, described, or figured, with any degree of accuracy. About this period, Pallas, Müller, Goeze, and Werner, distinguished themselves as cultivators of this department of science, and brought to light many important facts connected with the characters, functions, and distribution of the species. About the beginning of the present century, the subject became still more popular; and its importance, as connected with nosology, and the natural arrangement of animals, was generally acknowledged. On the continent, at present, collections of these worms are every where forming—many able naturalists are investigating their history—and we look forward, with confidence, to the time when their structure and functions will be more completely developed, and their systematic characters more perspicuously defined, than they appear to be, even in the valuable works of Oeder, Rudolphi, or Lamark. In this expectation, we delay the consideration of this department of zoology until we come to the article VERMES, where the history of the true worms, or Annelides of Latreille, will likewise be communicated to our readers. (F)

INTESTINES. See ANATOMY, *Human*, and ANATOMY, *Comparative*.

INTESTINAL CONCRETIONS. See CHEMISTRY.

INULIN. See CHEMISTRY.

INVERARY, or, more properly, perhaps, Inverara, is the capital of Argyllshire. The Celtic name is *Ionaraoradh*, i. e. the discharge of the Ara; the place where the river of that name falls into the Sea. This name was more applicable to the old than to the modern town. Previous to the year 1773, Inverary stood on the banks of the river, at the point where the mountain stream and the tide meet. But his Grace the Duke of Argyll, conceiving the town to be too close to his magnificent castle, removed it soon after that period to its present site. This change his Grace was the more easily enabled to accomplish, from the circumstance of his being almost sole proprietor, there being only a single feu in the place. And the inhabitants had rather cause to be pleased than sorry at its removal, as both the new houses and situation are greatly preferable to the old. Inverary now stands on a small peninsula, about a quarter of a mile south from the castle, and from its former position. The town, though small, is neat and handsome, particularly its north-eastern front, which produces a very pleasing and picturesque effect when it opens on the traveller approaching it by the great road from the south. Indeed the view of the place, to a stranger visiting by this route the capital of Argathelia, is altogether magnificent. On turning the point of Stronshira, a point of land about two miles distant projecting into Lochfine, the far-famed castle, the sprightly town, with its numerous flotilla of boats, the endless variety of peaks and banks, of hill and dale, of wood and water, which, all at once, and as if it were by enchantment, burst upon the eye of the traveller, rivet him to the spot, and overwhelm him with admiration and astonishment. From the vast number of objects, which, on turning this point, present themselves to the sight of the delighted beholder, objects not only individually interesting or magnificent, but grouping in the happiest manner, it is probable, that there is not another spot in the empire which can afford a prospect so striking and diversified. But the limits of an article of this kind will not allow us to enlarge on the varied beauties of Inverary. The truth is, that no description, however ably or eloquently written, can give an adequate idea of the fine views to be seen at this place; and we would recommend it to every person who is fond of the lovely and sublime in nature, to gratify his curiosity and taste by visiting Inverary; and employing, at least, a couple of days in examining its interesting and extensive scenery.

The population of the town of Inverary is small, amounting, within the royalty, according to the census taken in 1810, to only 1134 souls. There is little doubt that both the place and the population would have been greatly larger, had not the policy, whether judicious is rather questionable, of the family of Argyll been always averse to the increase.

There is only a single feu in the place, which was granted in lieu of a similar right possessed in the old town. A great part of the houses was built at the expence of his Grace, and are let to the inhabitants; and such as were erected at the cost of private individuals have been built on long leases.

Of Inverary little is known previous to its having been made a burgh in the year 1648. There is reason to suppose that, before that period, it was a mere fishing village. But the patronage of the family of Argyll, the erection of the place into a royal burgh, and its becoming the seat of the circuit and sheriff courts, soon raised it to some importance. The town is governed by a provost, two bailies, a dean of guild, and a council of twelve burgesses, and it joins with Ayr, Irvine, Rothsay, and Campbelltown, in sending a member to Parliament. The revenues of the place are but trifling, though the charter vests the corporation with the right of levying harbour dues from every vessel which enters any creek or harbour in the shire. Unfortunately, however, the rights of the burgh were, till within the last few years, hidden in the mysticism of law Latin; and there is reason to fear that this important privilege, from its having been allowed to remain so long in desuetude, may now be lost. As might be expected, from the circumstance of Inverary being the seat of the courts of law, a considerable proportion of the genteel inhabitants follow this profession. Here, as in other places, it is found to be a thriving profession; and many instances have occurred, within the last 50 years, of men rising from the desk to the possession of considerable landed properties. The English language is generally spoken in the town. The better classes of the inhabitants, of both sexes, speak it with considerable propriety; and are, in general, distinguished for their politeness and intelligence.

There are at present (1817) no manufactures in the town or parish, though the dukes of Argyll, with that laudable attention to the interest and improvement of the country, which has uniformly distinguished that noble family, have made many attempts to establish them. The great staple, on which the bulk of the population of the place and of the whole coast of Lochfine depend for employment and subsistence, is the herring fishery. From the excellence and occasional abundance of the herrings caught in this loch, this is found to be a very lucrative trade, yielding sometimes more than 40,000*l.* per annum. Inverary has no foreign trade; its chief traffic consists in the export of wool and salted herrings to the Clyde and to Liverpool, and in the import of coals, meal, and merchandise, for the use of the inhabitants of the place and neighbourhood.

There are no antiquities or buildings of any interest in Inverary. On the lawn, a little to the south of the castle, there stands a single druidical stone, as it is sometimes termed, a kind of rude obelisk. Whether it was raised to mark the grave of a warrior, or for some other purpose, it is now impossible to ascertain. Many stones of this description are to be seen in the county of Argyll, and some of them of so stupendous a height and size, that it is quite inexplicable how the old Celts, who are represented as barbarians by certain refined antiquaries and historians, could have contrived to place them in their present position. Indeed, versed as the present generation is in mechanics, it would probably at this day be found an arduous task, either to remove or to erect these singular monuments. In the middle of the town there is a neat monument, raised about the year 1735, to some gentlemen of the clan Campbell, who, towards the close of the seventeenth century, fell victims to their attachment to Presbyterianism. About 14 years ago, a new church was built, comprehending under one roof two places of worship. The one is used for the Gaelic or parish part of the population, the other for the burgh or English. There are two clergymen, who preach alternately to each congregation. Two years ago the building of a new county jail was commenced. The plan of the structure seems to have been designed with a view to the ornament of the place, and the comfort of the unfortunate prisoners. Its site is on the beach, in a very airy situation; and, besides the mere jail, it is meant to contain within its wall a range of handsome court and county rooms.

The castle, which stands, as it was already noticed, about a quarter of a mile from the town, is a noble building. It was built by Archibald, Duke of Argyll, immediately after the year 1745; and, though it has been the subject of much criticism to men pretending to superior architectural discernment, yet most travellers of taste always view it with decided approbation. Indeed, the more one contemplates and considers the surrounding scenery, the more will he feel inclined to admire the tact of that distinguished nobleman, under whose auspices Inverary castle was designed and executed; and, with regard to internal elegance, comfort, and convenience, it is certain that this fine edifice is not inferior to any nobleman's residence in the kingdom.

The parish of Inverary extends, for nearly 12 miles, along the western shore of Lochfine. Its breadth generally is about 6 miles. The Duke of Argyll is sole proprietor. The population of the parish, without the royalty, according to the census of 1810, amounts to 977 souls. The aspect of the parish is hilly, and much of its soil is bad, and difficult of improvement. Indeed, few of the tenants make the attempt. The traveller is surprised to see the system of run rig, with all its wretched accompaniments, within a few miles of Inverary Castle. Unfortunately, many of the farms of the parish are subdivided among a number of small tenants, possessing little skill, enterprise, or capital; and notwithstanding the excellent example held out by the late Duke, no improvement could be expected under such a system. The very quantity of valuable wood, which is annually given by the noble proprietor to this swarm of tenantry, and which they consume in renewing or repairing their ill built and ill thatched houses, would, if accurately calculated, appear incredible, and shew, beyond dispute, the propriety of lessening their number. There was a period, indeed, when the house of Argyll found it politic, like other noble houses, to maintain on their estates a numerous population; when their credit, and perhaps security, depended not a little on the number of men they could bring into the field. But happily those times are gone by; and there can be no question, that the interest of the proprietor, and of the community at large, would be highly benefited by a change of system. Nay, the change would be advantageous to those small tenants themselves; for not a shadow of doubt can be entertained, that if his Grace were to give them cottages with small tenements of land, or crofts, as they are commonly termed in Scotland, on the side of Lochfine, where they might have access to the rich treasures of its fishery, instead of becoming in their old age, as is now too frequently the case, pensioners on his charity, their condition would be comparatively raised to a state of independence and of comfort.

The woods of Inverary, both natural and planted, have been long known and admired for their beauty and extent. There are great quantities of fine old oaks, sycamores, ashes, limes, chesnuts, &c. and the magnificent beeches can scarcely be matched in the kingdom. The woods of this parish have been reckoned worth nearly half a million of money; and though the data on which the calculations were formed may not be perfectly satisfactory, there can be no doubt that, from their extent, as well as quality, they must be of prodigious value. Inverary is situated in North Lat. 56° 28′, and in West Long. 5°. (*v. v.*)

INVERKEITHING is a royal burgh, and sea-port town of Scotland, in the county of Fife. It stands upon a rising ground on a bay of the same name, on the north side of the Firth of Forth. The town consists principally of one street, through which the great north road passes, and of some bye lanes. Some of the houses are good, but many of them are very old, with staircases on the outside. The town-house, which was built in 1770, contains a prison, and apartments for the business of the burgh, and for public meetings. The parish church, and the church for the burgher seceders, are the only other public buildings.

Inverkeithing is governed by a provost, two bailies, a dean of guild, and treasurer, who are elected annually by the councillors and the deacons of the trades. It received its charter from William the Lion. David I. resided in it; and within these 50 years the vestiges of his house remained. King James VI. ratified the charter granted by preceding monarchs, by a writ dated 4th May 1598.

There are almost no manufactures in Inverkeithing. An iron foundry, on a small scale, has been established; and there are several salt pans, which annually make about 15,000 bushels of salt. The trade of the town consists principally of the export of coals, to the extent of about 25,000 tons annually. The harbour has from 13 to 15 feet of water at spring tides, and there are good quays for loading and unloading vessels. The bay of Inverkeithing, which is separated from the Frith of Forth by the Ferry hills, affords excellent anchorage for vessels of any burden; and it is here that the ships of war stationed in Leith Roads often ride in severe storms. The Dominicans and the Franciscans had convents here, but no remains of them are now to be seen. The population of the town is about 1800. In the year 1811, the population of the burgh and parish was

Inhabited houses	381
Families	569
Do. employed in trade and manufactures	131
Population	2400

INVERNESS, an ancient and flourishing burgh and sea-port town of Scotland, and capital of the county, takes its name from its situation at the junction of the river Ness with the Moray Firth. It is 106 miles north northwest of Edinburgh; its Lat. is 57° 30′ 5″ North, and its Long. 4° 5′ West.

INVERNESS-SHIRE, the name of the largest of the counties of Scotland.

The county of Inverness is about 94 miles in length from east to west, and about 50 miles at its greatest breadth. It is bounded on the north by Ross-shire and the Moray Firth; on the east by Nairn, Moray, Banff, and Aberdeenshires; on the south by Argyle and Perth-shires; and on the west by the Atlantic Ocean. Besides this, which may be termed the continental part of it, a number of the Hebridean islands belong politically to the county. In considering the surface of this extensive and important part of Great Britain, it will be convenient to begin with a description of the grand outlines of its geography.

The great Caledonian Glen, or, as it is denominated in Gaelic, *Glen-mor na-albin*, is the most remarkable feature in Inverness-shire. Running in a straight line nearly from north-east to south-west, it divides the county into two almost equal parts. It may perhaps average somewhat less than a mile broad in the bottom, but towards its summit level, it is in many places scarcely a quarter of that width. The sides of the hills rise so very abruptly on both hands, and the shapes of their steep fronts seem so much adapted to one another, that the least observing person can hardly travel along its length, without the idea occurring that it must have been produced by some vast and sudden convulsion. The northern extremity of this extraordinary glen opens by the river Ness into the Moray Firth, and following it south-westwards from this point, we find it occupied by Lochs Ness, Oich, and Lochy, whence it extends into the Western Ocean by that long inlet of the sea called Loch Linnhe. In examining the straths and glens tributary to this great one, we find that they are eight in all; of which number, (speaking in a general manner,) four join it from the west north-west, viz. Glen Urquhart, Glen Morriston, Glen Garry, and the glen or strath of Loch Arkeg. The remainder come into it from the east south-east, and are Stratherick, Glen Gluoy, Glen Spean, and Glen Nevis; the three last situated in the district of Lochaber. Turning to the west coast of the county, we find it broken by six arms or bays of the sea, besides that of Loch Sheil, there forming its southern boundary. These are Loch Moidart, Loch Aylort. Loch-ananougal, Loch-nagaul, Loch Nevish, and Loch Hourn. The fresh water lake Loch Morrer, and several small glens, discharging independent streams into the Western Sea, tend still farther to disturb the continuity of the mountains in this part of the county. In the northern quarter of the shire, we notice the great glen of Strath Glass with its tributaries, running nearly north-east, and opening into the firth of Beauly. To the south of the town of Inverness, portions of Strath Nairn and Stradearn, or the strath of the Findhorn, run through the county in a direction nearly north north-east. And farther south still, on the great strath of the river Spey, we find the district of Badenoch; whence Inverness-shire is projected in a north-east direction between the shires of Banff and Moray, a considerable district round Castle Grant, being by them insulated from the rest; and in this way it includes a large portion of Strathspey.

All these glens are, comparatively speaking, narrow, and are bounded and divided from one another by very high mountains, which consequently form a great proportion of the surface of the county. It will be only necessary in this place, to notice one or two of the most distinguished. Mealfourvounie rises over the north side of Loch Ness, between Glen Urquhart and Glen Morriston, and is very conspicuous from its round-headed top. Its height above the level of the sea is 3060 feet, and it is visible from the east at a great distance. Cairngorum, and Brae Riach, are two mountains rising over the district of Rothiemurchus, on the Spey. By the barometrical measurement of Dr. Skene Keith, the former is 4244, and the latter 4304 feet above the level of the sea. But in Inverness-shire, as throughout the rest of the island, the highest ridge approaches much nearer to the Western than to the Eastern Sea. Accordingly we find, that the great mountain masses are accumulated towards the former side of the county, and it is there that Ben Nevis is situated. This gigantic mountain is 4370 feet; but it is not more remarkable for its superior altitude, than it is for the circumstance of its having its base almost washed by the sea, whence it towers up at once with a grandeur no where to be equalled in these kingdoms. It is never to be found without snow, and its top is almost constantly enveloped in clouds; but when it is uncovered, the view commanded from the summit is the most extensive that can be imagined, taking in a range of more that 170 miles, and embracing the greater number of the Hebrides. By going about a quarter of a mile up the river, above the house of Glen Nevis, it is easily ascended by one of its western ridges.

The most important lakes of Inverness-shire, are Lochs Ness, Oich, Lochy, Arkeg, and Morrer, already mentioned; Loch Clunie in Glen Morriston; Lochs Garry and Quoich in the district of Glen Garry; Lochs Laggan and Treig, emptying themselves into Glen Spean; and Loch Maddy, running into Strath Glass. To these Loch Ericht may be added, being partly in this county, and partly in Perth-shire. These lakes, depending for their shapes upon the lengthened glens in which they are situated, are all long and narrow. They generally deepen suddenly from within a few yards of the margin, where they are surrounded by a shallow beach. They are of various magnitudes, being on an average from six, to twelve, and fourteen miles in length.

Besides those we have enumerated, there are a multitude of smaller lakes, each of which in any other part of Britain would rise into importance.

The greater rivers of Inverness-shire are, the Ness, the Lochy, the Beauly, and the Spey; the lesser are, the Findhorn, the Nairn, and the Nevis. These have numerous large streams supplying them; as the Enneric and the Coiltie, the Morriston, the Garry, the Feachloin and Foyers, and the Farragig, all tributary to the Ness; the water from Loch Arkeg, and the Roy and Spean united, falling into the Lochy; the Farrer, Canuich, and Glass, forming the Beauly; and the Truim, the Trommie, and the Feshie, running into the Spey. Almost all these rivers are clear, rapid, and rocky. Those discharging themselves into the East Sea, have much longer courses than those entering the Western Ocean.

In Inverness-shire, as in all other mountainous countries, springs of water of the greatest purity are found every where. Those impregnated with mineral substances are more rare, or, at least, are as yet little known

Water of sulphureous impregnation issues in various places from the hills of Loch Ness; and chalybeate springs are found in various situations, particularly in the district of Strathspey.

In a county so varied, and so extensive as Inverness-shire, it is natural to expect a great variety of climate. From the constant alternation of hill and valley, the circumstance of two thermometers within half a mile of each other, denoting several degrees of difference of temperature, is not uncommon. The eastern part of the county, like the rest of the coast of Scotland, on the same side of the island, is subject to cutting east winds, often accompanied by dense and chilling fogs. But the prevailing breeze, as indicated by the general inclination of single trees in exposed situations, is unquestionably that blowing from the south-east. It is owing to the prevalence of this, that there is such a marked difference between the climate of the east, and that of the west coast, in respect to moisture, the former being comparatively dry, whilst the latter is exposed to constant and heavy rains. The watery vapour swept up by the wind, in its progress over the vast expanse of the Atlantic, is attracted by the summits of the great mountain chain, running along the western side of the island. It is there condensed, and thrown down on the narrow stripe of country at their base, in heavy rains, continuing with a duration corresponding to that of the current supplying them. But it is only when this wind blows with long and uninterrupted violence, that any great proportion of the aqueous accumulation thus formed is wafted over to the eastern side; and when this does happen, the extent of country between the hills and the sea, being infinitely greater there, the rains are more diffused, less violent, and less continued. But as the rain falling on the east coast, comes more frequently from the sea in its own immediate vicinity, it is generally remarked, that when it occurs, it almost always furnishes a security of the weather being fine on the west coast. Upon the whole, snow lies for a shorter period on land of the same height on the western, than on the eastern coast. These observations are to be understood as being merely general; particular places being subjected to particular modifying circumstances, rendering them exceptions to these laws.

The soil and surface of Inverness-shire is very various. It has been calculated, that only about one fortieth part of the county is arable land; and that probably twenty-six of the remaining parts are hills in a great measure covered with heath. Deducting these hills and moors then, the rest consists of clay, haugh or holm land, loam, gravelly or sandy soil, and till. Of these different descriptions of soil, the three first are the most rare, and the two last the most frequent. According to the map accompanying the agricultural survey of Inverness-shire, clay only appears extending in a very narrow stripe along the shores of the Beauly and Moray firths. Haugh or holm is found on the banks of the river Ness, in Glen Urquhart, at Invermorriston, at Fort Augustus, Loch Oich, on the river Lochy, and in Glenspean; on the west coast at Moidart and Glenelg, and some few intervening spots; along the river Spey in Badenoch, where it is most extensive; and on the river Findhorn, near Freeburn, and about the Loch of Moy, tributary to it. The loam is found at Inverness, stretching to the east of the town, and from the Caledonian Canal, running westward to Beauly, along the edge of the clay just noticed. There is a small patch of it streching northwards from Boleskine; Glen Roy is all loam, and part of the banks of the river and lake of Treig, the north shore of Loch Hourn, and the coast towards Glenelg, the banks of the river Nairn above and below Cantray, and the north bank of the Spey from Rothiemurchus to below Grantown, are all of this description of soil. To enumerate the gravelly, sandy, or tilly localities, would lead us beyond the bounds prescribed for this article.

The name of Inverness-shire, is certainly circuitously derived from the fall of Foyers. We have already stated, (see article Foyers,) that *ess*, signifying a waterfall, *loch an ess* is the lake of the waterfall; whence the names of the river, of the town, and lastly of the county. Inverness-shire contains 31 parishes, eleven of which belong to the Hebrides. These parishes are scattered amongst five or six different presbyteries. The districts into which the county has been divided by public arbitrary usage, are, Lochaber, Moidart, Arasaig, South and North Morrer, Knoidart, Glengarry, Glenelg, Glenmorriston, Urquhart, Strathglass, the Aird, Inverness, Petty, Ardersier, Stratheric, the Braes of Strath Nairn, the Braes of Stradearn, Badenoch, Rothiemurchus, and Strathspey; all of which are separately distinguished from one another. There are four sheriff-courts, one at Inverness, one at Fort William, one in Sky, and one in the Long Island. There are about 57 freeholders in the county, who return one member to represent it in parliament.

Druidical circles are numerous in the county, as well as those appearances denominated vitrified forts. (See Forts Vitrified.) At Glenelg, in the Aird, and at Dalchully, in Badenoch, are the remains of very singular ancient buildings, composed of large stones, nicely adapted to each other, without cement, supposed to have been Pictish or Danish alarm posts. The royal castle of Inverlochy, near Fort William, had once a thriving burgh attached to it, called, by some of the old historians, the emporium of Scotland. The castle, now in ruins, is a quadrangular building, with round towers at the angles, the whole area included within the outer ditch being nearly an acre and an half. The league between Charles the Great of France, and Achaius king of Scots, is said to have been signed here about the end of the eighth century. Urquhart castle, once a royal fort, capable of containing 600 men, but now a ruin, stands very picturesquely on a rocky point projecting into Loch Ness. It was reduced in 1303 by Edw: I. and, in 1334, Robert Lauder, the governor, maintained it against the English, then espousing the cause of Edward Baliol. The castle of Invergarry was burned in 1746; its ruins are situated on a bold rock, rising from the side of Loch Oich. Besides these, there are many other castles of inferior note. Loch Moidart, on the west coast, is famous for having been the landing place of the young Pretender in 1745; and Culloden Moor, well known as the scene of his final defeat, on the 16th April, 1746, lies on the flat and lengthened ridge of a hill about a mile from Inverness. The graves of the slain are distinguished by rising green from amidst the brown heath. We are not disposed to class what are called the parallel roads of Glen Roy, under the head of antiquities, as we conceive them to owe their origin to natural causes. (See Parallel Roads.)

The population of Inverness-shire, in 1811, was estimated at 78,336; it is much to be feared, however, that it has not been on the increase since that period. The sheep farming system, prosecuted with so much eagerness by many of the great proprietors, particularly by those on the western coast, has compelled the Highlanders to emigrate with their families to America, in bodies so considerable as to depopulate large districts.

Some of the great landed proprietors in this county are, the Duke of Gordon, the Earl of Moray, the Earl of Seafield, Lord M'Donald, Lord Cawdor, Fraser of Lovat, M'Donald of Clanronald, M'Leod of M'Leod, M'Intosh of M'Intosh, M'Donell of Glengarry, M'Pherson of Cluny, Chisholm of Chisholm, Cameron of Lochiel, &c. The whole valued rent of the county, as fixed by the commissioners at Inverness in 1601, amounts to about 72,836*l.* Scots.

The difference which exists between the climate and character of the east coast, and that of the west, is productive of very different modes of turning the surface to account. The comparative flatness and dryness of the former encourages agriculture, which in many districts, particularly about Inverness, the Aird, &c. has been carried to the greatest perfection. Grain of all sorts, such as wheat, barley, oats, rye, &c. as well as pease and beans, are raised of the best possible quality. The farms are in general large, the leases of the duration of 19 years, and the tenants respectable. Lime is much employed as a manure, and green crops are every where raised with success, in these eastern maritime districts; and they are even beginning to be cultivated by the more intelligent tenants in the higher glens. Many very spirited improvements have been carried on by proprietors. Mr Bailie of Dochfour has lately rendered arable a large portion of his estate, by trenching and draining. And Mr M'Pherson Grant, of Ballindalloch, has effected a drainage on his estate of Invereshie in Badenoch, upon a scale so great as hardly to be paralleled by the exertions of any one individual. We regret that our limits do not permit us to give a detailed account of an undertaking so interesting to the rural economist; but we cannot pass it over without noticing the outlines of it. The subject is a large, flat, alluvial deposition, evidently formed by the river Spey, which runs along the north side of it to enter Loch Inch. It is bounded on the south side by the ground rising from the valley, on the west by the river Trommie, there joining the Spey at right angles; and on the east by a round hill, dividing it from Loch Inch. Extending about three miles in length, it is, at its greatest breadth, about three quarters of a mile, and contains about 650 Scots acres: It lies so level in its whole extent, that not above three or four feet of fall could be obtained. Numerous springs rising in the ground itself, and the water of upwards of ten streams of different sizes, discharging themselves into it from the hills on the south, contributed to render it a morass, which, whenever the Spey overflowed its banks, was converted into a large sheet of water. A partial defence against the river had been begun at the junction of the Trommie with the Spey; but finding that this was quite ineffectual, Mr Grant began, in 1807, to carry a more substantial embankment from this point, all along the edge of the Spey, towards the junction of that river with the lake, where he united it to the north end of the round hill, already noticed as existing there. Beginning at the the lake, he cut a canal up through the opening to the south side of the round hill, and continuing it up the south side of the flat, and along the bottom of the high ground, he in this way intercepted all the streams, and compelled them to flow by the canal into the lake, through a valve floodgate, so constructed, as to prevent any regurgitation from its floods. Drains running diagonally from the embankment, and discharging themselves into the canal, were cut across various parts of the level, serving not only effectually to dry it, but also to subdivide it. The whole length of embankment, following the sinuosities of the river, is about three miles and a half, averaging six feet in height, and thirty feet in base. The canal is about three miles in length, and 21 feet wide. The whole expence of the work was about 2300*l.*, and the subject is improved about 300*l.* per annum. It is chiefly used as pasture; but from some parts of it there are cut very rich crops of fine natural hay, chiefly fiorin. One field of 20 acres has repeatedly given upwards of 6*l.* per acre of rent; which, when the high situation is considered, is perhaps no where equalled in the kingdom. Mr Macpherson of Belleville, also, has embanked to a very considerable extent on the north side of the river.

On the west coast, the agriculture of the farms consists in little more than the culture of a few potatoes or a patch of barley, on such small spots as can be dug with the spade; nor would the moisture of the climate admit of the secure harvesting of large crops of grain, what is raised being generally housed in great covered barns, having air holes through them. The riches of this part of the county, depend on the immense flocks of sheep covering the many hills, now required to constitute the large farms of individuals. 2000*l.* or 3000*l.* a-year, is not an uncommon rent for a single farm, the extent of which may be many miles. The hills on this side of the island are all beautifully green, and this fresh hue is manifestly increasing, by the constant pasturing of sheep. It must, therefore, be admitted, that, however harsh may be the measures leading to a commencement of this system, it is unquestionably the mode of employing the estates in the western part of the country pointed out by nature as the best.

The salmon fishings on the river Ness let for 1200*l.* per annum, and those of the other rivers in a ratio equal to their comparative value: the fish are mostly sent to supply the London market. The herring fishery, particularly where the fish are cured and exported, also affords a considerable branch of commerce.

Fort George is situated at the northern extremity of the county, on a low point stretching into the Moray Firth, the passage of which it commands. It was begun to be built under the direction of General Skinner, by the orders of the Duke of Cumberland, in 1747, and cost 160 000*l.* in the completion. The citadel occupies fifteen English acres. The ramparts are washed by the sea on three sides, and the ditch surrounding the remainder can be filled at pleasure. It is well supplied with water, has four bastions, 80 cannon, and contains barracks for 3000 men. Though a beautiful specimen of fortification, it is considered defective as to position; and is particularly assailable from the east along the shore, under cover of a sandy bank. Fort Augustus, situated at the western end of Loch Ness, was built in 1730. It has the lake on the north, the river Tarf on the south-east, and the Erish on its north-west side. It has four bastions, and barracks for 400 soldiers. It was taken by the rebels in 1746, but was afterwards deserted by them. Fort William stands at the eastern extremity of Loch Linnhe. It was originally built during Cromwell's usurpation, when it occupied much more ground than it does now. It was rebuilt by King William on its present reduced scale, and is now of a triangular form, having two bastions, 15 twelve pounders, and some mortars. In 1746 it stood a siege of five weeks, which was as last raised, with the loss to the garrison of only six men killed and four wounded. These two last forts were adapted for nothing else but keeping the undisciplined Highlanders in awe. They may now, however, be of some use as stations, for those who are to look after the Caledonian Canal, and to collect its imposts. (For an account of this great national work, see INLAND *Navigation*.)

By the late exertions of the parliamentary commissioners for Higland roads and bridges, numerous and convenient communications have been opened between the different parts of this county. The roads are all carried on excellent lines, and executed in the most superior and substantial manner. The road up the north side of Loch Ness, cut through solid rock, is a grand example of what human industry can accomplish in overcoming natural difficulties.

It is for the most part carried along the face of perpendicular precipices hanging over the lake. An enumeration of all the roads made in Inverness-shire under the direction of this body would exceed our limits; we must, therefore, refer to the map, accompanying their last report to parliament on this subject: suffice it to say, that the total length of line, without including Sky, does not amount to less than 282 miles. The employment of such a number of hands as have been required to execute these roads has tended in some measure to raise the price of labour; but it has also given a degree of dexterity to the workmen of the Highlands not formerly possessed by them, which will be of great future benefit to the country.

We intended, under the present article, to have given an account of the island of HARRIS, and the other smaller islands which belong to the county of Inverness; but we have thought it better to include the whole of these islands under the heads of LEWIS, and the islands connected with it, (including HARRIS,) SKY and UIST. (T. L. D.)

INVERSION, in music, consists in placing one of the notes of a consonance either an octave higher or lower than it is written, or had before been considered; by which means, the *complements* of the inverted notes to the octave are produced. On comparing the ratio of inverted notes with those of their originals, it will be found, that one of the terms remains the same, and the other term is either halved or doubled. (*e*)

INVOLUTION. See ALGEBRA.

JOAN OF ARC. See ARC.

JOANNINA, the capital of Albania, and, next to Salonika, Adrianople, and Widdin, the most considerable place in European Turkey. It is said to have been founded by Michael Lucas Sebastocrator, and by the despot Thomas, who conquered Amurath Bey, the general of Amurath II., in 1424. It stands on the west bank, and near the northern extremity, of a large lake; and is about two miles and a half in length, and in some places nearly a mile in breadth. The ground on which it is built begins to rise and to become uneven towards the north and west, and a triangular peninsula, jutting into the lake, and defended by fortifications, contains the residence of the pasha. There are two principal streets, one running nearly the whole length of the town, and the other cutting it at right angles, and extending to the fortress. Many of the houses are large and well built. The bazar, or the street inhabited by tradesmen, is well furnished with shops of a shewy appearance; and the bizestein, or covered bazar, is of considerable size. There is a summer residence of the vizier in the suburbs, at the north-west end of the town, built in the form of a pavilion, in a very superior style; containing a large saloon, floored with marble, and situated in the midst of a garden, which is filled with the fruit-trees of the country, but otherwise in a wild and tangled state.

The first view of Joannina, on the road from Arta, is extremely beautiful. The houses, domes, and minarets, appear glittering through groves of orange, lemon, and cypress trees; and the lake spreads its smooth expanse at the foot of the city, while the mountains rise abruptly from its banks. The lake is about 10 or 12 miles in length, and three in breadth, stretching from north-west to south south-east, and containing two woody islands, one of which, towards the south, is of considerable size. On the western side of the lake are seen a beautiful verdant plain, the whole line of the town, and a long succession of groves and gardens; and, on the north and east, a chain of lofty mountains, one range of which, running from north to south, called Tomorh, is the ancient Tomasus, and another, from north to south-east, called Metzovo, is the ancient Pindus, dividing that part of Albania from the plains of Thessaly. The southern extremity of the lake extends into a hilly country, and forms at last a small river, which disappears for a few miles before it reaches the marsh on the banks of the gulph of Arta; and hence, by some geographers, has been improperly styled the ancient Acheron, which did not flow into the Ambracian, but the Thesprotian Gulph.

The population of Joannina is computed at the lowest to be 35.000, of which one-tenth are Mahometans, and the remainder Christians, with a few Jews. The Greek citizens are considered as a distinct race from the inhabitants of the adjacent country, and are supposed to be descended from ancient settlers who had retired from Peloponnesus. They are remarkably industrious, and excel in works of embroidery. Except the priests, and a few persons employed by the pasha, they are all engaged in trade; and many of them have spent three or four years in the mercantile houses of Trieste, Genoa, Leghorn, Vienna, and Venice. They are, in general, well acquainted with the manners and languages of Christendom; and the town altogether affords a very safe and agreeable residence to travellers. The inhabitants are subject to tertian fevers during the spring and autumn seasons, which has been ascribed to the vicinity of the lake; and the islands in the lake are said to be visited with earthquakes, especially in the month of October.

The annual revenue, drawn from the city by the pasha, is said to be 250,000 piastres. A fair is held once a-year about a mile and a half from the city, and continues for the space of a fortnight. On that occasion, all the tradesmen in the city are obliged to shut their shops, and to erect booths in the fair, resembling those of England, which are regularly arranged like streets, and thus afford a full view of the merchandise of the place. There are caps from Trieste, Leghorn, and Genoa; knives, sword-blades, gun-barrels, glass and paper from Venice; some coffee and sugar from Trieste; gold and silver thread from Vienna. But the chief articles of importation are French and German cloths from Leipsic, which are purchased by all the richer Greeks and Turks of the neighbouring countries for winter robes and pelisses. English cloth is the most esteemed, but is seldom met with, on account of its high price; and the best of what is sold at the fair of Joannina is not equal to the worst of English fabric. The articles of exportation are, oil, wool, corn, and tobacco for Naples, and the ports of the Adriatic; spun cottons for the plains of Triccola; stocks of guns and pistols, embroidered velvets, stuffs, and cloths, for the inland consumption of Albania and Romelia. Large flocks of sheep and goats, and droves of cattle and horses, from the hills of Albania, are collected also at this fair, and sold for the Ionian Islands. The balance of trade is in favour of Joannina, and is paid in Venetian sequins. See Hobhouse's *Tour in Albania*, and Holland's *Travels in Greece*. (*q*)

IODINE. This word is of Greek etymology, and signifies a *violet colour*. It has been recently introduced into the French and English languages, for the purpose of being applied as a name for a chemical substance recently discovered. The description of that substance and its properties will now hold a prominent place in all systems of chemistry; but it is one with which the science has been enriched since our article Chemistry was published. What applications it may admit of in the useful arts we do not as yet know; but those properties which it has been found to possess render it extremely interesting to chemistry as a science, by affording scope for experimental investigation and scientific reasoning; and it so happens that it gives an additional importance, by its curious analogies, to some of those doctrines which have been in modern times most keenly contested, and in which the contending parties, with all the advantages of patient experiment and consummate acumen, aided by the zeal which a certain degree of opposition of opinion excites, have scarcely been able to devise experiments of a decisive kind.

The discoverer of iodine was M. Courtois, a manufacturer of nitre in Paris, whose attention was directed to the subject, in consequence of a corrosion to which the metallic vessels employed in the process for procuring soda from the ashes of sea-weeds were liable, the cause of which he investigated, and in the investigation discovered this substance. The leading investigators of its chemical properties have been M. Gay-Lussac and Sir Humphry Davy; both of whom have mingled their experimental inquiries with their views of the more recondite laws of chemical change. In the present article, it is our intention to give a plain and perspicuous account of the leading facts, without omitting to notice the most important and least intricate of the arguments connected with them.

M. Courtois discovered iodine in the year 1811; and the discovery was announced to the Institute by M. Clement about two years after, viz. on the 29th of November 1813. The chief reason of this long delay seems to have been, that these two gentlemen had wished to ascertain previously the qualities of this new substance, but had been prevented by the attention which their other pursuits demanded, from executing their design so speedily or so extensively as they hoped.

This substance is procured from kelp in the following manner. The kelp is treated with hot water till all its soluble parts are dissolved. The solution is then evaporated, and from the dry salt the substance in question is separated by sulphuric acid. The salt is put in a tubulated retort, deep, but not large. The beak of the retort, which ought to be short, is introduced into a large globular glass receiver, which has an opening to allow the air to escape. Concentrated sulphuric acid is poured on the salt, through the opening, which is then closed with a stopper. An active effervescence ensues, and a violet-coloured gas is driven off, which crystallizes on the inside of the receiver. This is the iodine. When raised to its vaporific point of temperature, it is a violet-coloured gas. Below that point, it has the form of brownish black shining plates.

It was at first erroneously reported that the iodine was obtained from the insoluble parts of kelp. It cannot be obtained from pounded kelp. The solution and crystallization seem to be indispensable pre-requisites to the operation.

The following method, recommended by Dr. Wollaston, yields it more abundantly. After concentrating the aqueous solution of the soluble parts of kelp, and separating from it all the crystals that can be obtained, the remaining liquid is to be poured into a clean vessel, and mixed with an excess of sulphuric acid. This is boiled for some time, during which process sulphur is precipitated, and muriatic acid is driven off. The clear liquid is then decanted off, and strained through wool. It is next put into a small flask, with a quantity of black oxide of manganese, equal to that of the sulphuric acid first employed. A glass tube, closed at one end, is fixed to the top of the flask, and heat applied to the bottom. The iodine is sublimed and crystallized within the tube. Soaper's black ashes yield it in large quantity.

This substance has all the interest of a newly discovered gas, and derives a further interest from being the second coloured gas known in chemistry; colour being a property possessed by none previously known, excepting the oxymuriatic or chlorine gas. A volume of it of considerable diameter exhibits a beautiful and rich violet appearance.

In the solid state, it has the form of flat octahedral crystals, the axes of which are in the proportion of two, three, and four. The form which most frequently appears in a section parallel to the plane of the greatest and smallest axis is a rhombic plate, bevelled at each of its edges by two narrow planes, inclined to one another at an angle of about 120°.

According to the experiments of Dr. Brewster, iodine possesses the property of polarizing, in two opposite planes, the light which it reflects, a property which is peculiar to metallic bodies.

Its fusing temperature, when pure, is 225°, and it is volatilized at 347° or 356°; though it may be distilled over with water at 212°. Its odour resembles that of oxymuriatic gas, though weaker. It is soft and friable, and may be rubbed into a fine powder. Its taste is acrid, and its action on the stomach poisonous. It gives a *deep brown* stain to the skin, which, however, is soon removed. Like the oxymuriatic acid, it destroys vegetable colours, though with less energy. It is soluble in 4000 times its weight of water, and communicates to it an orange yellow colour. Its specific gravity at 62½° is 4.948.

Iodine is not combustible, and cannot be made to combine by any direct method, with oxygen.

It has the property of combining with almost all the metals. In this, and some other properties, it resembles the oxymuriatic or chlorine gas; but much less heat is evolved than by the combination of the metal with this last-mentioned substance. One probable reason of this is, that iodine is previously in a solid state. From this property, however, Dr. Thomson classes it with chlorine and oxygen, under the title of supporters of combustion. In this particular, it is to be observed, it also resembles sulphur, which combines with metals with an evolution of caloric.

Potassium, during its union with iodine, emits a pale blue flame. The result of the union is a white compound, fusible at a red heat, soluble in water, of an acrid taste, and re-yielding the iodine when treated with sulphuric acid.

With iron, mercury, tin, zinc, and lead, it forms compounds, fusible at a moderate heat, and generally of bright colours. Most of these are capable of forming compounds with potass, from which sulphuric acid evolves the iodine.

Under water, zinc and iodine combine on the application of a moderate heat. 100 parts of iodine combine with about 26.225 of the metals. These metallic compounds are called iodurets. Iron is acted on in the same manner. The ioduret of iron is brown, and fusible at a red heat. Its solution in water is of a light green, like the muriate, or what Gay-Lussac called the chloruret of iron, from supposing that it is not a combination of a metallic oxide with muriatic acid, but of the pure metal with chlorine.

The ioduret of tin is very fusible. When in powder it has a dark orange colour. It was found by Sir H. Davy to possess the characters of an acid. It combined with the alkalies without depositing any oxide. The ioduret of antimony is, like the preceding, fusible, and resembles it when in the state of powder. The iodurets of lead, copper, bismuth, silver, and mercury, are insoluble in water, a property in which they differ from those of the more oxidable metals.

There are two iodurets of mercury, the yellow and the red, depending on differences of proportion in the combinations. The yellow ioduret contains one half less iodine than the red.

The iodurets of the metals are decomposed by chlorine, which unites with the metals, and expels the iodine. When ioduret of potassium is heated in contact with chlorine, chloruret of potassium (the substance called muriate of potass) is formed, the violet gas appears, but soon unites with chlorine, and they form by their union a peculiar acid compound; but towards the end of the process, as the proportion of chlorine diminishes, the violet coloured gas again appears. Ioduret of silver gives similar phenomena. Iodine, however, appears to possess a stonger attraction for most of the metals than oxygen.

Charcoal has no action on iodine, either at high or low temperatures.

With sulphur, iodine forms a weak compound of a greyish black colour, radiated like sulphuret of antimony, and iodine is separated from it when distilled with water.

With phosphorus it combines in different proportions with the disengagement of heat without light. One part of phosphorus and eight of iodine form a compound of a red orange brown colour, fusible about 212°, and volatile, at a higher temperature.

With 16 parts of iodine to 1 of phosphorus, a greyish black crystallized compound is formed, fusible at 84°. With 24 parts a black compound is obtained, partially fusible at 115°.

The iodurets of phosphorus exhale, when moistened, acid vapours. These are an acid substance, bearing the same relation to iodine that muriatic acid does to chlorine; and those who still maintain that chlorine is a compound of muriatic acid with oxygen, and that muriatic acid is obtained from it by separating the oxygen, may consider iodine as a compound containing oxygen, and the acid produced from it as comparatively a simple substance, being deprived of the oxygen contained in the iodine. But in this case, as in the former, the presence of hydrogen is essential to the formation of acid from the alleged compound. This most commonly happens from the presence of water; and for this, among other reasons, Gay-Lussac and Sir H Davy consider the chemical change induced as consisting in the union of a simple substance, chlorine in the one case, and iodine in the other, with hydrogen. Though fully aware of the difficulty of deciding this question in the present state of science, we shall adopt the phraseology and nomenclature which depend on the latter of these theories, and which are in conformity with the doctrines of chlorine and muriatic acid, as stated in our article CHEMISTRY. We shall keep in view that an acid is obtained from iodine by combining it with hydrogen, and this we shall call the *hydriodic* acid. This indeed is a matter of fact, whether iodine is regarded as a simple or a compound body.

Hydrogen, whether dry or moist, has no action on iodine at the ordinary temperature; but when a mixture of it with iodine is exposed to a red heat in a tube, they unite, and hydriodic acid is produced, which shews its presence by giving a reddish brown colour to water. The cause of this colour will afterwards appear. In this process, 100 parts of iodine absorb only .849 by weight of hydrogen.

Hydriodic acid is produced most easily by means of ioduret of phosphorus. In order to procure it free from any admixture of phosphuretted hydrogen, it is necessary to employ a compound in which the phosphorus does not exceed a ninth part. This ioduret was, in the experiments of Gay-Lussac, moistened with pure water, or, what is better, water containing some hydriodic acid previously formed. Another method is to put the iodine into a small tube, which is then to be reversed in mercury, and the air expelled from it, by introducing a glass rod which nearly fills it; after which the phosphorus is brought in contact with the iodine, by being made to rise through the mercury; the substances immediately combine, and the hydriodic gas is disengaged, and may be collected, by putting the open extremity of the tube under a glass jar standing in the mercury. The gas, however, begins to be decomposed as soon as it comes in contact with the mercury. The iodine combines with the mercury, forming a greenish yellow ioduret. By agitating the mercury, this decomposition may be made to extend to the whole gas present, and a volume of hydrogen is left exactly equal to one half of the hydriodic gas. The contact of zinc and potassium produces the same result.

Hydriodic acid gas is colourless and has an odour similar to that of muriatic acid. Its taste is intensely acid. It saturates its own bulk of ammoniacal gas. Chlorine deprives it of its hydrogen, and reduces it to the state of iodine, while itself assumes the form of muriatic acid. This acid is denominated by Gay-Lussac hydrochloric, being formed of chlorine and hydrogen, and this name represents the analogy subsisting between it and the hydriodic. The specific gravity of hydriodic gas is to that of air as 4443 to 1000. Iodine and hydrogen combine in equal volumes to produce this gas, and, as the vapour of iodine is the heaviest we are acquainted with, being to that of oxygen as 15.621 to 1, and to that of hydrogen as 117.71 to 1, it does not take one hundreth part of its weight of the latter gas to be converted into an acid. On this part of the subject, Gay Lussac takes occasion to illustrate his principle on the ratio of saturation, as being determined by the relative densities of bodies in the state of vapour. The facts, as applied to the well-known gaseous substances, were first pointed out by that philosopher, and the doctrine extended by him to all other bodies, though of course it can only be determined with regard to those which we find capable of being raised to the state of vapour in our experiments, and not to all of these, as the high temperature at which many of them are volatilized renders all manipulations on their vapour, for the purpose of ascertaining their specific gravity, unmanageable.

Hydriodic gas is partly decomposed by a red heat. By the presence of oxygen, the decomposition is rendered more rapid and complete, and water and iodine are the products.

Hydriodic gas has a very strong attraction for water; a very large quantity of the gas is absorbed by a very small quantity of water, imparting to it a great increase of density, and the solution when strong is smoaking. The most convenient way of obtaining this acid in a liquid state is, to dissolve ioduret of phosphorus in water. Part of the water is decomposed, the hydrogen forming hydriodic acid, and the oxygen a portion of phosphorous acid. When heat is applied, the two acids are separated. Another and an easier method is, to pass sulphureted hydrogen through water containing iodine. The hydrogen goes to form the acid required, and the sulphur is precipitated. Heat is then applied to drive off the excess of sulphureted hydrogen, and a colourless hydriodic acid is procured, from which the sulphur precipitated to the bottom of the vessel may be decanted off. This acid, like the sulphuric, may be concentrated by evaporation, and, till it is raised to 257°, the vapour which it loses is almost pure water. While under this temperature, therefore, it may be evaporated in an open vessel, or the liquid which distils over may be thrown away. When raised to this temperature, it gives over an abundant quantity of acid, and it does not admit of being heated above 262½ under the common atmospheric pressure. This is the boiling point of the acid; and, being comparatively high, it prevents it from being disengaged from any neutralizing base by the volatile acids.

When distilled, or even simply exposed to the air, it assumes a brownish-red colour, from a partial decomposition by the contact of oxygenous gas, which forms water with its hydrogen; and the iodine, which is then evolved, combines with the liquid acid. This change is assisted by light and heat. The property of absorbing and dissolving iodine is one of the most prominent that belong to this acid, and the iodine is not capable of being driven off from it by heat, as it may from a simple solution in water.

Hydriodic acid is rapidly decomposed by sulphuric and nitric acid, and by chlorine, which seize on its hydrogen, and the iodine is either precipitated in brown crystals, or exhales in purple vapours. Chlorine is a delicate test of this acid, as the purple vapours instantly appear when it is dropped into any solution which contains it; but they are speedily re-dissolved by the acid, and therefore the chlorine must be cautiously added. When heated with black oxide of manganese it affords iodine, and an hydriodate of the metal. With red oxide of lead it affords iodine and an ioduret of the metal, the oxygen of the oxide going to form an additional quantity of water.

Before we proceed farther, it may be proper to state the meaning of some terms connected with this subject. *Iodine* and *hydriodic acid* have been explained. The compounds of the acid, with neutralizing bases, are called *hydriodates*. Iodine, as we shall find, may be combined with oxygen, and the compound possesses acid properties. This acid is called by Gay-Lussac the *iodic*, and the compounds which it forms by uniting with neutralizing bases, he calls *iodates*. Dr. Murray calls this acid the *oxiodic*, and its compounds *oxiodates*. We shall adopt these last terms, as well fitted to keep the facts in mind, and capable of being adapted to any theory.

The combination of iodine with azote cannot be produced by direct experiment. Ioduret of ammonia must be first formed. We shall therefore describe the phenomena which iodine exhibits with ammonia, previously to the consideration of the other alkalis. It differs from these others by not containing oxygen, a circumstance which materially affects the characteristic results of the chemical changes. When ammoniacal gas is passed over iodine, a viscid shining liquid is immediately formed, of a brownish-black colour, which, in proportion as it is saturated with ammonia, loses its lustre and viscosity. This is an ioduret of ammonia. When dissolved in water, the hydrogen of the ammonia unites with one portion of the iodine to form hydriodic acid, and its azote unites with another, to form an ioduret of azote. Or this substance may be obtained directly, by putting iodine in fine powder into an aqueous solution of ammonia. This ioduret is pulverulent, and of a brownish-black colour. It detonates from the smallest shock and from heat. The flame is of a feeble violet colour. When delicately prepared, it sometimes detonates spontaneously. When this compound is put in potash, the azote is disengaged, and the same products are obtained as when iodine is brought in contact with that alkali

Iodine undergoes no change on the contact of gaseous sulphurous acid; but, when the acid is dissolved in water, part of the water is decomposed. Its oxygen converts the sulphurous into sulphuric acid, and its hydrogen the iodine into hydriodic. These cannot be separated by heat, for the temperature which volatilizes hydriodic acid decomposes, under these circumstances, the sulphuric, reproducing the original sulphurous acid and the iodine. While the liquid is distilled over, these are the two ingredients, and it is coloured by the iodine; but, when cooled in the receiver, it resumes the state of sulphuric and hydriodic acids in limpid mixture.

The action of iodine on the oxides takes place both with and without the presence of water, but exhibits different phenomena, according to this difference of circumstances. When brought in contact with the oxide of potassium produced by combustion, it combines with the potassium to form an ioduret, and the oxygen is disengaged.

Barytes, strontites, and lime, unite with iodine, without the evolution of any gas. The oxides of zinc and iron undergo no change. The iodurets of barytes, strontites, and lime, show strong alkaline properties when dissolved in water, and are considered by Gay-Lussac as subiodurets.

When iodine and oxides are made to act on one another in contact with water, the water is decomposed, its hydrogen forms hydriodic acid with a portion of the iodine, and its oxygen combines with another portion to form oxiodic acid. This takes place with potass, soda, barytes, strontites, lime, and magnesia.

Iodine, when made to act on a concentrated solution of potass, is rapidly dissolved, and forms, as one of the results, a granular white precipitate, which is shown to consist of oxiodic acid, combining to form an oxiodate with potass; for this substance deflagrates on burning coals like nitre, giving out oxygen, and becoming ioduret of potass. The solution consists of hydriodate of potass, containing iodine. It is of an orange yellow, but, when saturated with iodine, it is of a deep reddish-brown. When it is evaporated, and heated to redness, an ioduret of potassium is formed. In the first part of this process, the oxygen, according to Sir H. Davy, is expelled from one part of the potass, to form the ioduret of potassium, and is united to another to form the oxiodate of potass. But Gay-Lussac's view of it, that water is decomposed, its oxygen serving to form the oxiodate, and its hydrogen the hydriodate, seems more completely conformable to the facts. Sir H. Davy, from his first experiments, conceived that iodine formed substances analogous to alkalis, by combining with the alkaline metalloids; for the compound produced by its action on solution of potass, even when it was in great excess, reddened turmeric paper, and rendered the colouring matter of violets green; but he afterwards found that this was owing to a small quantity of supercarbonate of potass which existed in the hydrate; and when the compound is treated with hydriodic acid, and heated to redness, so as to produce an ioduret, it loses this property, and acquires the taste of a neutral rather than an alkali. Concentrated soda produces similar phenomena; a deflagrating oxiodate is precipitated, and a hydriodate retained in solution. The case is the same with barytes, lime, and strontites, and their oxiodates have little solubility. Hence these salts are obtained in a state of considerable purity.

When peroxide of mercury is exposed to a heat between 140° and 212° in water and iodine, a super-oxiodate of mercury is formed, which is held in solution, and an oxiodate which is insoluble, and remains mixed with the red ioduret, which is at the same time formed.

The oxiodic acid, in order that its properties may be ascertained, ought to be obtained in a state of separation from the bases with which it is combined in its formation. For this purpose Gay-Lussac adopted the following process: Upon oxiodate of barytes, he poured sulphuric acid, diluted with twice its own quantity of water, and heated the mixture. The oxiodic acid in this case, according to him, abandoned its earthy base, and combined with the water. A small quantity of the sulphuric acid continued mixed with it, in consequence of the strong affinity of oxiodic acid for barytes. Sir H. Davy, however, found reason to be dissatisfied with these results, as disguising the real properties of this compound: and he succeeded in producing one in a pure state, by bringing together iodine and euchlorine, (hyperoxymuriatic acid,) in the form of gas, at the ordinary temperature of the atmosphere. The resulting compound, when the other ingredients were driven off by heat, was a white semitransparent solid, of an astringent and acid taste, and sufficiently heavy to sink in sulphuric acid It is deliquescent: its aqueous solution may be evaporated to the consistence of a syrup, and, by the continuance of heat, may be reduced to the original solid compound. It detonates when heated in mixture with inflammable substances. The oxiodic acid obtained by Gay-Lussac differed from this, by containing a portion of sulphuric acid, which prevented that chemist from being able to procure it in a solid form, and led him to believe that water was essential to its constitution. This acid cannot be procured by the direct union of iodine with oxygenous gas.

Dry iodine, when presented to chlorine gas, rapidly absorbs it in a quantity less than one-third by weight, producing a compound, which in some parts has a fine orange yellow colour; in others an orange red. The yellow parts contain the largest proportion of chlorine, and are the most volatile. The yellow compound is called, by Gay-Lussac, the chloruret, and the red the sub-chloruret of iodine. Both of them speedily deliquesce in the air. The solution of the chloruret is colourless, when the excess of chlorine is driven off, and then the mutual saturation of the two constituents appears to be complete. These solutions are very acid, and destroy the colour of a solution of indigo in sulphuric acid. The chloruret receives from Sir H. Davy the name of chlorionic acid. When a solution of it is saturated with an alkali, the chlorine requires hydrogen, and the iodine oxygen, so that a muriate and an oxiodate of the alkali are obtained. Such are the relative tendencies of these two substances. That of combining with hydrogen is greatest in chlorine, and that of combining with oxygen is greatest in iodine. Heat disengages part of the chlorine, and reduces the solution to a sub-chloruret. The solution of the sub-chloruret is more stable, and capable of being volatilized without decomposition.

We shall now describe the properties of the neutral salts formed by combinations of the acids of iodine with salifiable bases. First the hydriodates, and then the oxiodates.

The hydriodates may, in general, be obtained by combining hydriodic acid with the bases. But those of potass, soda, barytes, strontian, and lime, may also be prepared, by treating iodine with these bases, and employing the methods already described for separating these salts from the oxiodates, which are formed at the same time. The hydriodates of zinc and iron, and in general of all the metals that decompose water, are obtained by dissolving the iodurets of those metals in water, and applying heat.

The hydriodates are not changed by sulphurous or muriatic acid, or sulphuretted hydrogen. Chlorine, nitric acid, and concentrated sulphuric acid, constantly decompose them, and separate the iodine.

When a solution of hydriodate of potass is made to crystallize, the oxygen of the potass and the hydrogen of the acid unite, according to Gay-Lussac, to form water, and crystals of ioduret of potassium are formed; these are considered by that chemist as completely analogous to the compound of chlorine and sodium, his chloruret of sodium, the sodane of Sir H. Davy, and the muriate of soda of former chemists. That there is no alkali in these compounds, and that the appearance of alkaline properties, neutralized by an acid, arises from the chlorine supplying the place both of oxygen and acid, though it contains no oxygen and possesses no acid qualities, is one of the striking paradoxes which the adherents of the old school find most difficulty in admitting, and which, in determining the plausibility of the two theories, seems to form a sufficient counterpoise to the curious coincidencies in some other particulars by which the new doctrines are supported. Hydriodate of potass is composed of

Hydriodic acid . . .	100.
Potass	37.426

Hydriodate of soda may be obtained in flat rhomboidal prisms of considerable size. These unite to form larger ones, terminated in echelon, and striated like crystals of sulphate of soda. They contain a large proportion of water of crystallization, and are very deliquescent. Heat drives off the water, melts the salt, and then renders it slightly alkaline. It does not sublime so easily as hydriodate of potass. At the temperature of 57, 100 parts of this salt are soluble in a little more than 57 parts of water. When dried, Gay-Lussac considers it as an ioduret of sodium, conformably to the doctrine already mentioned, which makes the salt called muriate of soda a chloruret of sodium. Hydriodate of soda is composed of

Acid	100.
Soda	24.728

Hydriodate of barytes crystallizes in fine prisms, like those of muriate of strontites. These are very gradually decomposed by exposure to the air, and iodine is evolved. They are faintly deliquescent, but have great solubility in water. They bear, without change, a very strong heat; and heat neither melts this salt, nor alters its state of neutralization; but, if oxygen is made to play on its surface when thus heated, vapours of iodine are evolved, and the salt becomes alkaline. A red heat, according to the opinion of the chemist just mentioned, converts it into an ioduret of barium. Hydriodate of barytes is composed of

Acid	100.
Barytes	60.622

The hydriodates of lime and strontites are very soluble. That of lime is also very deliquescent, and has a bitter taste, similar to that of the muriate of lime.

Hydriodate of ammonia may be formed, either by combining equal volumes of ammoniacal and hydriodic gas, or by saturating the liquid acid with ammonia. It possesses nearly the volatility of muriate of ammonia, but it is more soluble and more deliquescent. It crystallizes in cubes.

The hydriodate of magnesia, formed by uniting its constituents, is deliquescent, and crystallizes with difficulty. When heated to redness, the acid abandons the magnesia, in the same way as takes place with the muriate of this earth.

The hydriodate of zinc is obtained by putting iodine in water with an excess of zinc, and applying heat. This salt is extremely deliquescent, and scarcely crystallizable by evaporation. Heat deprives it of its water, then melts it, and sublimes it in fine prisms. If this is performed in close vessels, the salt is not decomposed; but air, when admitted, disengages iodine, and oxide of zinc is left behind. This hydriodate is composed of

Acid	100.
Oxide of zinc	32.352.

When a solution of hydriodate of soda, or potass, is mixed with a solution of the salts of manganese, nickel, or cobalt, no precipitate is obtained; which shews that the hydriodates of these metals are soluble.

The hydriodate of soda, however, gives metallic precipitates with the salts of copper, lead, mercury, silver, and bismuth. That of copper is whitish-grey, that of lead a fine orange-yellow, that of protoxide of mercury greenish-yellow, that of per-oxide of mercury orange-red, that of silver white, that of bismuth chesnut-brown. These are considered by Gay-Lussac, not as consisting of hydriodic acid and the oxides, but of iodine and the metals, and he therefore calls them metallic iodurets. Those chemists who adhere to the old opinions, and apply them to the substances now under consideration, will not allow that there is any difference corresponding to these terms, because they consider iodine as a combination of the acid with oxygen.

All the hydriodates have the property of dissolving a large quantity of iodine, which imparts to them a deep reddish-brown colour. It is separated from them by boiling, or exposure to the air in a dry state. This seems to be a simple solution, and not attended with any saturation of properties.

The oxiodates of the alkalis, as was already mentioned, are formed along with the hydriodates, when iodine and the alkalis are made to act on one another in water. In order to obtain these salts in a state of absolute purity, it is necessary to boil them repeatedly in small quantities of alcohol of a specific gravity from 8.6 to 9.2, which dissolves the hydriodates, but not the oxiodates.

Oxiodate of potass may be obtained in small crystals, nearly of a cubic form, which are not altered by exposure to the air, and deflagrate on burning coals like nitre. They require 13½ times their weight of water to dissolve them. They require for their decomposition a heat somewhat higher than the hyper-oxymuriates. Oxygen is disengaged, and ioduret of potassium (or hydriodate of potass) remains, which forms a neutral solution in water. This decomposition affords the following proportions of constituents:

Oxygen	22.59
Ioduret of potassium . .	77.41
	100.00

When we consider the potassium as oxydated, viz. in the state of potass, the portion of the oxygen which belongs to it is 3.773. The proportions, according to this distribution, therefore, will be

Potass	22.246
Iodine	58.937
Oxygen	18 817
	100.000

These two last numbers give the proportions of iodine and oxygen, which form oxyiodic acid, which are as 10. to 31.321.

Oxiodate of soda crystallizes in small prisms, united in tufts, or in small cubic grains. They deflagrate on hot coals, below a red heat, giving out a very little iodine. They are nearly of the same solubility in water as the former. When decomposed by heat, they afford.

Oxygen	24.432
Ioduret of soda	75.508
	100.000

On putting iodine into a solution of soda, till the liquid begins to be coloured, fine crystals, in six sided prisms, may be obtained by evaporation. These are very alkaline, and deflagrate on burning coals. They are very soluble, and contain a large quantity of water of crystallization. When soda is added to a neutral solution of oxiodate of soda, a salt is obtained in smaller crystals, or silky needles united in tufts. They are not altered by the air. Both the oxiodic and the hydriodic acids have a great tendency to form subsalts.

The oxiodates of potass and soda detonate feebly by percussion, when mixed with sulphur. It is not probable that they could be advantageously employed in the manufacture of gunpowder; 100 parts give only 22.59 of gas, whereas 100 parts of nitre give 53.62. This disadvantage would require to be compensated by a greater rapidity of detonation.

Oxiodate of ammonia can only be obtained by saturating oxiodic acid with ammonia, or by saturating with it a solution of chlorine and iodine, (the chloruret of iodine of Gay-Lussac.) This oxiodate assumes the form of small granular crystals. On a hot body it detonates with a hissing noise, a weak violet light, and the disengagement of vapours of iodine. When decomposed by heat, it gives out a mixture of oxygen and azote. It is composed of

Oxiodic acid	100.00.
Ammonia	10.94.

Oxiodate of barytes is easily obtained by double affinities, or by putting iodine into barytes water. It precipitates in the form of a powder, which may be purified by repeated washing. While drying it concretes into lumps, and becomes mealy. It retains water in composition, which it gives out at a temperature of 212°, before being decomposed by heat. It is composed of

Oxiodic acid	100.
Barytes	46 340

On hot coals it does not deflagrate, but only gives out a weak intermitting light. It is infusible, and only a small quantity of the salt comes in contact with the fuel, so that the oxygen which is disengaged contributes very little to its combustion.

The oxiodate of strontites has similar properties.

The oxiodate of lime is generally pulverulent, but may be crystallized in the muriate or the hydriodate of lime, which augment its solubility, and it then assumes the form of small quadrangular prisms. It holds about 3 *per cent.* of water in combination.

The other oxiodates may be obtained by double decompositions. Nitrate of silver gives with the oxiodate of potass a white precipitate, which is the oxiodate of silver, and is very soluble in ammonia.

The oxiodates do not, like the hydriodates, absorb iodine to form iodureted salts. Their solutions absorb no more of this substance than is done by pure water.

Iodine gives a blue colour to starch by combination; and this is done with such facility, that starch is one of the most delicate tests of this substance. It does not, however, detect it in the state of acid, unless the iodine is previously evolved by some other acid substance.

On mixing two parts in volume of alcohol with coloured hydriodic acid of the specific gravity of 1.7, and distilling the mixture in a water bath, an alcoholic liquor is produced, colourless and limpid, which, when mixed with water, becomes muddy, and lets fall in small globules a liquid, at first milky, which gradually becomes transparent. This is hydriodic ether. What remains in the retort is hydriodic acid, very dark coloured, from holding in solution all the iodine which had coloured the original quantity. Hydriodic ether, after being washed two or three times with water, (in which it has very little solubility,) is in a pure state. It has a strong and peculiar odour, though analogous to that of the other ethers. After some days it acquires a red colour, from the evolution of a little iodine, which, however, does not afterwards increase. This colour may be removed by the addition of a little potass or mercury.

which combine with the iodine. The specific gravity of this ether, at 72½°, is 1.9206. It boils at 148.1. It is not inflammable—a circumstance very singular in an ether. It only exhales purple vapours when thrown on burning coals. Potassium may be preserved in it without alteration. Concentrated sulphuric acid renders it brown. When passed through a red-hot tube, it is speedily decomposed, giving an inflammable carbureted gas, very brown hydriodic acid, and a little charcoal.

The concurrence of properties which we find in iodine, and its various states of chemical combination, is curious and singular. "In its specific gravity," says Sir H. Davy, who considers it as an undecompounded body, "in lustre, the high number in which it enters into combination, and in colour, it resembles the metals; but in all its chemical agencies it is more analogous to oxygen and chlorine: it is a non-conductor of electricity, and possesses, like these bodies, the negative electrical energy with respect to metals, inflammable and alkaline substances; and hence, when combined with these substances in aqueous solution, and electrized in the voltaic circuit, it separates at the positive surface: but it has a positive energy with respect to chlorine; for, when united to this substance to form a compound acid, it separates from it at the negative surface. It has a stronger attraction for most of the metals than oxygen, but oxygen expels it from phosphorus and sulphur. Under a red heat, oxygen converts the ioduret of phosphorus into phosphoric acid, and evolves the iodine. Its saturating powers seem to be greater than those of oxygen, and less than those of chlorine. It agrees with chlorine and fluorine in forming an acid with hydrogen; and it agrees with oxygen in forming an acid with chlorine."

One of the best tests of iodine is to be found in its action on silver, which has the advantage of manifesting its presence in whatever state of combination it may exist. Water, when it contains less than one-thousandth part of its weight of a hydriodate, or oxiodate, tarnishes polished silver. This effect may be distinguished from that produced by compounds containing sulphurets, or sulphureted hydrogen, by this circumstance, that the latter, by being boiled with a little muriatic acid, are deprived of the power of tarnishing the metal, whereas solutions containing iodine, when treated in the same manner, still retain it.

In the experiments made by Sir H. Davy on natural productions which might be supposed to yield iodine, he found that the *fuci* and *ulvæ* of the Mediterranean afforded it in smaller quantities than the *sel de varec;* and it was only in a few cases that he could find in them any traces of its existence. Slight traces of it were found in the *Fucus cartilaginus*, the *membranaceus*, *rubens*, and *filamentosus*, and in the *Ulva pavonia* and *Ulva linza*, but none in the ashes of the corallines and sponges. He examined some specimens of alkali, formed by the combustion of maritime vegetables which are not submarine, but found in them no decided indications of iodine. Yet he failed in his attempts to obtain it from sea-water, though the use of the voltaic battery afforded some obscure results. The products separated at the positive pole were collected in a small cup of gold, covered with cement, except in the interior and lower part; and this, when exposed to the negative pole of a voltaic apparatus, yielded a black powder fixed in the fire, not unlike the compound formed by heating iodine and gold together; but it was too minute to admit of chemical analysis, in order to ascertain that it was not the same as is obtained by negatively electrifying the oxymuriate of gold.

See the Memoir of Gay-Lussac on Iodine, in the *Annales de Chimie;* or the English translation of it in the fifth and sixth volumes of Thomson's *Annals of Philosophy;* and the two Memoirs of Sir Humphrey Davy on the same subject, in the *London Philosophical Transactions* for 1814, parts i. and ii., which are republished in Tilloch's *Philosophical Magazine;* and an additional Memoir in the *Transactions* for 1815, part ii. (*H. D.*)

JOHANNA, one of the Comoro islands, lying in the northern part of the Mozambique Channel, which separates Madagascar from the coast of Africa. Its proper name is Hinzuan, which is said to have been progressively corrupted into Anzuan, Anjuan, Juanny, and Johanna. This island is of a triangular figure, each side extending, as we conceive, about eighteen miles in length; and its superficial area is computed at 162 miles. There is a bay with good anchorage on the north, though currents run with considerable force; and hither European vessels repair for the purpose of obtaining provisions and water. The island is mountainous, having in general a bold shore, and is visible from a great distance. A lofty peak rises amidst hills, which are clothed with wood and beautiful verdure. Numerous vallies, each watered by a stream, are interspersed among them, and their margins covered with groves of cocoa trees, mangoes, oranges, and citrons. Nothing can be more picturesque than the island of Johanna from every point of view. A volcano seems to have been anciently in activity here. Volcanic productions are universally disseminated: ferruginous particles are found in several places: flints are common on the shore, some parts of which also consist of a sandy beach.

This island abounds in great variety of the finest and most useful vegetables. Every gorge among the mountains, at a short distance from the sea, is compared to a well watered garden. In addition to the fruits already named, many others of the tropical climate grow in profusion. Roots are plentiful; the sugar cane attains much perfection; and wild indigo is copiously diffused. The henna, with the juice of which the natives stain their skin, is a shrub reaching the height of six or eight feet, though perhaps not indigenous to the island.

No venemous creatures are found here; but musquitoes are extremely troublesome. Fish are not particularly abundant, at least at certain seasons, which has been ascribed to the presence of sharks. When they do appear, they are caught with lines, or speared very dexterously on rising to the surface. Turtle doves (one species of which is of a beautiful grey, shaded with green, blue, and white) and quails, are numerous: the guinea fowl is less so, but is said to be remarkably tame; and there are multitudes of a kind of hawk which subsists on fish. A species of brown monkey is the chief wild animal inhabiting the woods; swarms of mice infest the fields, and are supposed to be detrimental to the crops. The only domesticated quadrupeds are goats and the Indian cow, which find excellent pasture in the vallies.

The inhabitants of this island are of two different kinds, Africans and Asiatics, distinguished by prominent features. The former are the same as those dwelling on the neighbouring coasts; the latter have sprung from a colony of Arabians, by whom the island was conquered, and who still hold it in subjection. These constitute the higher ranks, and the others the lower. But from the intermixture that unavoidably takes place among mankind in the course of successive generations, the original character of each is much obliterated among many of the natives, unless in the family of the sultan, where it is still preserved pure. The Arabic language is in general spoken; and, from the frequent visits of European vessels, both English and French are tolerably well understood, and even employed in conversation by the natives. The men in general testify much good sense and acuteness; many embellish their discourse with poetical phrases; and great politeness is practised in their address. They are of a courteous and affable disposition, extremely hospitable to strangers, whom they receive with extraordinary demonstrations of friendship, nor are these external only, for numerous examples might be given of their affording succour to shipwrecked mariners, when they could entertain no expectation of any return. Their honesty is remarkable, and those who have provided supplies to European vessels are anxious for certificates of their conduct. These people are nevertheless indolent, excessively jealous of their women, and far from being endowed with much personal courage. Perhaps the last ensues from their constant exposure to the attacks of a ferocious enemy of superior force, which cannot but damp the spirit of resistance. Women of the lower ranks withdraw from the gaze of the men, and those of the higher are seldom or never seen by strangers. But those English ladies whose curiosity has gained them access to the harem report that they are handsome, richly attired, and display a profusion of ornaments.

Marriages are celebrated with music and dancing, the former produced by the Mozambique violin, drums, and shells. Sometimes there is singing by male voices, when the burden of the song is repeated by the whole company present. Sir William Jones was assured, that songs were composed in the island. The dances resemble those of Madagascar, sometimes exhibiting intricate movements, but in general distinguished by contortions accompanied by grimaces, more than by graceful action. At the close of every dance, a few pieces of money are thrown at the feet of the musicians. Meantime the new married female sends presents of flowers to strangers from the place of concealment, where she and her friends behold what passes. On the celebration of a marriage, the husband invites all his friends and relations to feast and dance during eight successive days, beginning at four in the afternoon, and continuing until morning. The guests, however, according to their ability, contribute towards defraying the expences.

The inhabitants occupy themselves in agriculture, some holding considerable estates in the interior. Several practise the mechanical arts, though, from the rudeness of their tools, the workmanship is coarse; and shops of goldsmiths, weavers, and the like, are to be seen. The unsettled state of the country, however, is very prejudicial to agricultural pursuits. Probably they construct their own vessels, which consist of small canoes hollowed from the trunk of a tree, and war boats capable of carrying 200 men. In their large barks they undertake long voyages, sailing as far as Bombay and Surat, or to the isle of France; but they seem to have little productive trade; for notwithstanding the beauty and fertility of their island, it seems to have few commodities which are desired by other nations. Arms and ammunition, knives, cloth, and cotton, are purchased at Bombay; ivory is obtained from Mozambique; rice, a kind of bread fruit, and cattle, from the rest of the Comoro islands. Some of the chief men make expeditions to the African coast for the purchase of slaves; the humanity of which traffic they defend on the same principle as other dealers, namely, that the objects of it would otherwise suffer death: and others are purveyors to the European vessels that anchor on the coast.

Almost all the natives of Johanna profess the Mahomedan religion; but it is asserted, that *fetishes*, that is, animals or inanimate bodies, are venerated by the lower orders; and it is related, that there is a small lake among the mountains of the interior, which is held sacred, as well as the water-fowl that frequent it. The higher ranks and clergy are not entirely destitute of learning, and they possess some books among them, apparently for the most part theological.

The government of the island is monarchical, elective, (though the right is not known to have been exercised,) and aristocratic. The extent of the Sultan's power is not explained; he is obliged to obtain the sanction of his chiefs to certain acts, such as the declaration of peace or war; and the latter are said to defray its expence by a voluntary contribution, in return for which they claim all the booty. Profound respect is entertained for the person of the Sultan; none of the inhabitants can address him unless kneeling, and having touched the ground with their foreheads. He never goes abroad but when accompanied by several chiefs and domestics, of whom one carries his betel box, other two his lances, a fourth precedes him blowing a shell, and a considerable retinue of the populace is in attendance. The charges of government are defrayed by a tax from the villages. Formerly the other Comoro islands were subject to the Sultan of Johanna, and the present prince still claims the sovereignty of them, and the vassalage of their chiefs; but it is very doubtful how far he receives any tribute. Females are not excluded from the succession.

The principal town of the island is Machadou, or Matsanudo, on the north coast, near the bottom of a mountain. It is surrounded by walls fifteen feet high, flanked by square towers, and is said to be a mile and a half in circuit. But the streets are narrow and irregular, resembling so many lanes, and the houses poor both within and without. They are commonly ranged around a small interior court. The first apartment is open, and beyond the court is that of the women. In the former, the place for repose is separated by a chintz curtain from the rest of the room, and elevated in an angle several feet high. It is composed of successive broad steps, whereon one or two persons can rest. The middle of the apartment is appropriated for meals, where the guests either sit on low stools, or recline against the steps of the bed-place. The houses of the chief men, however, are capacious, but scantily furnished. That of the king, which cannot merit the name of a palace, differs from the rest in having a more spacious vestibule, and a long gallery hung round with muskets and powder horns, serving both for a hall of audience and a kind of arsenal. At one end are three large windows within a balustrade, where also is an arm chair, occupied as a throne by the sovereign. Sir William Jones describes an apartment wherein the sultan received him, as "hung with old red cloth, and decorated with pieces of porcelain, and festoons of English bottles; the lamps were placed on the ground in large sea-shells; and the bed-place was a recess, concealed by a chintz hanging opposite to a sofa." The houses are so much impregnated with the odour of musk, for which the natives entertain a remarkable partiality, as to be exceedingly disagreeable. Machadou contains a mosque, a small mean edifice, surmounted by a minaret, where several Arabians are always to be seen in prayer. It was built by a female sovereign of the island, named Halimah, or Alima, who probably reigned two centuries ago; but is now becoming ruinous. The fort commands the town, and being elevated high above it, at first sight presents an imposing appearance. It is gained by flights of 300 or 400 steps included between two walls. The country is rather arid in the immediate vicinity of Machadou; but the climate is very fine, and the people healthy. Some nevertheless labour under severe distempers. Fevers and dysentery are the most common complaints; and it is much to be doubted whether the climate is equally salubrious to Europeans.

Another town, said to have been named Johanna, stood on the eastern coast seven leagues from Machadou, in a picturesque situation. It was sacked in 1790 by the natives of Madagascar, who make frequent descents on the Comoro islands, and always commit terrible ravages. Their very name makes the inhabitants tremble, and in general they never go unarmed.

Very different statements have been given of the population of Johanna. Grose states it at 130,000, which exceeds all probability. Captain Williamson, in 1810, computes it at 90,000 or 100,000, which at a medium would allow 581 persons to each square mile; and Sir William Jones speaks of taxes being levied from 200 villages. But late calculations, apparently much more authentic, reduce the population to 6000 or 7000.

The history of Johanna is obscure. It is supposed that the Comoro islands were peopled originally from Africa, and that the Arabians established themselves here in the twelfth century. In the year 1600, Captain John Davis found Johanna governed by a queen; and fifteen years later, Sir Thomas Roe and Captain Peyton remarked, that the dominion of a female extended over all the islands; but he seems to place her residence on Mohilla, one of their number. Sidi Ahamed ruled Johanna in 1783, probably the same Sultan who, in 1788, is represented as being 65 years of age, and having occupied the government for 40 years. His manners were dignified, and his courtesy to strangers of the most engaging description; but the island was visited by many misfortunes during his reign, and he is supposed to have survived the sack of Johanna only a short time. He was succeeded by his eldest son Missolin, who died in the year 1797, leaving a son Ahmed under the regency of his brother. During the minority of this prince, 33 Frenchmen, some of whom had distinguished themselves in the revolution that agitated their own country, were banished hither, and landed under the ostensible pretence of assisting in the defence of the island. In 21 days no less than 20 died: the survivors embarked for Comoro, 25 leagues distant; but owing to accidents and other causes, they successively perished, so that not one survived in 1804, only a year after their first arrival. The regent having formed a plan for the destruction of the young prince, which proved abortive, fled to Muskat, where he in vain sought the aid of the Imam. Lat. 12° 4′ N. Long. 44° 34′ E. (*c*)

JOHNSON, Samuel, an eminent English author, was born at Litchfield, in Staffordshire, on the 18th of September, (N. S.) 1709. His mother, Sarah Ford, was descended of an ancient race of substantial yeomanry in Warwickshire. His father, Michael Johnson, was a bookseller and stationer in Litchfield. He was a man of a large robust body, and of considerable mental attainments; but not without that morbid taint of melancholy which his son inherited. It seems to have been from him, and not from his nurse, as has been elswhere stated, that our author received the tinge of scrophula, which disfigured a countenance naturally well-formed, and hurt his visual nerves so much, that he did not see with one of his eyes, although its appearance was little different from that of the other. His mother, yielding to the superstitious notion which so long prevailed as to the virtue of the royal touch, carried him to London in his childhood, where he was actually touched by Queen Anne. The faint remembrance of this circumstance always remained in Johnson's mind. Being asked, if he could remember Queen Anne? He said, he had a confused, but sort of solemn recollection, of a lady in diamonds, and a long black hood.

He was first taught to read English by a woman, who kept a school for young children in Litchfield. When he was going to Oxford, this humble instructress of his childhood came to take leave of him; and, in the simplicity of her kindness, brought him a present of gingerbread, saying that he was the best scholar she had ever had. He delighted in mentioning this little compliment; adding, with a smile, "that this was as high a proof of his merit as he could receive." His next instructor in English was one Brown, who had published a spelling-book, which he dedicated to the universe, but of which Dr. Johnson was afraid that no copy was to be found. He learned Latin at a school at Litchfield under a Mr. Hunter, a severe disciplinarian, but an attentive teacher. Johnson owned, that he had himself required the rod; and to that instrument of tuition, it was a part of his principles to pay the most profound deference. Once, when he saw some young ladies who had been remarkably well brought up by a severe mother, he exclaimed, "Rod, I will honour thee for this thy duty!" The mind that can dwell with satisfaction on the associated ideas of a rod and the tender frame of a young virgin, must have its sensibilities oddly constituted. At school, though he was too short-sighted to join in the generality of boyish amusements, he maintained the same ascendancy over his playmates that he kept up, in after life, in the circles of literature. His proficiency was also then, as in every other period of life, much beyond his apparent diligence. He was impatient of stated tasks, but could rouse himself to great exertions. His memory was prodigiously tenacious. When a boy, he was immoderately fond of reading romances. To those extravagant fictions he was once heard to attribute the unsettled turn of mind which prevented him from ever fixing in any settled profession. The circumstance of his reading many romances in his youth is not wonderful, for that species of reading was much more common in the last than in the present age. Romance reading is now revived as a species of black-letter learning; it was then the ordinary food of young minds, before they encountered more serious erudition.

After having resided for some time at the house of his uncle Cornelius Ford, Johnson was, at the age of 15, removed to the School of Stowbridge in Worcestershire, of which Mr. Wentworth was then master. Here, according to his own account, he was rather irreverent towards a severe master, whom he did not on the whole esteem, but in after life disposed to make allowance for his castigations of him, and to reflect on how much he had taught him. He remained at Stowbridge about a year, and then returned home, where he staid for two years, reading in a very desultory manner, but with such ultimate advantage, as to go exceedingly well qualified to the university. He might perhaps, as Mr. Boswell justly remarks, have studied more assiduously, but it may be doubted whether such a mind as his was not more enriched by roaming at large in the fields of literature. The analogy between the body and mind is very general, and the parallel will hold as much as to their food as to any other particular. The flesh of animals who feed excursively, is allowed to have a higher flavour than that of those who are cooped up. May there not be the same difference between men who read as their taste prompts, and men who are confined, in cells and colleges, to stated tasks? By what means his father was enabled to undertake the expence of sending him to the university, has not been very accurately told. He had once realized a good deal of money in trade, but had afterwards lost it, by embarking in a ruinous speculation, and was at this time in narrow circumstances. It is believed that one of his schoolfellows undertook to support Johnson at Oxford, in the quality of his companion, though he failed in rendering him the promised assistance. He went, however, to Oxford, and was entered a commoner of Pembroke college on the 31st of October, being then in his 19th year. His tutor was a Mr. Jordan, whom Johnson respected for his personal worth, but not for his abilities. Having absented himself from this preceptor for several days, Mr. Jordan asked him the reason of his absence. Johnson told him he had been sliding in Christ Church meadows. Mr. Boswell, to whom he related this answer, remarked, that it shewed great fortitude of mind. "No, Sir," said Johnson, "stark insensibility."

In his 20th year, while he was at Litchfield during the college vacation, his constitutional melancholy assumed a peculiarly gloomy aspect, and on his return to the university, the unequal state of his spirits, and probably too real causes for depression about his future prospects, seem to have made him an irregular, and by no means an exemplary student. He was often seen lounging at the college gates with the younger students, whom he amused by his wit, and spirited up to contempt of their superiors by his satire. Dr. Adams, his nominal tutor, after Norden, at Pembroke college, said, that while he was there, he was a gay and frolicksome fellow. When the remark was imparted to him by Boswell, "Ah, Sir," he said, "I was mad and violent; I was miserably poor, and thought to fight my way by my literature and my wit." Poverty at length compelled him to quit the university without a degree. He returned to Litchfield, in 1731, with very gloomy prospects. His father died a few months after his return, and the little he left was barely sufficient for the temporary support of his widow. In the following year, he accepted the place of usher of the school of Market Bosworth in Leicestershire, an employment which the insolence of the patron of the school. Sir Wolstan Dixie, with whom he was obliged to live, made him speedily resign, and always remember with a sort of horror. After this he resided for six months at Birmingham, as the guest of his old schoolfellow, Mr. Hector, an eminent surgeon, in whose house he translated and abridged Father Lobo's *Voyage to Abyssinia*. For this task he received five guineas. The body of the work is written with no remarkable elegance or power, but the preface has some passages that are full of his characteristic manner.

In 1734 he returned to Litchfield, and there issued proposals for an edition of the Latin poems of Politian, with the history of Latin poetry, from the era of Petrarch to the time of Politian, together with a life of Politian. The subscription, however, was not enough to encourage him to proceed. Disappointed in this scheme, he offered his services to Mr. Cave, the proprietor and editor of the *Gentleman's Magazine*. On this occasion he suggested some improvements in the management of the Magazine, and specified the articles which he was ready to supply. Cave answered his letters; but it does not appear that any agreement was formed between them at this time. At this period, in his 25th year, when his finances must have been very low, and his prospects very precarious, he adopted that happy mode of extricating himself from his difficulties, to which men of genius often resort, that of taking to himself a wife. His choice was a Mrs. Porter, the widow of a mercer in Birmingham, who was in her 48th year. In spite of this disparity of their ages, Johnson gravely told his friend, Mr. Topham Beauclerk, who archly repeated it, "that it was a love marriage on both sides." His bride had a fortune of eight hundred pounds; and with part of this money he hired a house at Edial, near Litchfield, where young gentlemen were to be boarded, and taught the Greek and Latin languages. The scheme, however, did not succeed. In the space of a year and a half he had only found three pupils, one of whom was David Garrick. During his residence at Edial, he wrote a considerable part of his *Irene*, which his friend Gilbert Walmsey, registrar of the ecclesiastial court of Litchfield, a man of letters and generosity, advised him to prepare for the stage.

Finding his academy so unlikely to succeed, he determined to repair to London, and there to try his fortune. Garrick, his pupil, had formed the same resolution, and, in March 1737, they arrived in the metropolis together. One of his first employments in London was to proceed with the composition of his tragedy. He also renewed his application to Cave, by whom he was employed in translating the history of the Council of Trent, and for the part of the work which he executed he received 49*l.* but it was dropt upon the announcement of a rival translation. In the course of the summer he went back to Litchfield, where he had left Mrs. Johnson—finished his tragedy, and returned at the end of three months, with his wife, to London, where he endeavoured to prevail on Fleetwood, the patentee of Drury Lane, to accept it. Being unsuccessful in this attempt, he resumed his literary drudgery, and became a principal contributor to Cave's Magazine. For that work he supplied, among many various articles, the debates in Parliament. These were given under the fiction of debates in the senate of Lilliput, and the speakers were disguised under feigned names. Guthrie, a writer of history, for a time composed these speeches from such heads as he could bring away in his memory. Johnson first assisted in this department, and then entirely filled it. The public was highly delighted with the extraordinary eloquence which Johnson displayed in these compositions, which were almost exclusively the product of his own invention. In process of time he came to consider this deceit as an unjustifiable imposition on the world. It is probable, however, that he generally adhered to the tenor of argument really employed by the parliamentary speakers, otherwise his account of the debates could scarcely have passed at the time for genuine. He owned that he was not quite impartial in dealing out his reason and rhetoric; but took care that the Whig dogs should not have the best of it. Mr. Chalmers, in his edition of the British poets, (Life of Johnson,) has announced his having made the discovery, that Johnson was at one time editor of the *Gentleman's Magazine*, and had a regular salary of 100*l.* but that must have been at some distance of time from his first connexion with the work. His apparent poverty, when he writes to Cave with the signature of *Impransus*, seems to be with difficulty reconcileable to the supposition of his having had, at that early stage of his career, so considerable a settled income.

In the year 1738, he rose at once to public notice by the publication of his *London*, in imitation of the third satire of Juvenal. Dodsley gave him ten guineas for the copyright of this poem, and such was the state of literary property at the time, that he considered it a liberal price. His *London* came out in the same morning with Pope's "Seventeen hundred and thirty-eight." The former poem immediately brought its unknown author a reputation, that made him be compared with the reigning bard of the time; and Pope himself was among the first to acknowledge its merit, and to predict his future consequence. It is at this very period when he could be said to have first begun to taste the only consolation of an author's life—*reputation*, that we find him making serious efforts to settle himself in some other profession for a livelihood. He would have accepted of the mastership of the school of Appleby in Leicestershire, the salary of which was about 60*l* a year; but the laws of the school required that the candidate should be a master of arts; and the University of Oxford, when applied to for a degree, refused to grant it. In this unsuccessful effort for a degree, Pope interested himself in Johnson's behalf; although he knew him only by name.

as author of *London*. About the same time he formed a design of studying the civil law, with a view to practise in Doctor's Commons. This scheme, also, was rendered abortive for want of a degree, and he was obliged to resume his labours in the *Gentleman's Magazine*. His productions from this time became more numerous than it is possible to particularize in any condensed account of our author. He published, in 1739, an "ironical" vindication of the licencers of the stage, against the scandalous aspersions of the author of "Gustavus Vasa." In the same year his attachment to the Tory, or rather the Jacobite party, was shewn in an humorous pamphlet, entitled *Marmor Norfolciense*, consisting of a supposed ancient prophecy in monkish Latin rhymes, with an explanation. For some years he composed biographical articles in the *Gentleman's Magazine*, full of that animated and shrewd cast of language and thought, which he brought into English biography. His life of Savage, published separately in 1744, forms a sort of era in the record of his prose writings. He had been intimate with Savage for several years; and if we may judge of Johnson, by the circumstance of his living for a time separated from his wife, as well as by the poverty and midnight rambles in which Savage and he shared, it would appear that the moral biographer himself had been drawn, for a while, into the same follies, dissipations, and idleness, of his ill-starred brother genius. But the effect of his companionship on Johnson's habits was not lasting, and, to his knowledge of Savage, we are indebted for one of the most interesting and instructive pictures of an individual mind that was ever exhibited. No one who has read the life of Savage can have failed to acknowledge the eloquence with which he describes the sufferings of unfortunate genius, and the candour with which he traces his faults; whilst he throws a transparent veil of compassion and charity, that softens, without hiding, those vices that would offend us in closer view.

In 1745, he published miscellaneous observations on the tragedy of Macbeth, with remarks on Sir Thomas Hanmer's edition of Shakspeare, to which he prefixed proposals for a new edition of the great poet, and was probably engaged at times, during two years, in preparing for the undertaking, as, in 1745 and 1746, his periodical contributions to the Magazine were suspended. The notice of the public, however, was not excited to his anonymous proposals, for the execution of a task which Warburton was known to have undertaken; and the project died at the present, though to revive at a future period. The year 1747 was remarkable, in his life, for the production of one of his best pieces of poetry, namely the prologue which he supplied to Garrick at the opening of Drury Lane theatre, and the undertaking of his grand work, a Dictionary of the English language. A plan of the dictionary, written with uncommon comprehension, perspicuity, and precision, was addressed to the Earl of Chesterfield. The professions of Chesterfield as a Mæcenas in this business, and his subsequent neglect of Johnson, are but too well known. The price for which Johnson agreed with the booksellers for his Dictionary was 1575*l*. At the outset, he flattered himself that he should be able to finish it in three years, but it employed him, through many intermissions, for eight years. With a view to the completion of his great task, he hired a house in Gough Square, Fleet Street, where a room was fitted up for the amanuenses, who were to execute the laborious part of the business.

At intervals he exerted his talents in compositions very different from lexicography, and, probably anticipating easier circumstances from the credit with his booksellers which his compilation afforded him, he devoted a regular portion of his time to social amusements with selected friends. Of these he formed a club, that met at Horseman's Chop-house, in Ivy-lane, Paternoster Row, every Tuesday evening, with a view to enjoy literary conversation. The members, associated with him in this club, were, his beloved friend Dr. Richard Bathurst, a physician; Dr. Hawkesworth; Dr. Salter; Mr. Ryland, a merchant; Mr. John Payne, then a bookseller in Paternoster Row; Mr. Samuel Dyer, a learned young man intended for the dissenting ministry; Dr. M'Ghie, a Scotch physician; Dr. Edmund Barker, another physician; and Sir John Hawkins. The endowments of Dyer are represented by Sir John Hawkins as of so superior a kind, that Johnson might almost be said to have looked up to him. They used to dispute in this club about the moral sense and fitness of things; but Johnson was not uniform in his opinions, contending as often for victory as for truth. This failing attended him through life.

In January 1749, he published with his name *The Vanity of Human Wishes, being the Tenth Satire of Juvenal imitated*. Criticism seems always to have the fairest right to establish comparisons between one work of an author and another of a similar nature. *London*, and *the Vanity of Human Wishes*, have, therefore, been often compared. The general opinion has agreed, that there is more of the charm of common life in the poem *London*, and a higher tone of reflective moral eloquence in *The Vanity of Human Wishes*. The description of the scholar's disappointed hopes, in the latter poem, is peculiarly eloquent.

In the same year, his tragedy of *Irene*, which, to use his own phrase respecting one of Thomson's poems, might have been expected, in its long state of repose, to have gathered dust and harboured spiders, was brought upon the stage of Drury-lane by the kindness of Garrick. Sensibly as Johnson ought to have felt obliged to Garrick for his assistance, he at first resisted, with violent irritation, all the alterations which the manager suggested for adapting his piece for theatric effect. "The fellow," he said of Garrick, "wants me to make Mahomet run mad, that he may have an opportunity of tossing his hands and kicking his heels." He was at last, with difficulty, prevailed upon to comply with Garrick's wishes, and to allow of some changes; but still these were not enough. *Irene* was accordingly brought upon the boards, but, though supported by the finest acting, and by every advantage of dress and decoration, it failed to captivate the public. Garrick's zeal, nevertheless, carried it through for nine nights; so that the author had his three nights profits; and Dodsley gave him 100*l*. for the copy right. When asked how he felt upon the bad success of his tragedy, he replied, "Like the monument." Such magnanimity is, probably, as rarely to be found, as the power of writing a tolerable tragedy.

In the year 1750, he came forward in the character for which he was eminently qualified, that of a declaimer on moral and religious subjects. The vehicle which he chose was a periodical paper, denominated, (with no great felicity of title,) *The Rambler*. This title has been ludicrously translated, in the Italian version of the work, literally *Il Vagabondo*. The first paper of *The Rambler* was published on Tuesday the 20th of March 1750, and he was enabled to continue it, without interruption, every Tuesday and Friday, till Saturday the 17th of March 1752, on which it closed. Many of those papers were written in haste, as the moment pressed, without ever being read over by him before they were printed. He received, in the course of the work, no assistance, except four billets in No. 10, by Miss Mulso, afterwards Mrs. Chapone; No. 30, by Mrs. Catherine Talbot; No. 97, by the famous Samuel Richardson, and No. 44, and 100, by Mrs. Elizabeth Carter. The first reception of *The Rambler* was not highly favourable. Its popularity was of slow growth.

In the following year, he was involved in the controversy that arose from Lauder's attack upon the memory of Milton. The history of Lauder's forgeries need not be here detailed. It may be necessary, however, to notice, that the extraordinary attempt of that impostor was no sudden effort.—He had brooded over it for many years; and, considering the difficulty of the task, came wonderfully well prepared for the execution of it. The depth and artifice of Lauder, and the seeming improbability of any man being capable of such gratuitous and unprincipled malice towards the memory of an author who had been fourscore years in his grave, form some apology for Johnson having been, in the first instance, the dupe of Lauder. Yet it is impossible to advert to the cheerful promptitude with which Johnson lent his pen to the first support of the forger, without a suspicion that he was well pleased at the prospect of Milton's reputation sustaining a reverse. Sir John Hawkins says, "he could all along observe, that Johnson seemed to approve, not only Lauder's design, but of the argument; and seemed to exult in a persuasion that the reputation of Milton was likely to suffer by this discovery." Lauder, after having from time to time published his fabrications in the Gentleman's Magazine, ventured at last to collect them into a pamphlet, entitled an Essay on Milton's use and imitations of the Moderns in Paradise Lost. To this pamphlet, Johnson wrote a preface, expressing a full conviction of Lauder's arguments. But the Rev. Dr. Douglas having clearly detected the impostor's forgeries, Johnson dictated a letter for Lauder, addressed to Dr. Douglas, and acknowledging his fraud in terms of suitable contrition. Johnson's conduct has been praised for doing so.—He could do nothing less, unless he had deliberately resolved to consign his own character to infamy. Though his circumstances were at this time far from being easy, his humane and charitable disposition was constantly exerting itself. Mrs. Anna Williams, daughter of a very ingenious Welch Physician, and a woman of more than ordinary talents and literature, having come to London in hopes of being cured of a cataract in both her eyes, which afterwards ended in total blindness, was kindly received as a constant visitor at his house while Mrs. Johnson lived; and, after her death, having come under his roof to have an operation upon her eyes performed with more comfort to her than in lodgings, she had an apartment from him during the rest of her life, at all times when he had a house. Three days after the conclusion of the Rambler, he lost his wife; whose loss there is every reason to suppose he felt as deeply as he deplored it. When he had recovered from the first shock of this event, he contributed several papers to the Adventurer, then conducted by Dr. Hawkesworth. His dictionary was now drawing to a conclusion; and Chesterfield, who had left him to struggle with difficulties during the compilation of it, meanly began to court a renewal of his acquaintance, in the hopes of the work being dedicated to him on its appearance. For this purpose he wrote two essays in the World, anticipating the high character of the dictionary, and sent a friend to sound Johnson on the subject of the dedication. Johnson, although he had once condescended to be indebted for 10*l.* to his Lordship, treated the shewy patronage of the peer with deserved contempt, and sent him that letter of rebuke which has been so often transcribed, containing these memorable words:—"The notice which you have been pleased to take of my labours, had it been early, had been kind; but it has been delayed till I am indifferent, and cannot enjoy it—till I am solitary, and cannot impart it—till I am known, and do not want it." In 1755, the degree of Master of Arts was conferred on him by the University of Oxford, after which, in May, his Dictionary came out. From the just value of this great and useful work, we are neither competent nor willing to detract. Considered as the work of one individual, it is a monument of Herculean strength; but when Johnson's lexicographical success is compared with that of the forty French academicians, and even preferred to it, the parallel can only be regarded as an illusion of national prejudice. For promoting works of poetry and imagination in a language, dictionaries are not the best receipts. The close definition of words deprives them of that halo of indistinct association which delights the fancy—it prunes and trims the vegetation of language beyond the natural wildness of poetry; but for prose composition—for logical eloquence and for science, dictionaries and close definitions are not only important, but essential. The language of France has owed much more to this species of pruning, for it cannot be called cultivation, than our own; and evidently has owed much more than our own to its Dictionary. Its prose is superior to our own—its poetry incomparably inferior. Without regretting that we have no academy like that of our neighbours, we ought, in justice, to acknowledge, that Johnson has not given, perhaps, even the fortieth part of the distinctness and definition to our tongue that the French academicians have bestowed upon theirs. Johnson had great reading, and still more sagacity; but he was a bad etymologist, and very little acquainted with philological niceties.

In a pecuniary light, he derived very little benefit from the publication of his Dictionary; for, when it was finished, he had been paid more than the stipulated sum. He was, therefore, still entirely dependent on the exertions of the day for his support; and it is melancholy to find, that a writer, esteemed an honour to his country, was, in the subsequent year, (1756,) in his 45th year, under an arrest for five pounds eighteen shillings. It is no wonder that his constitutional melancholy should at this time have exerted a peculiar sway over his mind.

About this period he was offered a living of considerable value in Lincolnshire, if he were inclined to enter into holy orders. It was a rectory in the gift of Mr. Langton, the father of one of his most intimate friends; but he did not accept of it, partly, says Mr. Boswell, I believe, from a conscientious motive, being persuaded that his temper and habits rendered him unfit for that assiduous and familiar instruction of the vulgar and ignorant, which he held to be an essential duty in a clergyman, and partly, because his love of a London life was so strong, that he would have thought himself an exile in any other place, particularly if residing in the country. In the same year, 1756, he engaged to superintend a monthly publication, entitled the *Literary Magazine*, or *Universal Register*. To this he contributed a great many articles, enumerated by Mr. Boswell, and several reviews of new books. The most celebrated of his reviews, and one of his most finished compositions, both in point of style, argument, and wit, was that of Soame Jenyns' *Free Inquiry into the Nature and Origin of Evil.* This attracted so much attention that the bookseller was encouraged to publish it separately, and two editions were rapidly sold. He wrote also, in 1756, some essays in the *Universal Visitor*, another magazine, which lasted only a year. His proposal for an edition of *Shakspeare* was again revived, but it did not go to press for many years after.

In April 1758, he began a new periodical paper, entitled the *Idler*, which came out every Saturday, in a weekly newspaper, "*The Universal Chronicle, or Weekly Gazette*," published by Newberry. These essays were continued till the April of 1760, amounting in number to one hundred and three, twelve of which were contributed by his friends, Mr. T. Warton, Mr. Langton, and Sir Joshua Reynolds, Though evidently the work of the same mind that produced the *Rambler*; yet, as his biographer justly remarks, "*it has less body, and more spirit.*" Many of these essays were written as hastily as an ordinary letter. Mr. Langton remembers Johnson, when on a visit at Oxford, asking him one evening how long it was till the post went out; and, on being told about half an hour, then, he exclaimed, we shall do very well. He upon this instantly sat down and finished an Idler. Mr. Langton having signified a wish to read it: "Sir," said he, "you shall not do more than I have done myself." He then folded it up, and sent it off. No. 41 of the *Idler* alludes to the death of his mother, which took place in 1759. He had ever been a dutiful son, and had contributed to her support, often when he knew not where to recruit his finances. On the event of her death, he wrote his *Rasselas, Prince of Abyssinia*, that he might be enabled to raise a sum sufficient to defray the expences of her funeral, and pay some little debts she had left. He told Sir Joshua Reynolds, that he composed it in the evenings of one week—sent it to the press in portions after it was written—and never read it again till at the distance of several years. None of his writings have been so extensively diffused over Europe; for it has been translated into most, if not into all the languages of modern Europe. Such, at this period, was the state of his finances, that he was obliged to break up house-keeping, and retire to chambers, where he lived, says his biographer, Mr. Murphy, in poverty, total idleness, and the pride of literature. From this unhappy state, he was at length rescued by the grant of a pension of 300*l.* per annum from his Majesty, in 1762, during the ministry of Lord Bute. When the liberal offer was made, a short struggle of repugnance, to accept of a favour from the house of Hanover, and become that character—"a pensioner," on which he had betowed a sarcastic definition in his Dictionary, was overcome by a sense of the substantial benefit conferred by it. From the dates of Johnson's political writings, it is pretty clear that his pension was meant as a literary reward, and not as a political hire. That it might afterwards have influenced him to favour the court by the influence of personal gratitude, is not impossible; but there is no reason to believe that it ever made him prostitute his opinions. These were innately Tory; and it is easy to conceive how his loyalty, after the last hopes of the Jacobites had expired, might revert with sincere bias to the throne, which had become legitimated by possession.

In the same year that he received his pension, he accompanied Sir Joshua Reynolds in a visit which he paid to his native county, Devonshire; was much delighted with his jaunt, and declared that he had derived from it a great accession of new ideas. He was entertained at the seats of several noblemen and gentlemen in the West of England; but the greatest part of his time was passed at Plymouth, where, according to Mr. Boswell, the magnificence of the navy, the ship-building, and all its circumstances, afforded him a grand subject of contemplation. While at Plymouth, he saw many of its inhabitants, and was not sparing of his entertaining conversation. It was here that he made a frank confession, that ignorance, pure ignorance, was the cause of a wrong definition in his Dictionary of the word *pastern*, to the no small surprise of the lady who put the question to him.

He now took a house in Johnson's Court, Fleet Street, and allotted an apartment in it for Mrs. Williams.

A fondness for liberal and cultivated conversation was one of Johnson's strongest propensities; and he had sought it, as we have before mentioned, in a club of literary men, soon after his settling in the metropolis. His advanced reputation and amended circumstances now enabled him to indulge it in a higher style; and he became member of a weekly club in Gerard Street, composed of persons eminent for various talents, and occupying distinguished situations in society. He also acquired an additional source of enjoyment, both social and intellectual, by his introduction, in 1765, to the acquaintance of Mr. Thrale, an opulent brewer, whose lady possessed a lively mind, highly accomplished by an enlarged education. In their hospitable retreat at Streatham, Johnson was for a considerable time domesticated, receiving every attention that could flatter his pride, and accommodated with every convenience and gratification that wealth could bestow. His shattered spirits were recruited, and his habits of life were rendered more regular in this agreeable residence.

In the October of this year, he at length gave to the world his edition of Shakspeare. His biographer Boswell's eulogy of this edition we forbear to quote, as we cannot agree with it. Undoubtedly there is much of Johnson's manliness and perspicuity shewn, both in the notes and in the preface; but the latter is written with the judgment of one who had reflected on the opinions of others, rather than felt deep impressions of his own respecting Shakspeare; and there is little or no depth of knowledge in the literature of Shakspeare's age. The edition, upon the whole, disappointed expectation. Its most valuable part is the summary views of the respective plays. In 1766 he furnished the preface, and some of the pieces, to a volume of poetical miscellanies by Mrs. Anna Williams. This lady was still an inmate in his house, and was indeed absolute mistress. Although her temper was far from pleasant, she had gained an ascendancy over him, which she often maintained with peevishness; but he forgot her fretfulness in her distresses. His house was filled with other dependants besides Mrs. Williams, whose perverse tempers frequently drove him out of it; yet nothing that he suffered from them could induce him to relieve himself at their expence. His noble expression was, "If I dismiss them, who will receive them?" In 1767, he had the honour to be admitted to a personal interview with his Majesty in the library of the Queen's palace. Of the conversation which passed, Mr. Boswell has given a very interesting and authentic account. On the institution of the Royal Academy of Arts, Johnson was appointed Professor in Ancient Literature, and probably at one time had some design of delivering a course of lectures; but, if he ever had the intention, he never fulfilled it. In 1770 he published a political pamphlet, entitled *The False Alarm*, intended to justify the conduct of ministry, and their majority in the House of Commons, for having virtually assumed it as an axiom, that the expulsion of a member of parliament was equivalent to exclusion, and thus having declared Colonel Lutterel to be duly elected for the county of Middlesex, notwithstanding Mr. Wilkes had a great majority of votes. This being justly considered as a great violation of the right of election, an alarm for the constitution extended itself all over the kingdom. To prove this alarm to be false, was the purpose of Johnson's pamphlet; but even his great powers were inadequate to cope with constitutional truth and reason, and his arguments failed of effect. The House of Commons were ultimately obliged to retrace their steps, and to expunge the offensive resolution from their journals. That the House of Commons might have expelled Mr. Wilkes repeatedly, and as often as he should be rechosen, was not denied; but incapacitation cannot be pronounced but by an act of the whole legislature. It was wonderful to see how a prejudice in favour of government in general, and an aversion to popular clamour, could blind and contract such an understanding as Johnson's in this particular case. That it endeavoured to infuse a narcotic indifference as to public concerns into the minds of the people, and that it broke sometimes into an extreme coarseness of contemptuous abuse, is acknowledged even by his most partial biographer.

On the subject of Johnson's political opinions, it would be unjust to the small degree of liberality that is to be found in them, to omit the notice of his good wishes in favour of Catholic emancipation. Without inquiring too strictly how far his Toryism might have given him this bias as much as his sense of justice, it should be recorded to his honour, that his views on this subject were humane and liberal, and anticipated those which are gradually gaining ground against the receding prejudices of modern barbarism. He had great compassion, says Mr. Boswell, for the miseries and distresses of the Irish nation, particularly the Papists, and severely reprobated the barbarous debilitating policy of the British government, which he said was the most detestable mode of persecution. To a gentleman who hinted that such policy might be necessary to support the authority of the English government, he replied by saying, "Let the authority of the English government perish, rather than be maintained by iniquity. Better would it be to restrain the turbulence of the natives by the authority of the sword, and to make them amenable to law and justice by an effectual and vigorous police, than, by an unrelenting persecution, to beggar and starve them."

In 1771, he published another political pamphlet, entitled *Thoughts on the late Transactions respecting Falkland's Islands*, in which, upon materials furnished to him by ministry, and upon general topics, expanded in his rich style, he successfully endeavoured to persuade the nation that it was wise and laudable to suffer the question of right to remain undecided, rather than involve our country in any war. It has been suggested by some, that he rated the importance of those islands to Great Britain too low. However this may be, his earnestness to avert the calamities of war, and his eloquent description of its miseries, cannot be over-praised.

Mr. Strahan the printer, who was himself a member of Parliament, and who loved much to be employed in political negotiation, thought he should do eminent service both to government and to Johnson, if he could be the means of his getting a seat in the House of Commons. With this view he wrote a strong recommendation of our author to one of the secretaries of the Treasury; but, for reasons that are not well known, the ministry did not take up his suggestion. It was much agitated among his friends and admirers, whether, if he had obtained a seat in Parliament, he would have distinguished himself in debate. Had he entered the house at an early period of life, there can hardly be a doubt that his knowledge and eloquence would have commanded in the legislature a similar esteem to that which they possessed in literature, but his own acknowledgment that he had tried several times to speak in the Society of Arts and Sciences, but that all his flowers of oratory forsook him, render it probable that he was too far advanced in age to commence the practice of public oratory. Eminence in parliamentary eloquence, in the ablest individuals, has been almost in all instances gradual, and the result of training and experience.

His pamphlet, entitled the *Patriot*, in 1774, was composed on the eve of a general election, in order to indispose the people against the oppositionists; but the strongest display of his political bigotry was reserved for his production, entitled *Taxation no Tyranny*, which was meant as an answer to the declaration of the American congress, relative to the claims of Great Britain. Long before this time he had indulged most unfavourable sentiments of our fellow subjects in America. "They are a race of convicts," he said to Dr. John Campbell, "and ought to have been thankful for any thing we allow them short of hanging." In this pamphlet on the right of Britain to tax America, there is not even acuteness of sophistry, far less any thing deserving the name of argument. Positive assertion, sarcastical severity, and extravagant ridicule, which he himself reprobated as a test, composed the rhapsody. Ministers themselves thought it decent to retrench some of the absurdities which he put to press in defence of their cause. They struck out, by his own confession, one passage to the following effect: "That the colonies could with no solidity argue from their not having been taxed while in their infancy, that they should not now be taxed; we do not put a calf into the plough, we wait until he is an ox." He said, "they struck it out either critically as too ludicrous, or politically as too exasperating; I care not which. *It was their business.*" Dr. Johnson here speaks of his labours in a light that is not far from venal.

A tour to the Western Islands of Scotland in 1773, in which he was accompanied by Mr. Boswell, forms a remarkable and entertaining incident in his life. His stay in Scotland was from the 18th of August, in which he arrived, till the 22d of November, when he set out on his return to London. He came by way of Berwick-upon-Tweed to Edinburgh, where he remained a few days, and then went by St. Andrew's, Aberdeen, Inverness, and Fort Augustus, to the Hebrides, the principal object of his tour. He visited the isles of Sky, Raasay, Coll, Mull, Inchkenneth, and Icolmkill. He then travelled through Ayrshire by Inverary, and from thence by Lochlomond and Dumbarton to Glasgow, then by Loudon to Auchinleck, in Ayrshire, the seat of Boswell's family, and by Hamilton back to Edinburgh, where he again spent some time. He thus saw the four universities of Scotland, its three principal cities, and as much of the Highland and insular life as was sufficient for his philosophical contemplation.—Among his prejudices, a strong antipathy to the natives of Scotland in general had long been conspicuous, and this journey exhibited many instances of his contempt for their learning and abhorrence of their religion. When he published, however, the account of his tour, two years afterwards, more candour and impartiality was found in it than had been expected; and to the praise which is justly due to the elegance and vivacity of his descriptions, it may be added, that the Scotch were indebted to him, in some instances, for his reprehension of customs and peculiarities from which they have since departed. Prejudiced as he was, he often made a fair war upon Scottish prejudices; and though a sloven, he made some just remarks on the sloth and discomforts that retard civilization. On one subject he gave more offence to the national feelings than truth and candour will permit us to sympathize with. Our Celtic scholars have never proved the authenticity of the poems ascribed to Ossian, and Johnson sturdily denied them to be authentic. If the advocates for the authenticity of the Gaelic poems had confined their pretensions to a few fragments, or to any moderate ideas of their antiquity, the cause might have admitted of a dispute; but when they supported Macpherson's imaginary date of the third century, and the existence of an entire epic poem, the sarcasms of Johnson's incredulity had their full force.

In the month of March 1775, he was gratified by the title of Doctor of Laws, conferred on him by the university of Oxford, at the solicitation of Lord North. In September he visited France, for the first time, with Mr. and Mrs. Thrale, and Mr. Baretti. His journey did not occupy more than two months. Foote, who happened to be at Paris at the same time, said, that the French were perfectly astonished at his figure and manner, and at his dress, which was exactly the same with what he was accustomed to in London.—his brown clothes, black stockings, and plain shirt. Of the occurrences of this tour it is probable that he kept a journal, though unfortunately he never perfected it, from want of leisure or inclination. In the preceding year he had also made a journey into Wales; but Wales, he observed, is so little different from England, that it offers nothing to the speculation of the traveller.

In 1776, he wrote nothing for the public. In that year he removed from Johnson's Court to a larger house in Bolt Court, Fleet Street, with a garden, which he took delight in watering. A room on the ground floor was assigned to Miss Williams, and the whole of the two pair of stairs' floors was made a repository for his books, consisting of about 5000 volumes. Here, in the interval of his residence at Streatham, he sat every morning receiving visits, and sometimes gave not inelegant dinners. Chemistry afforded him some amusement, and he had an apparatus for the study of it in his house. He had also a laboratory at Streatham, and diverted himself with drawing essences and colouring liquors for Mrs. Thrale. His last literary undertaking was in consequence of a request from the London booksellers, who had engaged in an edition of the works of the principal English poets, and wished to prefix to each a biographical and critical preface from his hand. Dr. Johnson executed this task with all the spirit and vigour of his best days. The publication of his *Lives of the Poets* began in 1779, and was completed in 1781. In a separate form, they compose four volumes octavo, and have made a valuable addition to English biography and criticism. The style of this performance is comparatively free from the stiffness and turgidity of his earlier compositions.

This was the last of Johnson's literary labours; and, though completed when he was in his seventy-first year, shews that his faculties were in as vigorous a state as ever. In the year 1781, he lost his valuable friend Thrale. Dr. Johnson's friends were in hopes that Mr. Thrale might have made a liberal provision for him for his life; which as he (Mr. Thrale) left no son, and a very large fortune, it would have been highly to his honour to have done: but he bequeathed him only 200*l.* which was the legacy left to each of his executors. With Thrale, many of the comforts of Johnson's life might be said to expire. In the course of 1782 he complains, that he passed the summer at Streatham, but there was no Thrale. His visits to that place became less and less frequent, and, in the following year, entirely ceased. He kept up, however, a friendly correspondence with the widow of his friend, till she informed him of her intention to marry Mr. Piozzi, an Italian music-master. Johnson, as the executor of her husband, thought himself bound, in duty to the memory of Thrale, and the welfare of his children, to remonstrate with her on the intended step. Mrs. Piozzi's answer contained an indignant vindication of her conduct and of her fame, and bade a final adieu to her adviser, until he should have altered his opinion of the man of her choice. Of the charms of Dr. Johnson's friendship the lady thus candidly expresses herself in her *Anecdotes:* "Veneration for his virtue, reverence for his talents, delight in his conversation, and habitual endurance of a yoke my husband first put upon me, made me go on so long with Mr. Johnson; but the perpetual confinement I will own to have been terrifying in the first years of our friendship, and irksome in the last, nor would I pretend to support it without help when my co-adjutor was no more."

Thus excluded from the most agreeable dwelling in which he had ever been domesticated, he was compelled to return to his own house, to spend cheerless hours among the objects of his bounty, when increasing age and infirmities had made their company more obnoxious than when he left them; and the society of which he had recently been deprived rendered him comparatively less patient to endure it. From this time the narrative of his life is little more than a recital of the pressures of melancholy and disease, and of numberless excursions taken to calm his anxiety, and soothe his apprehensions of the terrors of death, by flying, as it were, from himself. His health began to decline more visibly from the month of June 1783, when he had a paralytic stroke; and although he recovered so far as to be able to take another journey to Litchfield and Oxford towards the close of the year, symptoms of a dropsy indicated the probability of his dissolution not being remote. Some relief, however, having been administered, he rejoined the society of his friends; and, with a mind still curious, intelligent, and active, renewed his attention to the concerns of literature, and tried his faculties by Latin translations from the Greek poets. During his absence, his friends endeavoured to procure some addition to his pension, that he might be enabled to try the genial effects of a warmer climate in the south of Europe. Application was accordingly made to the Lord Chancellor Thurlow, who applied to the Treasury for this purpose, but without success. His lordship, however, evinced his regard for our author, by offering to advance the sum of 500*l.* for this object; an offer which Johnson declined, with the most dignified expressions of gratitude. Dr. Brocklesby also made a similar offer; nor were there wanting others, who would have liberally supplied him for his continental tour. But these offers were not accepted, and his strength was becoming unequal to the effort of a journey. The dropsy and asthma were making hasty approaches. No man seems ever to have had the instinctive horror at the prospect of dissolution more strongly impressed on his mind than Johnson. Unfortunately for himself, he had a smattering of medical science, and imagining that the dropsical collection of water which oppressed him might be drawn off by making incisions in the calves of his legs, he said to the surgeon, who was making slight scarifications in his swollen legs, "deeper, deeper. I want length of life, and you are afraid of giving me pain, which I do not value;" and he afterwards, with his own hand, had punctures made for this purpose. Devotion, however, is said at last to have come to the support and pacification of his mind. He died on the 15th of December, in the seventy-fifth year of his age. His remains, attended by a respectable concourse of friends, were interred in Westminster Abbey, and a monumental statue has been since placed to his memory in St. Paul's Cathedral. He left his property, a few legacies excepted, to a faithful black servant, who had long lived with him. A short time before his dissolution he had burnt large masses of paper, and, among others, two large quarto volumes, containing a full and most particular account of his life. The loss of which might be a subject of regret, if the biographical accounts were not so numerous and authentic. Johnson was, at his death, and had been for some time before it, the most conspicuous character in English literature. He had less of the pure quality of genius than Goldsmith, but he had more energy in the expression of his prose style, and a more imposing air of consequence in giving weight to his opinions. He was not so truly eloquent as Burke, but he devoted himself more to literature. He was less learned than Warburton, but more popular from his choice of subjects, and superior to that scholar in richness of fancy. There was no contemporary prose writer whose style was more poetical: there was no poet who combined with the talent for poetry a command of prose so valuable and strong; yet his poetry is marked by precision of thought, and not by exquisite feeling, and his prose is far from being chaste or idiomatic. It abounds with the formality of antithesis, with latinisms, with too much abstraction of terms, with a rotundity of words that is often more sonorous than instructive, and with a pomp of metaphor that is frequently applied to trivial ideas. Still there is a breadth and magnificence in his style, considered as the drapery of his thoughts, that makes the richness of its tissue atone for the stiffness of its folds. And if his colours of language be gorgeous, his ideas are for the most part sufficiently vigorous to stand exposure in the strongest light.

As a critic, where his political or accidental prejudices did not happen to interfere, he could seize more vigorously, than almost any other mind, upon the main outlines of merits and defects in poetry, and illustrate them with a force and felicity entirely his own. But we believe it will be generally granted, that though he fully possessed the great outlines of critical discernment, he had not that finer tact of sensibility which directs to the more latent and exquisite beauties of poetry. Garrick complained, and we believe justly, that he was wholly dead to the finest impressions of tragedy; yet no one could give, in general terms, a more just description of the merits which tragedy should possess. His critical sensibility was sagacious, not sensitive. Those who blame him for not going deeper among our ancient poets, in his edition of them, forget that the study of our elder poets was but then begun. Of the poets whom he criticised, he made, upon the whole, a pretty fair estimate. It is the rage of modern taste to exaggerate the merits of all our old minor poets; Johnson's work will probably serve, in a future age, to counteract this overweening opinion. Indeed, at this moment there is no critical authority to which we should resort more willingly, than to his, against the tasteless depreciation of Pope, which has of late been so ominously current. The history of his life cannot be perused without many recollections of personal esteem. The traits of his charity and benevolence to the unfortunate are very numerous. He was a dutiful son and a kind master; and the spectacle of his early career, that of a friendless scholar, supporting himself by the toils of literature, bursting forth upon the world as a man of genius, through the clouds of poverty, depression, and hypochondria, and maintaining all along a virtuous pride and independence of character;—this is an object of interesting and even of elevated contemplation. It may soften our animadversion, though it cannot wholly blind us to his faults as a philosopher and a man. In neither of these views, whether we consider him as an individual member of society, or a teacher of the truths that publicly interest society, can he be held up as an object altogether entitled to be loved, or fit to be imitated. He seems neither to have felt nor practised one of the first duties of a member of society—that of social and civilized deportment. The history of his conversations, as related by Mr. Boswell, gives us the picture of a strong and amusing, but of a coarse and insolent mind. Whatever praise may be due to his strictly private and domestic virtues, he often brought no better feelings into promiscuous society, than those of spleen, egotism, and domineering pride. We are told by his biographers only of his victories in the warfare of conversation; but private tradition has preserved many anecdotes of his insolence being properly chastised, and often in the most humiliating manner, by individuals who were his inferiors in general knowledge. It would have been well if these had been recorded with equal assiduity as his triumphs; for his example was calculated to injure the tone of general manners; and it is certain that there were at one time many apes of his manner in conversation, as well as in writing. But, happily, the prevailing manners of polite life are now such, that the dogmatic manner of a Johnson would not at this moment be tolerated.

He was an advocate of arbitrary power in politics, though it is but justice to mention with what particular qualifications. He abhorred the existence of absolute slavery, and used to express his detestation of that remaining blot upon our national character, the slavery of negroes in our colonies. He wished well to Roman Catholic emancipation; and even after the alarm of the memorable riots in London, rejoiced that the acquittal of Lord George Gordon had not sanctioned the doctrine of executing a man for *constructive treason*. So far his sense of rectitude prevailed, in particular cases, over his general tendency to bigotted and despotic sentiments. But the main current of his opinions ran in the latter channel. We need not trouble the reader with quotations; for the most who have perused his life, must remember many traits of his superstition and intolerance. He bowed to a bishop as to a being of a superior nature. He abused, in the most rancorous terms, a young woman who had been guilty of quitting the established church, and joining the society of Quakers, declaring that she had no right to think for herself on the subject. He spoke of Rousseau as one whom he would have rejoiced to punish as a felon. We are not disciples of Rousseau; but we have no hesitation in declaring our opinion, that some of Dr. Johnson's tenets were not less noxious than those of the philosopher of Geneva. In point of immediate and obvious evil tendency, nothing that Rousseau ever wrote was so pernicious as our author's pamphlet on the subject of our dispute with America. It may not be easy to ascertain how much influence that production exercised in biasing the public mind towards hostilities; but he lent his influence, such as it was, to sanction unjust pretensions, and to promote the exasperation and sufferings of millions of his species.

The tendency of his abstract sentiments in favour of arbitrary power was, perhaps, not very mischievous. It is chiefly in confined and particular questions that the sophistry of an illiberal writer can do much harm. Taken in a general view, an animated author counteracts all the evil impressions which he can make against the cause of liberty, by the spirit of discussion which he awakens, and by the attention and contradiction which he provokes. Johnson defended principles with his pen, which, in the long run, can never be supported but by the sword.

Nevertheless, when we assign to departed individuals their respective rank in the scale of benefactors to their species, we cannot forget the question, whether they have lent the strength of their talents to promote the progress of moral civilization, or to retard the emancipation of the human mind from bigotry and servility. Had the leading spirits of our literature been all like Dr. Johnson, we might have been at this day burning witches, and believing in the second sight. With what contrasted feelings do we rise from perusing the life and writings of that Milton, whom our author has pourtrayed with the heavy hand of malignant hatred. Milton left his contemporaries behind him, in his high moral and political views, and bequeathed texts for succeeding times to comment upon, and to put in practice. Johnson straggled behind his own age, among the prejudices of the nursery; and, with all his eloquence and manly powers, came from the most enlightened capital in the world, to find the reveries of barbarism in the island of Sky congenial with his own opinions. (*)

JOINERY.*

Joinery is that branch of civil architecture, which treats of the art of framing and joining wood together for the internal and external finishing of houses.

The smoothing of wood, by cutting the superfluous parts away in thin equal slices, is called *planing ;* and the tools used for this purpose are called *planes*, whether they are employed in reducing the surface to a plane, or to a convex, a concave, or an undulated form.

The wood is called *stuff*, and is previously formed into rectangular prisms by the saw. These prisms are denominated deals, boards, battens, planks, &c. according to their dimensions in breadth and thickness. So that in this article, whenever a piece of wood is spoken of, it is understood to be bounded by six planes, and to have all its angles right angles.

The *arrises* are the lines of concourse formed by every two planes, and are therefore eight in number.

Deals are of two kinds, white and yellow; the white is employed for panelling, and the yellow for the framing. But of late, instead of white deal, American wood has been brought into use, and employed both in framing and panelling. It is soft, very free from knots, and easily wrought; but is more liable to warp than white deal.

Of Mouldings.

As mouldings have already been defined under Civil Architecture, we shall here only point out those which are commonly used in joinery.

Wood is generally much thinner than the dimension of its breadth, reckoning the breadth and thickness on the sides of the rectangular section made by cutting it perpendicular to the fibres, the length being understood to be parallel to the fibres. The faces are the two broad planes that run in the direction of the fibres; and the edges are the two narrow planes which also run in the direction of the fibres. The ends are the two planes perpendicular to the fibres.

When the wood has been reduced to the rectangular shape by the square and plane, so that the sides may be planes, and the angles right angles, the next operation is to take away the right angles, and reduce the wood to mouldings, which is called *sticking*, and the moulding is said to be *stuck*.

When the edge of a piece of wood is reduced to a cylindrical form, it is said to be *rounded*, which is the simplest species of moulded work.

When a part of the arris is reduced to a semicylinder, so that the surface of the cylindrical part may be flush, both with the face and edge of the wood, and that a groove or sinking may be made in the face only, the cylindrical part is called a bead, and the sinking a quirk, so that the moulding is called a *quirked bead.*

When a quirk is also formed in the narrow plane, or edge, so as to make the rounded part at the angle three-fourths of a cylinder, the moulding obtains the name of *bead and double quirk.*

When there are two semicylindrical mouldings, rising both from a plane parallel to the face; and when one comes close to the edge of the piece, and the other has a quirk on the farther side, and its surface flush with the face of the wood, the combinations of these mouldings are termed a *double bead*, or *double bead and quirk.* In this combination, the bead which is next to the edge of the stuff is much less than the other.

Mouldings are generally separated from one another, and frequently terminated by two narrow planes, at right angles to each other, called *fillets*, which shew two sides of a rectangular prism.

Mouldings, as well as fillets, are called *members.*

When a semicylindrical moulding, which rises from a plane parallel to the face, is terminated on the edge by a fillet, the two members thus combined are called a *torus.*

If there be two semicylindrical mouldings springing from a plane parallel to the face, terminated on the edge by a fillet, this combination of members is called a *double torus.*

A repetition of equal semicylindrical mouldings, springing from a plane or cylindrical surface, is called *reeds.*

The *cima recta*, and *cima reversa*, are called in joinery *ogee.* The former is called *ogee*, and the latter *ogee reverse.*

Ovolo has already been defined in our article Civil Architecture.

A *quarter round* is the fourth part of a cylindrical surface, but has no quirk on either side.

Mouldings for Framing.

In framed work, as doors, shutters, wainscoting, &c. the edges of the framing is generally reduced at the angles to mouldings. The mouldings for this purpose are the *ovolo*, or the *ogee*, with or without a bead next to the panel; but when the ovolo is employed, a bead or a fillet becomes necessary. The ogee is either common or quirked, with a bead at the bottom.

When the margins of the framing terminate on the edges next to the panel, with one or more mouldings, which both advance before, and retire from the face of the framing to the panelling. The mouldings thus introduced are called *bolection mouldings.*

The panelling of framed work is generally sunk within the face of the framing; sometimes, however, for outside work, it is made flush. In the best flush work, the panels are surrounded with a bead, formed on the edge of the framing, and the work is called *bead and flush.* In the more common kind of flush framing, the bead is run on the two edges of the panel in the direction of the fibres, and is called *bead and butt.*

Fig. 1. Plate CCCXXXIII. Fillets.

Fig. 2. Edge rounded. This simple moulding is also sometimes called a bead; but not unless it is fixed to one side of a rectangular piece of wood, and the rounded part made flush with the other side.

Fig. 3. Flush bead, or bead and quirk.

Fig. 4. Bead and double quirk.

Fig. 5. Double bead.

Fig. 6. Torus. The torus in joinery differs from the beak, in having a fillet.

Fig. 7. Double torus.

Fig. 8. Reeded moulding on the edge.

Fig. 9. Reeded moulding on the face, which may apply to bands, architraves, and pilasters.

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* The editor is indebted for this article to Peter Nicholson, Esq.

Fig. 10. Reeded mouldings round a cylinder or staff. These will apply to columns, or other circular bodies.

Fig. 11. Semicircular flutes, which may apply to bands, pilasters, and columns.

Fig. 12. Shallow flutes, which may also be applied to columns, pilasters, and flat bands.

Fig. 13. Style of a door or shutter, with part of the panel, shewing the mouldings which are here termed quirk, ogee, and bead.

Fig. 14. Style and part of the panel of a door or shutter, shewing the mouldings which are in this example termed quirked ovolo and bead.

Fig. 15. Section of a door style, with part of the panel, shewing the mouldings which are here termed bolection mouldings.

Figs. 16, 17, 18, and 19, are various forms of sections for sash bars.

Scribing and Mitreing.

When two bodies are so fitted together that their surfaces intersect or meet each other, they are in general said to *mitre* or *scribe*.

Two bodies are said to mitre together in a plane passing through the common intersection of their surfaces.

One body is said to scribe upon another, when the two surfaces intersect each other, and when so much of the one body is cut off to make way for the other body entire.

In finishing, whether the bodies are mitred or scribed, the external appearance is the same.

As the theory of the intersection of geometrical bodies with one another has been omitted in the article Carpentry, where it is absolutely necessary in the practice of groins and arches, in order to make correct work; and as it is also essential in joinery, in mitreing, and scribing, we shall make no apology for inserting it in the present article.

The bodies which we shall suppose to be joined together are prisms, cones, and conoids.

Prisms include all solids which may be cut into equal and similar sections by parallel planes, and which may also be cut by parallel planes in some other direction into parallelograms of the same length; and consequently, by this definition, not only triangular, rectangular, and polygonal prisms are included, but also cylinders, cylindroids, and such as may have parallel sections, equal and similar parabolas, or equal and similar hyperbolas.

Parabolic and hyperbolic prisms are here supposed to be generated in the following manner. Imagine the plane of the figure to be, with its apex, along a straight line perpendicular thereto, while its axis or double ordinate to the axis may describe a plane.

In order to prevent repetitions, let it be understood, that when two prisms intersect each other, that they intersect at right angles.

The method of ascertaining the construction of the meeting of the surfaces of two different bodies is, to suppose the position of the one body given in respect to the other, and the position of both in respect to a given plane, and the projection of the intersection of the two surfaces to be made on that plane.

For the purpose of projection, let us suppose that, besides the plane on which the projection is made, there are two others at right angles, forming, with the plane of projection, an internal solid angle.

To render the practice of this easy, we shall suppose that, when the intersection of two prisms is required, the ends are placed at right angles to the plane of projection, and that the double ordinates of their generating figures are parallel thereto.

Let us suppose, in the case of two prisms joining, that the planes generated by the axis of the generating figure of each prism, are the plane whose distances are respectively x and y.

Or, in the case of a prism joining with a conoid, that the plane described by the axis of the generating figure of the prism, and the plane passing through the axis or centre of the conoid at right angles therewith, and also to the plane of projection, are the two planes whose distances are respectively x and y.

Prob. To find the projection of the intersection of two prisms, or of a prism and conoid.

Suppose the plane of projection to pass through one extremity of the axis of the generating figure, and let a be equal to the axis of that figure, and consequently equal to the distance of the most remote point of the intersection of the two solids from the plane of projection; and let z be equal to the distance of any point in the intersection from the said plane, x equal to the distance of that point from one of the vertical planes, and y the distance of the same point from the other vertical plane.

Find the equation of the one generating curve in terms of x and z, also the equation of the other generating curve in terms of y and z. Find the value of z or any equal power of z in each of these equations; put these values equal to one another; then the equation between x and y will determine the species of the curve.

Ex. 1. Suppose two parabolic prisms to intersect each other, so that the apex line of the one prism, and the rectangle opposite the apex line of the other, may be in the plane of projection.

Fig. 20. Plate CCCXXXIII. Let CI be the apex line of the one prism, and A F the line described by the extremity of the axis which meets the double ordinate of the other. Let APDC be half of the generating parabola, of which its axis forms the line CI; and A′P′D′C′ half the generating section, of which the extremity of the axis that meets the double ordinate forms the line A′F.

Draw BP parallel to CD; make AC $= a$, CD $= b$, AB $= z$, and BP $= y$. Draw B′F′ parallel to C′D′; make C′A′ $= a$, C′D′ $= c$, C′B′ $= z$, and B′P′ $= x$; therefore B′A′ will be $= a - z$.

Then, by the property of the parabola,

In the section APDC, $a : z :: b^2 : y^2$; therefore $z = \frac{ay^2}{b^2}$;

and in the section C′D′P′A′, $a : a - z :: c^2 : x^2$; therefore

$$z = a - \frac{ax^2}{c^2};$$

Consequently $\frac{ay^2}{b^2} = a - \frac{ax^2}{c^2}$; whence we infer, that the curve FGHRI, which is the projection of the two prismatic surfaces, is an ellipse.

If $b = c$, the projection will be a circle.

Ex. 2. Suppose the generating figures of both prisms to be parabolas, as before; and that the rectangle described by the double ordinate of each is on the plane of projection, to find the projection of the intersection of their surfaces.

Let APDC, Fig. 21. Plate CCCXXXIII, be the generating figure of the one prism, and A′P′D′C′ that of the other. Make CA $= a$, CB $= z$, CD $= b$, and BP $= x$, also C′A′ $= c$, C′B′ $= z$, C′D′ $= d$, and B′P′ $= y$; therefore BA $= a - z$, and B′A′ $= c - z$.

From the property of the parabola we have from the figure A P D C. $a : a - z :: b^2 : x^2$; whence $z = a -$

$\frac{ax^2}{b^2}$, also from the figure A′P′D′C, $c : c - z :: d^2 : y^2$; whence $z = c - \frac{cy^2}{d^2}$; therefore $a - \frac{ax^2}{b^2} = c - \frac{cy}{d^2}$; therefore $y^2 = \frac{d^2(c-a)}{c} + \frac{ad^2}{cb^2}x^2$; whence we infer that the curve is an hyperbola; and if a and c become equal, we should then have $y^2 = \frac{d^2}{b^2}x^2$, or $y = \frac{d}{b}x$, and consequently, in this case, the projection of the intersection of the two surfaces would be straight lines, and would form the figure of a groin; and if b and d were equal, we should have $y^2 = \frac{b^2(c-a)}{c} + \frac{a}{c}x^2$, which is a case that would more frequently occur in practice.

Ex. 3. Suppose the generating figure of the one prism to be a semi-ellipse, of which the greater axis is the base, and the generating figure of the other to be a semi-circle; and that the rectangle described by the greater axis of the former, and the rectangle described by the diameter of the latter, are in the plane of projection.

Let APDC. Fig. 22. be the half of the generating figure of the elliptic-prism, or semi-cylindroid, and A′P′D′C′ be half of the generating figure of the semi-cylinder. Make $CA = a$, $CB = z$, $CD = b$. and $BP = x$; also $C'A' = c$, $C'B' = z$, $C'D' = d$, and $B'P' = y$.

Then, from the property of the ellipse, in the figure APDC, we have $a^2 : b^2 :: (a + z(a - z) : x^2$; whence $a^2x^2 = b^2(a^2 - z^2)$. Therefore $z^2 = a^2 - \frac{a^2}{b^2}x^2$.

Again, from the property of the circle in the figure A′P′D′C, we have $y^2 = (d+z)(d-z) = d^2 - z^2$; whence $z^3 = d^2 - y^2$, therefore $a^2 - \frac{a^2}{b^2}x^2 = d^2 - y^2$; whence $y^2 = d^3 - a^2 + \frac{a^2}{b^2}x^2$. Whence we infer that the curve is an hyperbola.

This example is exceedingly useful in groined arches. Let $y = o$, then will $o = d^2 - a^2 + \frac{a^2}{b^2}x^2$, whence $x = \frac{b}{a}\sqrt{(a^2 - d^2)}$, which is half of the greater axis of the curve. Suppose y infinite, then will $y^2 = \frac{a^2}{b^2}x^2$, or $y = \frac{a}{b}x$, therefore $a : b :: y : x$, that is GF : FE :: $x : y$; whence GE is an asymptote to the curve. If $a = b$, as is generally the case, we shall have $y^2 = d^2 - a^2 + x^2$; and in this case, if $y = o$, we shall have $x^2 = a^2 - d^2 = (a + d)(a - d)$; therefore, this particular value of x will be a mean proportional between the sum and difference of the two radii.

Of the various Forms of Joints for Doors and Shutters, and of the Methods of Hinging them together.

The forms of joints for folding and hinging is essential to the beauty of the work. Such joints ought to be so made, as to preserve the uniformity of the door or shutter on both sides; and to exclude as much air as possible from rushing through between the edges of the two bodies to be hinged, and thereby rendering the apartments cold in winter.

In the joints of doors which are to be hinged together, both angles of one of the bodies are usually beaded, in order to conceal the open space which would be seen from every point of view; and to preserve the regularity of the work, the hinges employed to couple them together are made exactly to the size of the bead, on the side on which the knuckle is to be placed; so that, when they are hung, the knuckles of the hinges and the wooden bead form one continued staff or cylinder.

Plate CCCXXXIV. Fig. 1. Nos. 1. and 2, is a section of part of the door style and part of the hanging style at the joint. In this, the centre of the bead on each side is in the line of the straight part of the joint from the opposite side. To form the joint exactly, let C be the centre of the bead, AG part of the joint in a line with the edge of the same, join AC, and draw AB perpendicular to AC; the other part BH is perpendicular to EF, the face of the door or hanging style. This joint will be found sufficient for many purposes, and may be hung with common hinges, and, being crooked, will break the current of air.

Fig. 2. Nos. 1. and 2. is a plane joint, beaded alike on both sides. Here, as the plane of the joint is a tangent to the cylindrical surfaces of both beads, the margin will be alike on both sides, and, therefore, affords no check in preventing the cold air from rushing through the aperture or seam into the apartment. Another inconvenience is, that the hinge which is to connect the two bodies must not be made in the usual manner, but in the form shewn in No. 3, where the bodies are hinged together.

Fig. 3. In Nos. 1. and 2. the plane of the joint from the one side is directed to the axis of the bead on the other. This joint is upon the same principle as Fig. 1. and therefore may also be hinged with common hinges, as at No. 3. where the two parts are coupled together. These forms of Figs. 1 and 3. are applicable to those cases where a part of the margin is concealed on one side of the door.

Fig. 4. In Nos. 1. and 2, the beads are of the same size on both sides, and are exactly opposite to each other, and the joint is broken by indenting a part which terminates by a plane directed to the axis of the two opposite beads. This form is not only beautiful and strong, but tends to make the apartment comfortable, and the hinges only require to be of the common form. No. 3. shews the two parts hinged together.

Fig. 5. In Nos. 1. and 2. the beads are placed alike on both sides, but not on the same piece as in Fig. 4; and though the uniformity is preserved, the bead which projects the whole of its thickness is weakened.

Fig. 6. Shews the method of hinging shutters and concealing the hinges. A is the inside bead of the sash frame, B the inside lining, C part of the style of the shutter. To find the form of the joint, let *a f* be the face of the shutter perpendicular to *a r*, the face of the inside lining. Bisect the angle *f a r* by the straight line *a a*; then, taking any point *c* in the centre, draw *d d* perpendicular to *a a*, cutting *a a* at *c*; and *c* is the centre of the hinge. From *c* describe an arc *a m*, which must be hollowed out of the inside lining of the sash, from the whole height of the shutter; and the internal right angle must be cut out of the edge of the shutter to the breadth of the hinge, in order to make way for the hinge in the act of opening and shutting. Here the toils of the hinges are shewn of different lengths, in order to strengthen them.

Fig. 7. Is a joint with concealed hinges intended for a door; and here, as the door is sufficiently thick, the ends of

the hinges are of equal lengths, and are concealed in the thickness of the wood.

Fig. 8. Is the method of hinging shutters in the common way, where the hinge is let its whole thickness into the edge of the shutter, upon the supposition that the inside lining would be too thin for the screws which are employed in fastening them, in order to have sufficient hold.

Fig. 9. Shews the method of hanging a door with centres which are entirely concealed. Suppose *a d* that part of the side of the jamb which comes in contact with the edge of the door; bisect *a d* in *b*, and draw *b c* perpendicular to *a d*; make *b c* equal to *b a* or *b d*, and join *a c* and *c d*; from *c* describe an arc *a e d*, which shows the part to be hollowed out of the jamb. The centres are fixed to the top or bottom of the door. The upper centre must be so constructed as to admit of being taken out of the socket, so that the door may be unhung, as may be required.

Fig. 10. Shews the method of hanging shutters in the usual way, where the centres of the knuckle of the hinge is placed exactly opposite to the perpendicular part of the rebate. The dotted lines shew the flap exactly as folded back.

Fig. 11. Shews how the hinge is to be placed when the axis of the knuckle cannot be placed opposite to the joint. Thus, let *a b* be the distance of the edge of the flap from the edge of the shutter; bisect *a b* in *c*; then *c* is the point opposite to which the centre of the hinge must be placed. This situation for the knuckle of the hinge becomes necessary, when the shutters are not square at the ends, or when the boxing-room is not sufficiently ample. The principle is, to place the centre of the knuckle of the hinge at half the distance of the edge of the flap from the rebate on the edge of the shutter.

Fig. 12. Shews the two parts as hinged together.

Fig. 13. When a door has a cornice, or other projecting moulding, and when it is required to bring the doors in a situation, when open, parallel to its place when shut, the knuckle of the hinge must be made to project as far, or something more, than the cornice or caping moulding. This principle will be sufficiently evident by inspecting the figure. The dotted lines shew the situation of the door when folded back.

Fig. 14. Shews the form of a rule-joint, either for shutters or furniture that require to open no farther than a right-angle, and that are to be exposed at the external angle. Here the centre of the hinge must obviously be in the centre of the arc.

Fig. 15. Shews the same when turned to a right-angle.

Shutters are always within the apartments, wherever beauty is aimed at; those on the outside destroying the appearance of the front. They are divided into several vertical slips folding behind each other, for the conveniency of concealing them within the thickness of the wall. Each slip or fold is framed and composed of several panels, either raised or flat, surrounded with small mouldings contained within the thickness of the framing.

The case in which the shutters are enclosed, is called the *boxing*. The parts of the sash-frame in connection with the shutters, are the inside lining which forms one side of the boxing, and to which the front shutter is hung. The vertical piece of wood which adjoins the edges of the sashes and the inside lining, is called the *pulley style*. The vertical piece of wood which joins the pulley style on the outside, parallel to the inside lining, is called the *outside lining*. That side of the boxing which is parallel to the face of the shutter, is called the *back of the boxing*. The remaining third side of the boxing is either formed by the architrave which surrounds the aperture within the room, or, in very good houses, by a groined flush on one side with the plaster of the wall. The parts of the sash-frame which are parallel to the horizon, are the *sill* and *top*, which names bespeak the situation in which they are placed. Inside beads are those slips of wood, rounded on the edges, which form one side of the race or groove for the sashes to run in. Parting beads are those slips of wood which separate the upper and lower sashes.

The method of making doors open exactly, so as to cut away the least quantity of wood, or to keep the narrow planes of the edges as nearly perpendicular to the face of the work as possible, depends upon the following principle.

Supposing a correct section to be drawn; then, if the aperture be shut with a door to open in one breadth, draw a straight line from the centre of the hinge to the opposite angle of the plane; perpendicular to which, draw another straight line, and this perpendicular will give the splay of the jamb which comes in contact with the edge of the door which is to be fastened or locked therein. If the aperture is closed with two doors, the principle is still the same, as it is only necessary to consider one of them to open at a time, while the edge of the other, which is bolted to the floor and soffit, is considered as a jamb; then proceeding with the other half, which is thus left to turn on its hinges, as if it where a whole, in the same manner that we have now described.

Fig. 16. Shews the section of a door for a straight wall.

Fig. 17. Is the section of folding doors. Here it will be necessary to attend to the principle.

Fig. 18. Is the section of a door in one breadth in a circular wall. Here the joints should tend to the axis of the cylinder.

Fig. 19. Is the section of a door in a cylindrical wall, in two parts. In this the above method should be attended to.

Fig. 20. Is the section of a double door, to open to the space on the concave side. Here, in particular, the above method of making the doors open to clear the jambs should be attended to.

Fig. 21. Is the section of a single door, to open to the concave side. Here the principle of making it open must also be attended to.

Raking Mouldings.

Raking mouldings depend upon the principle of a solid angle consisting of three plane angles, or what may be called a trihedral; and this may be considered either as a hollow or as a solid, according as it may be used externally or internally. The mouldings are supposed to be placed in two of the lines of concourse, and to meet each other in a plane passing through the other line of concourse.

The raking mouldings of a pediment are placed upon a solid trihedral, the horizontal moulding being disposed upon the obtuse angle, and the raking mouldings upon the top of the tympanum. In this case, the mitre of the mouldings is in the same plane with the line of concourse of the two sides of the building.

The three planes which terminate in a point in the inside of a rectangular room, may be considered as a hollow trihedral. Now, if these three planes which constitute the trihedral be at right-angles, no difficulty can occur in constructing the mouldings, as each cornice may have the same section, and as the direction of both cornices are perpendicular to the line of concourse of the two vertical sides of the room; but where the cornice is perpendicular, and the other oblique, the case becomes the same as the preceding.

The same principle is also applied to the bars of a bow window, of which the sides form a polygonal prism. In this, the trihedral is considered as formed by the face of one of the vertical planes; a vertical plane bisecting the two adjoining faces and a horizontal plane.

Let us suppose the inclination of the two planes through which the plane of the mitre passes, and the other two angles of the trihedral to be given. The projection of each mitre, and the figure of the mitre, or the section of one of the mouldings and the mitre line, must also be given, and we shall have sufficient data in order to ascertain the section of the other moulding.

This construction becomes very easy, where the inclination of the two planes is a right-angle, and when the angle contained by the edges of the one plane is a right-angle, and that contained by the edges of the other an obtuse angle, as is the case with a pediment. The plane of the two adjoining walls is generally a right-angle, and the angle contained by two of the edges of one of the planes is an obtuse angle, and that contained by the two edges of the other a right-angle.

This case affords a very easy construction; it being only necessary to lay down the side of the building on which the pediment or inclined cornice is to be made, with a projection of the mouldings at the lower end, without any plan whatever, provided that the mouldings have the same projecture on both sides.

The same is also the case with regard to the two sides of a bow window, where the sides are vertical planes at any angles with each other.

Fig. 1. Plate CCCXXXV. Shews the elevation of a triangular pediment with a modillion cornice.

Fig. 2. Shews the elevation of an open pediment with the same cornice as Fig. 1. It is in such examples as these that raking mouldings occur.

Fig. 3. Shews the method of tracing a raking cimarecta. The curve turned towards Fig. 2. is the return moulding in the open part of the pediment, Fig. 2. The curve next to the margin of the plate is the return moulding at the lower extremities of the pediments, Fig. 1. and 2. The middle curve is a section of the raking or inclined moulding itself.

Fig. 4. Shews the front of a modillion, with the raking moulding which forms the cap. The upper extreme curve is a section of the level return at the top; the lower extreme curve is a section of the level return moulding at the bottom; and the curve shewn in the middle is a section of the raking moulding itself. This is the same modillion as shewn in the designs of Figs. 1. and 2.

Fig. 5. Shews the section of a raking cavetto, and that of the return moulding at the bottom.

Fig. 6. Shews the section of a raking ovolo, and the sections of the return mouldings at the top and bottom. As the principle of all these is the same, though the forms are different, we shall here describe the method of tracing these curves. Admitting the curve ABCDEF at the bottom to be given: draw lines B b *b*, C c *c*, D d *d*, E e *e*, F f *f*, parallel to A a *a*, or to the fillets of the moulding: Draw AI, BK, CL, DM, EN, FO perpendicular to FG, and draw any straight line IKLMNO parallel to FG, place the distances IK, KL, LM, MN, NO, upon any part of the fillet, and draw the straight lines i a, k b, l c, m d, n e, o f, and a b c d e f is the section of the raking moulding. In the same manner, by drawing any straight line *i k l m n o* parallel to FG, and drawing *i a*, *k b*, *l c*, *m d*, *n e*, *o f*, perpendicular to FG, we shall obtain the curve *b c d e f*, and the lower side of the fillet *a b* for the section of the return moulding at the top, if any should be wanted.

Fig. 7. Section of a raking architrave and soffit for the return of a splayed window, which is sometimes both necessary and ornamental in thick walls. No. 1. is the architrave for the soffit, which we shall suppose to be given in order to obtain No. 2. Let DF represent a section of the plane of the face of the soffit, then to find any point in the curve, draw E *e* perpendicular to DF cutting C *f*, the face of the raking architrave, at *f*; make *f e* equal to FE, and *e* will be a point in the raking moulding of the splayed architrave. Other points will be found in the same manner, and when a sufficient number are obtained, the curve may be drawn through these points by the hand.

Fig. 8. Is another design finished with reeded mouldings; the method of tracing is the same, but this is more particularly explained in the next figure.

Fig. 9. Is the method of tracing the moulding of a raking architrave more particularly explained. The moulding chosen for this purpose is an ogee reverse. No. 1. is the given moulding. No 2. the raking one, which is required to be found. AE, *e* B, are the edges of the mouldings, which are supposed to be in the plane of the finishing of the walls. EF and *e f* are the fillets which front each other. FG, *f g*, the sides of the quirks of the mouldings. IK, *i k*, the faces of the fillets. LK *l k*, the returns of the same, and IQPHONG, and *i q p h o n g*, ogee mouldings. Then to find any point *h* in the curve, draw H *h* parallel to AB, and supposing these mouldings to be of equal thickness, draw *a e* perpendicular to BC; make *a e* equal to AE; draw HM perpendicular to AE, cutting it at M; make *a m* equal to AM, and draw *m h* parallel to BC, *h* will be a point in the raking moulding as required. In the same manner, all the other points will be found and completed as before.

Fig. 10. Is a torus moulding for skirting stairs. The curve at the lower end shows the section that the moulding at the return makes in the passage below. The upper curve is a section of the moulding on the return at the landing. The middle curve is a section of the moulding placed in the staircase itself. This form of oblique curvatures would only take place in a straight flight of stairs, where the steps both begin and end in the passages.

Fig. 11. Shews the method of mitreing skirting, where the wall of a staircase is continued before the first step, and after the landing.

Fig. 12. Shews another method, by taking away the angles. Thus take two equal distances AB and AC. Draw BD perpendicular to AB, and CD perpendicular to AC. Then with D as a centre, describe the arc BC, which is the curve required.

Fig. 13. Shews the method of finding the forms of the bars of a bow window. The principle is the same as described in Fig. 9. No. 1. is a section of the given bar. No. 2. is a section of the raking bar in the mitre of an oblique angle. No. 3. section of the bar in a right angle.

Formation of Bodies in Parts by joining them with Glue.

Plate CCCXXXVI. Fig. 1. No. 1. Is a section of two boards glued up edge to edge. No. 2. face of the same.

Fig. 2. A section of two boards glued edge to edge, with a tongue inserted in a groove in each piece

By these means, a board may be made to any breadth, though the pieces which compose it be ever so narrow.

Fig. 3. Two boards fixed at right angles, the edge of the one being glued upon the side of the other. They are strengthened by a block, which is fitted and glued to the interior sides.

Fig. 4. No. 1. A section of two boards at an oblique angle, mitred and glued together, with a block in the angle. No. 2. shews the inner sides of the boards thus fixed. By this method columns are glued up.

Fig. 5. No. 1. Section of an architrave. As the moulding is generally, if not always glued to the plate or board, the dotted line circumscribing the moulded part shews the section of the piece to be glued. No. 2. face of the architrave. No. 3. a section of the architrave before it is moulded. No. 4. a front of the same. No. 5. a section of the same to a reduced size, with the button and nail, shewing the manner in which the two parts are glued together. No. 6. shews the back of the architrave with the buttons. The black dots shew the heads of the nails. The buttons are used, in order to bring the two surfaces which are glued together in contact, after the pieces have been set and held together, and are afterwards knocked off when the glue becomes dry, and then the moulding is stuck, as shewn by the section, No. 1. and elevation, No. 2.

Fig. 6. Shews the method of glueing up a solid niche in wood. No. 1. is the elevation. Here the work is constructed in the same manner as if it were stone or brick, except that the joints are all parallel to the plane of the base; for it is difficult to make a joint with curved surfaces, as would necessarily be the case if they all tended to the centre of the sphere. No. 2. and No. 3. shew the two bottom courses, where the vertical joints are made to break, and not to fall in the same planes. This is distinctly seen in the elevation, No. 1.

Fig. 7. Shews the manner of glueing veneers together, so as to form a cylindrical surface. This is done by nailing brackets to a board, with their faces upwards, and their ends perpendicular, leaving a cavity sufficient for the veneers and wedges between the ends. In No. 1. the thin part in the form of an arc shews the veneers in the state of being glued, and the wedges are shewn upon the convex side. No. 2. is a section of the board and bracket. The veneers ought to be heated before a large fire, and the glue laid on the surfaces that are to come in contact as hot as possible, to prevent the glue from setting, observing to glue only a small portion at a time, and then wedge it up. When the glue is dry, the wedges must be slackened, and the veneers, which will then form one solid, taken out.

Fig. 8. Shews a very strong method of forming a concave surface, by laying the veneer upon a cylinder, and backing it with blocks in the form of bricks, which are glued to the convex side of the veneers, and to each other. The fibres of the blocks must be as nearly parallel as possible to the fibres of the veneers. No. 1. shews a section of the cylinder, veneer, and blocks. No. 2. shews the convex side of the blocks.

Fig. 9. Shews another method of glueing veneers together with cross pieces screwed to a cylinder, the veneers being placed between the cross pieces and the cylinder.

Fig. 10. Shews the method of glueing up columns in eight staves or pieces, the whole being glued together in the manner of Figure 4. We must here observe, that the workman must be careful to keep the joints out of the flutes; for being in the fillets, there will be more substance to prevent them from giving way. No. 1. is a section of the column at the top; and No. 2. a section at the bottom. After being supposed to be glued together, the octagons and mitres must be laid down correctly, in order to form the joints truly. Here are two bevels shewn, one for trying up the mitres, and the other for trying the work when put together.

Fig. 11. shews the method of glueing up the base of a column, according to the following description. Let a course, consisting of pieces of equal lengths, be closely jointed together upon a plane surface or board, so as to be something more than the diameter of the most projecting moulding in the base, then glue the joints firmly together, and plane the upper surface smooth. Upon this course lay a second, with the same number of pieces as the first, closely jointed at the ends as before, and also to the upper surface of the lower course; glue down one of the pieces, so that the middle of its length may fall upon the joint of the two under pieces; then the others being glued on successively till the space is closed, a third may be repeated in the same manner. The horizontal joints of these courses must be so regulated, as to fall at the junction of two mouldings, forming a re-entering angle. When the glue is thoroughly hardened, the base may be sent to be turned. A base, glued up in this manner, will stand much better than one which has the fibres of the wood perpendicular. No. 1. is the plan of the base. The whole lines directed to the centre, shew the joints of the upper course; and the dotted lines tending to the same point, shew the joints of the course below.

Fig. 12. Shews the method of glueing up the modern Ionic capital. No. 1. is the plan exhibiting the manner of placing the blocks. No. 2. is the elevation of the same. The plan is here inverted.

Fig. 13. Shews the manner of glueing up the Corinthian capital for curving of the leaves. No. 1. is the plan inverted. No. 2. the elevation. The abacus is glued up in the same manner as the Ionic capital, Fig. 12.

Fig. 14. Is the method of forming a cylindrical surface, without veneers, by equidistant parallel grooves, and by inserting slips of wood in the grooves. No. 1. exhibits the elevation, and No. 2. the plan.

Fig. 15. Shews the method of forming a conic body. The theory of this is no more than covering the frustrum of a cone; the covering is formed by two concentric arcs, and terminated at the ends by the radii; the radius of the one arc is the whole slant side of the cone, that of the other is the slant side of the part cut off. Here the grooves are all directed to the centre, and filled in with slips of wood glued as before, the semicircle ABC below, is the plan: the arc HI must be equal to the semicircumference ABC.

Fig. 16. Is the same for a smaller segment.

Fig. 17. Shews the method of glueing up a sphere or globe, by the same method. No. 1. the face of the piece; No. 2. the edge, shewing the depth of the grooves; No. 3. shews the mould for forming the pieces to the true curvature; No. 4. exhibits the faces of two pieces put together.

Circular headed sash frames in circular walls. The principle of a circular headed sash frame in a circular wall, depends upon the section of a cylinder, and the development of the surface as cut by another cylinder. In the formation of the radial bars, two of the sides are parallel planes, and the edges are portions of cylindrical surfaces, contained between the exterior and interior faces of the wall. To form the cylindrical surfaces of the concave and convex sides of the radial bars, it will be necessary to be informed, that the curves which direct the shape of the edges are portions of two different ellipses, formed by cutting two different cylindrical surfaces contained between the two sides of the cylindrical wall, and concentic therewith by two parallel planes, inclined at the same angle as the planes of the bar, and having their distance from one another equal to the thickness of the said bar. And, consequently the ellipse, which directs the form of the concave edge of the bar, will have its lesser axis equal to the diameter of the interior cylindrical surface, and that which forms the convex edge equal to the diameter of the exterior cylindrical surface.

The circular bar, or, as it is improperly called, cod bar, depends on the development of the part of the cylindri cal surface, formed by cutting a vertical cylinder by a number of horizontal concentric cylindrical surfaces, which gives the form of the veneers, or thin slices of wood to be bent in thicknesses.

The head of the sash depends on the cutting of a hollow cylinder, so that the side contained between the two cylindrical surfaces, that stand upon the exterior and interior sides of the plane of the sash, may be every where perpendicular to these surfaces, and to follow the true shape of the elevation of the window, and thus the angles will be easily moulded. But in order that there may be no variation of the mouldings in a circular sash frame, it is necessary that both the radial and circular bars, as well as the head, should be moulded upon the same principle as a hand rail, viz. by means of face and falling moulds; the face mould for the radial bars will be as before observed, and the falling mould will be a parallel slip of wood, straight in the edges, in breadth equal to the thickness of the bar. The falling moulds of the other parts must be made according to the development of the cylindrical surfaces.

In fig. 1. ABC, Plate CCCXXXVII. is the elevation of the head of the sash, and ADC the plan of, the same. Bisect the arc ABC in B: draw BF perpendicular to AC, cutting the concave side of the plan at D: draw DG parallel to AC, and AG parallel to BF. Bisect the arc AB at 3, and draw 3 c parallel to BF, cutting GD at c, and the curve AD at c': draw the straight line A 3 K: draw AH making any angle with AK, and 3 I parallel to AH: make AH equal to AG, and 3 I equal to cc': draw the straight line HIK: join BK, and produce BK to L: draw AL perpendicular to BL, and join HL. Divide the arc AB into any number of equal parts as here, into 6: draw 1 a, 2 b, 3 c, &c. parallel to BF, cutting the inside of the head of the sash at a, b, c, &c. the inside of the plan at a, b, c, &c. and the straight line GD at a, b, c, &c. From the points a, b, c, &c. draw aa', bb', cc', &c. perpendicular to AL, cutting HL at a', b', c', &c. and AL at g, h, i, &c.: perpendicular to HL, draw $a'a''$, $b'b''$, cc'', &c. Make $a'a''$, $b'b''$, $c'c''$, &c. respectively equal to ga, hb, ic, &c., and through the points a'' b'' c'' &c. draw the curve a'' b'' c'' d'' e'' f'': draw also the straight line p, q, r, parallel to AH, cutting AL at q, HL at r; draw rs, perpendicular to HL; make rs equal to qp; draw LB′ perpendicular to HL, and make LB′ equal to LB; join Hs, sa'' and B′ f'', which will comple the concave edge of the face mould. In the same manner, by transferring the perpendiculars between AL, and the convex side AB respectively, to the perpendiculars upon HL, we shall have the points through which the convex edge of the face mould must pass, then tracing through the points so found, will complete the face mould R

To draw the falling mould S. Fig. 2, for the convex side of the rail. Extend the arc AB, Fig. 1. with the divisions to the straight line AB, Fig. 2. and mark the extremities A, B, and the divisions 1, 2, 3, &c. Draw the lines AA′, 1 a, 2 b, 3 c, &c. perpendicular to AB. From Fig. 1, transfer the distances GA, aa′, bb′, cc′, &c. to Figure 2. upon AA′, 1 a, 2 b, 3 c, &c. and draw the curve A a b c d e B will give one edge of the falling mould S; the lower edge will be found in the same manner.

To find the falling mould T, Fig. 3. for the concave side. From Fig. 1. extend p a, a b, b c, &c. to f, to Fig. 3. and place them upon PF, from P to a, a to b, b to c, &c. perpendicular to PF draw P l, a m. b n. &c. From Fig. 1. transfer the perpendiculars q r, g a' h b', i c, &c. to Fig 3. upon P l, a m, b n, c o &c. and draw the curve l m n o p q r. From Fig. 2. transfer AA′, 1 a, 2 b, 3 c, &c. to Fig. 3. upon a a', b b', c c', &c. and draw the curve a b c d e F which gives the upper edge of the falling mould T. The under edge of T will be found in the same manner from the under edge of S. The upper line m n o p q r coincides with the top of the stuff, when the mould T is bent round, and the space between the curves a b c d e F, and l m n o p q r, shews the waste of stuff at the acute angle of the piece.

Fig. 4. shews the application of the face mould R to the plank; the plane U shews the upper face of the plank; the plane V the edge; and the plane W the lower face of the plank; so that the two sides and the edge of the plank shew as if they were stretched out in one plane.

To apply the moulds in order to square the stuff, that is, to make it stand over the plane, and opposite to its elevation, when set up in due position: Apply the mould first to the top of the plank at U, so that the chord line of the concave arc of the mould may coincide with AB, the edge of the plank, then draw the form of the mould upon the plane U; let g be one of the extremities of the chord; draw g h perpendicular to AB, cutting the arris line CD at h; make the angle B g i equal to the angle LHA, Fig. 1. and the angle i h f in the plane W equal to LYF, Fig. 1. make hf equal to h i, and draw f e parallel to CD. Then apply the mould to the plane W, so that the face may coincide therewith, and the chord with the line CD, and the point that was at g may now coincide with f; then draw the form of the mould upon the plane W; proceed to cut out the head in the same manner as directed for a hand rail.

The mould X. Fig. 1, is the mould for the radial bars, traced from the plane below; Fig. 5. shews the method of applying it to the plane, which is exactly the same as if it were a hand rail.

Fig. 6. shews the method of tracing the veneers of the cod or circular bar. Fig. 7. is the concave veneer. Fig. 8. the convex veneer. Fig. 9. is the method of forming the edges of the veneers, which are to be cut out to their thickness afterwards.

Stairs.

Stairs and hand-rails are most important branches in joinery; but before we enter upon their construction, it will be useful to point out some of the leading principles, without regarding the materials of which stairs are constructed.

The breadth of steps in general use is from 9 to 12 inches, or about 10 inches at the medium. In the best staircases, the breadth ought never to be less than 12 inches, nor more than 18. It is a general maxim, that a step of greater breadth requires less height than one of less breadth: thus a step of 12 inches in breadth will require a rise of $5\frac{1}{2}$ inches; which may be taken as a standard by which to regulate those of other dimensions; so that multiplying 12 inches by $5\frac{1}{2}$, we should have 66; then supposing a step to be 10 inches in breadth, the height should be $\frac{66}{10} = 6\frac{3}{5}$ inches, which is nearly, if not exactly, what common practice would allow. The proportion of steps being thus regulated, the next consideration is the number requisite between two floors or stories: to ascertain this, we have only to suppose the breadth of the steps to be given, say 10 inches each, as depending on the space allowed for the staircase, and this, according to the rule laid down, will require a rise of 7 inches nearly. Suppose then the distance from floor to floor to be 13 feet 4 inches $=$ 160 inches; then $\frac{160}{7} = 22\frac{6}{7}$, which would be the number required. But as the steps must be equal in height, we should rather take twenty three rises, provided the staircase room would admit of it.

Stairs have several varieties of structure, which depend principally on the situation and destination of the building.

Dog legged stairs, are those that have no opening or well hole; the rail and balusters of both the progressive and returning flights fall in the same vertical planes.

Geometrical stairs, are those which have an opening down the middle, and of which every step derives its support from that immediately below, and from the wall of the staircase.

The steps of a stair consist of two parts, one being parallel, and the other perpendicular to the horizon. The part which is parallel is called the tread of the step, and the other part which is perpendicular, is called the riser.

The rough timber work which is used in the support of a stair is called the carriage.

The string board, is a board fitted against the ends of the steps next to the well-hole, so as to make a complete finish; and the string which terminates the ends of the winders, is a veneer made in the form of a spiral back, with thick wood, so as to make it sufficiently strong.

The most certain method of carrying up a stair, whether of stone or wood, is to provide a rod of sufficient length to reach from one floor to the other, divided into as many equal parts as the risers are in number, and thereby to try every step as the work advances.

Hand Railing.

A hand rail is the upper part of the fence in a geometrical stair. In order that the hand may glide easily along the rail without straining the body, it is evident that the rail ought to follow the general line of the steps, and to be quite smooth and free from inequalities.

The principle of hand railing depends on the method of finding the section of a right cylinder, cylindroid, or prism, according to three given points in or out of the surface, that is, the section made by a plane through three given points in space.

The cylinder, cylindroid, or prism, is hollow, and equal in thickness to the breadth of the rail that is to the horizontal dimension of its section, and the ends or bases, the same as the plane or projection upon the floor.

The hand rail of a stair may always be formed of a portion of this cylinder, cylindroid, or prism, the base of which is the plane of the stair; for the hand rail itself must stand over the plane, it will therefore be contained between the vertical surface of the cylinder, cylindroid, or prism. And as the hand rail is got out in portions, so that each portion may stand over a quadrant of the circle, or ellipse, which forms the plane, we may also suppose such a portion contained between two parallel planes, so that the portion of the hand rail may be thus contained between the two cylindrical, or cylindroidic surfaces, and the two parallel planes. The parts which are to be joined together to form the rail, are to be prepared in such a manner, that when set upon their place, all the sections which may be supposed to be made by a vertical plane passing through the axis of the cylinder, or cylindroid, may be rectangles, and this is called the *squaring of the rail;* which is all that can be done by geometrical rules.

Now, as hand rails are not made of such portions of hollow cylinders or cylindroids, but of plank wood, we have only to consider how such portions may be formed from a plank sufficiently thick. As the faces of the plank are planes, we may suppose the rail contained between two parallel planes, that is, between the two faces of the plank. Then such figures are to be drawn on the sides of the plank, that, when the superfluous parts are cut away, the surfaces that are formed between the opposite figures are portions of the external and internal cylindrical or cylindroidic surfaces. A mould made in the form of these figures, is called the *face mould*, which is only a section of the cylinder or cylindroid through three points in space.

The vertical, or cylindrical, or cylindroidic surfaces being formed, the upper and lower surfaces must next be formed. This is done, by bending another mould round one of the cylindrical or cylindroidic surfaces, generally made to the convex side, and drawing lines on the surface round the edges of this mould. Then the superfluous wood is cut away from the top and bottom, so that if the piece were set in its place, and a straight edge applied upon the the surfaces now formed, and directed to the axis of the well hole parallel to the horizon, it would coincide with the surface. The mould thus applied upon the convex side to form the top and bottom of the piece, is called the *falling mould*.

To find these moulds the plan of the steps and rail must first be laid down; then the falling mould, which must be regulated by the heights of the steps; and lastly the face mould is ascertained by the falling mould, which furnishes the three heights alluded to.

Plate CCCXXXVIII. Fig. 1. Is a dog-legged staircase. No. 1. is the plan. No. 2. the elevation, shewing the rough strings under the steps, and the sling rod marked into equal divisions, for regulating the work in the process of putting it up. The dotted lines above the rail, drawn by the square, show how the centres of the arcs that form the ramp are found.

Fig. 2. Geometrical staircase with winders. No. 1. is the plan. No. 2. the elevation and section. As the staircase is supposed to be cut through the middle, parallel to its length or longest dimension, it would be absurd to represent the whole elevation, as is frequently done; for this reason, only the farther half is represented, and the steps of the other half are shown by dotted lines.

Fig. 3. Geometrical staircase without winders. No. 1. is the plan. No. 2. the elevation. It is in such constructions as this and the last figure, where great nicety of workmanship, and skill in geometrical lines, are found necessary.

Fig. 4. A section of the rail and mitre cap for a dog-legged staircase. The dotted lines are drawn from the section of the rail. No. 1. to the mitre. No. 2. in straight lines. From thence in the arcs of circles, to the straight line passing through the centre of the cap at right angles to the former straight lines, then perpendiculars are drawn, and made equal in length to the perpendiculars. A curve being traced through the points, gives the form of the cap. The section, No. 1. is used in any kind of rail whatever.

Fig. 5. shows the section of a rail in a circular form. The sections of rails also form elliptic figures.

Fig. 6. is another form, called a toad's back rail, to be executed in the best houses. The top is generally cross bended, with coloured wood.

To draw the scroll for terminating the hand rail of a geometrical stair at the bottom. Let AB, Fig. 7. be the breadth given; draw AE perpendicular to AB; divide AB into eleven equal parts, and make AE equal to one of these parts. Join BE; bisect AB in C, and BE in F. Make CD equal to CF; draw DG perpendicular to AB; from F, with the radius FE or FB, describe an arc cutting DG at G. Draw GH perpendicular to BE, cutting BE at O. Draw the diagonals DOK and IOL perpendicular to DOK. Draw IK parallel to BA; KL parallel to ID, and so on to meet the diagonals. From D as a centre, with the distance DB, describe the arc BG. From I as a centre, with the distance IG, describe the arc GE. From K as a centre, with the distance KE, describe the arc EH. From L as a centre, with the distance LH, describe the arc HP. Proceed in the same manner, and complete the remaining three quarters, which will complete the outside of the scroll. Make BR equal to the breadth of the rail, viz. about two inches and a quarter. Then, with the centre D, and distance DR, describe the arc RS. With the centre I, and the distance IS, describe the arc ST; and with the centre T, and distance KT, describe the arc TU, which will complete the scroll.

Fig. 8. Shews the construction of the curtail step, which is that under the scroll; $a\,b\,c\,d$ represents the veneer which covers the riser; $e f g h$ the nosing of the cover, or horizontal part of the step; $i k l$ the face of the string-board; and $m\,n\,o$ the projection of the nosing.

Fig. 9. Shews the cover-board for the curtail step; $a b c d$ and $e f g h$ in dotted lines represent the plan of the scroll; $o p q r s$ the nosing of the curtail step: $t u v s$ the nosings and the ends of the risers. The circle 1, 2, 3, &c. is described from the centre of the scroll, and divided into equal parts, equal to the distances of the balusters from centre to centre; and lines are drawn to the centre of the scroll, in order to ascertain the middle of the balusters, by giving a regular gradation to the spaces. The whole of the spiral lines in this and in Fig. 9. are drawn from the same centres as the scroll.

Three heights from the base being given on the surface of a cylinder, or through three given points on its surface, to find a section of the cylinder, the heights of these points from the base being given.

Let ABC, Fig. 1. and 2. Plate CCCXXXIX. be the base of the cylinder, and A, B, C, the seats of the three points, of which the heights are $a\,b\,c$. Draw AD, BG, and CE perpendicular to the chord AC; make AD equal to a, BG equal to b, and CE equal to c. Produce CA and ED to meet each other in F. Draw BH parallel to CF, and GH parallel to EF; and join FH and produce it to I, if necessary. In CF take any point K, and draw KI perpendicular to CF, and KL perpendicular to EF, cutting EF at M. About K as a centre describe the arc MN, cutting CF at N, and draw NI. From F, with the distance FI, describe an arc at L, and join FL. In the arc ABC take any number of points, from which draw lines parallel to FI, meeting the chord CF. From these points in the chord CF draw lines parallel to CE to meet EF. From these points draw lines parallel to FL, equal in length to the lines parallel to FI; and through the extremities draw the curve EPD, which is the section of the cylinder required. The angle which the section now found makes with the plane ACED, is equal to the angle CNI.

Fig. 1. No. 1. is the plan of a part of a geometrical stair with winders and flyers below and above, with the rail marked upon the plan. No. 2. is the falling mould, found in the following manner. ABC is the semi-circumference of ABC, No. 1. extended in a straight line; AD and CE are each in length equal to the breadth of one of the flyers extended in the same line; EF, perpendicular to ED, is the height of twelve steps, viz. equal to the heights of all the windows and two of the flyers. Draw AI perpendicular to AD; make AI and FG each equal to the height of a step. Draw GH perpendicular to FG, and make GH equal to the breadth of one of the flyers. Join FH, HI, and ID. Draw BK perpendicular to AC, cutting HI at L. Make LM at the discretion of the workman; through M draw OMP, meeting ID in P, and produce FH to O. Make P a, P b, O c, O d each equal to ID or HF. Divide a P into any number of equal parts, beginning at a, and P b into the same number of equal parts, beginning at P; and draw lines through the corresponding points of division, and they will form a parabolic curve. Divide c O and o D in the same manner, and form another parabolic curve; and thus the curves and the straight line $a\,d$ will form the under edge of the falling mould. Make MN equal to the thickness of the falling mould, and through the point N draw the upper edge parallel to the lower edge, and thus complete the boundaries of the falling mould.

Make AV any distance, at the discretion of the workman, say 4 inches. Produce BM to K, cutting the upper edge of the falling mould at X. Bisect BV in Q. Draw QR and VW parallel to BX, cutting the upper edge of the falling mould at R and W.

Draw KTS parallel to EV. Make KT, TS, respectively equal to BQ, QV. Draw TU and SY parallel to KM, cutting the under edge of the falling mould at U and Y.

As one of the joints of the rail piece generally stands over the middle of the semicircular plan, and the other joint not over the place where the straight and circular parts meet, but three or four inches advanced into the straight part, in order to make a stronger joint, by using straight bolts or screws instead of circular ones; in laying down the plan of the rail for the face mould, we must first lay down the circular quarter, and then add the straight part, which is shewn by AV in the construction of the falling mould. It is obvious that the falling mould depends in some measure on the fancy of the workman. The reason of raising it above the line I, is, because if the rail were made the same height above the steps over the circular part of the plan as over the straight part, it would approach nearer to the nosings of the steps of the winders than to those of the flyers. It is evident that the ends of the steps might be so narrow in the circular part, as even to cause the rail to coincide with the nosings of the winders, while the under side of the rail would be two feet and upwards from the nosings, supposing the rail to be one height throughout, both in the straight and circular parts; the height being supposed to be regulated from the top. The curves $a\,b$ and $c\,d$ are entirely at the fancy of the workman, some making them longer and some shorter.

In No. 3. the construction of the falling mould make $a\,q\,b$ equal to the quadrant AB, No. 1. and draw $a\,v$ a tangent to the arc $a\,q\,b$ at a, and make $a\,v$ equal to $a\,v$, No. 2. and the arc $a\,q$ equal to the straight line AQ, No. 2. Draw the radii $a\,z$ and $b\,z$, which will be a right-angle. Draw $v\,v'$ parallel to $a\,z$. Make $v\,v'$ equal to the breadth of the rail, as shewn by the plan, No. 1.; and draw the concave side of the plan $v'\,a'\,q'\,b'$. Then, having the seats of three points v, q, b', and the heights VW, QR and BX in No. 2. we may now proceed to find the face mould in the same manner as in finding the section of a cylinder, Fig. 1. and 2.; viz. draw the chord $b'\,v'$, and draw $v\,w$, $q\,r$, and $b'\,x$ perpendicular to $b\,v$. Make $v\,w$, $q\,r$, and $b'\,x$ respectively equal to VW, QR, and BX, No. 2. Join $x\,w$ and $b'\,v$, and produce them to meet each other in s, and join $x\,s$. Draw $r\,i$ parallel to $x\,s$, and $q\,i$ parallel to $b'\,s$. Join $s\,i$, and produce $b'v$ and $i\,s$ to meet in f, and join $x\,f$; and proceed to complete the face mould, which is the section of a cylinder, in the same manner as in Fig. 1. and 2. as is plain by the small letters instead of the large ones.

No. 4. Shews the construction of the face mould for the upper part of the circle, which is the same as in No. 3. only the heights must be taken downwards, and from the lower side of the falling mould.

No. 5. Shews the application of the face mould to the plank, according to the following description. This diagram exhibits the two sides and the edge of the plank sketched out in one plane, as shewn for the circular sash-frame in a circular wall. W is the plane of the top of the plank, X that of the edge, and Y the under face of the same. Previous to commencing the operation of cutting out the rail, the plank must be first bevelled on the edge. In this case, for the lower piece, it must be taken off the under edge, according to the angle $b' n h$, No. 3.; that is, the two planes W and X must form an acute angle equal to the angle $b' n h$. Place the face mould No. 3. upon the plane W, and make the chord line coincident with the edge AB, that is, the extremities of the concave edge to AB. Draw $c d$ on the edge of the plank, making the angle B $c d$ equal to the angle $f x b'$. No. 3. Having drawn the lines on the top, round the face mould, apply the same point that was at c to d on the other side, and bring the chord to coincide with the edge CD. Then the plane of the mould coinciding with the plane of the plank, draw lines on the plank round the edges of the face mould as before. The lines being thus drawn, the superfluous parts that were on both sides of the mould are to be cut away, in such a manner as to form the surfaces of a cylinder on both sides. The falling mould constructed at No. 2. must be bent upon the convex side, and lines drawn upon that side round the edges of the falling mould. The superfluous wood must be cut off from the top of the piece, according to the upper line, by means of a square or right-angle; but, in squaring, the edge of the stock of the square must be always placed parallel to the axis of the cylinder. The other edge will be found by guaging the piece to its thickness on both sides, which is generally about two inches.

JOINVILLE is a town of France, and principal place of a district in the department of the Upper Marne. The town is situated on the Marne, and contains several good houses, and some streets that are tolerably wide. The church, which is an old building, is a mixture of Greek, Gothic, and Norman architecture. It has a handsome spire, all the ornaments of which, and even the pillars, are covered with slate. At the north end of the town, there is a neat bridge of three arches over the Marne, and there is a fine mall of trees near it, on the banks of the river. A canal passes through the town. The town contains 700 houses, and 3086 inhabitants.

IONA, ICOLMKILL, I-COLUMB-KILL, more correctly Y or I, is a celebrated island of the Hebrides, situated on the south-west side of the island of Mull, from which it is divided by a channel half a mile wide. By Bede, who is believed to have died in the year 762, it is named Hii, or Hy, for the punctuation of vowels had not then been introduced; and in the annals of Ulster, which are of later date, it receives the designation of Iæ and Aoi. However, in the records of Scotland down to the middle of the 16th century, in inscriptions contemporary with that period, still to be seen upon the island, and by the neighbouring inhabitants, it is simply called Y or I. This is said by etymologists to be the Irish for island; that I was aspirated by Bede to H'y; and *I-thon*, also the Irish for the *island of waves*, being pronounced *I-on*, was by the monks readily latinized Hyona. Iona likewise appears on monumental inscriptions a little anterior to the Reformation; but that name is now entirely lost in the neighbourhood. By some of the ancient Irish and Danish writers, it is designed the Holy Island; and its modern appellation Icolmkill signifies the island of the cell of St. Columba, which does not seem to have been unknown to Bede.

This island is two miles and a half in length, by little more than a mile in breadth, and contains a superficial area of about 1300 Scotch acres. The surface is unequal, rising into eminences; and the most elevated part is about 400 feet above the level of the sea. A light sandy soil prevails. Upwards of 500 acres are in occasional cultivation, and afford abundant crops of barley and oats, besides which, the pasture of the island is celebrated all over the vicinity. Notwithstanding the lateness of sowing the grain, harvest is early in August. Adamnan relates, that barley sown in June, by command of Columba, ripened in the beginning of August, which, however, he ascribes to a miracle; and he alludes to the abundance of fruit. Great variety of beautiful and valuable minerals are found on Icolmkill, among which are a small vein of coal; and Mr. Raspe observed an efflorescence of copper. Fine white marble, semi-pellucid when reduced to a thin plate, exists in strata of some thickness. It cuts freely, receives a good polish, and, except for the loss of colour, which is converted to a yellowish cast, resists the action of time. There are extensive rocks of sienite on the south-west shore, which will afford blocks of any dimensions, of vivid colour, extremely hard, and susceptible of a high polish. Of this substance all the remnants of antiquity, of which we shall immediately treat, are constructed. Rocks of beautiful serpentine also stretch along the southern extremity, of considerable hardness, an agreeable green clouded with other colours, and suitable for slabs or sculptures. Its quality has been compared to that of the ancient serpentine, but although masses of large dimensions might be procured, it would not be without much labour, on account of the solidity of the rocks. In the Port-na-curaich, a creek where Columba landed, there are found nodules of nephriticus, called the *Port-na curaich* stone, from the size of a pea to that of an apple. These are of a green colour, of a smooth soft appearance when polished, and are made into trinkets of various kinds. Many are worn by the Hebrideans as amulets, sometimes set in silver. They believe that a certain charm attends their presence, and they say that their colour and transparency are improved by remaining in the sea.

The botany and zoology of this island exhibit few peculiarities. Several fuci, of rare species, are found in the surrounding sea. The rocks are thickly incrusted with the *lichen omphalodes*, which is employed by the inhabitants to dye their plaids, and other stuffs: Small quantities of a fine kind of sponge are produced here, and some rare shells are cast up on the shore. Water is abundantly supplied from springs, which, collected in a rivulet, passes the ancient ruins, and is discharged into the sea. Vestiges remain of an artificial pond, adjoining the gardens of the abbey, which we shall immediately describe, that has occupied several acres, and was devised both for beauty and use. It is now a morass, traversed by what has formerly been an elevated terrace.

In the strait which separates Iona from Mull, there is sufficient depth of water for large vessels, and ships of war have sometimes passed it; but the navigation is rendered very dangerous from the sunken rocks. The island has no proper harbour; however, there is good anchorage, in a small sandy bay, about two cables length from the shore. There is a landing place for boats on the south-west part, but it is hazardous, unless in calm weather. This is a creek called *Port-na-curach*, or the Harbour of the Boat, by way of distinction, lined by perpendicular rocks of serpentine marble; and here the celebrated St. Columba is said to have landed, when he arrived from Ireland. Curach signifies a coracle, or wicker boat, covered with hides, such as was common to the British islanders, and is even now to be seen on some of the rivers in Wales. Considering the nature of the vessels so long employed, the same difficulties of approaching the shores of Iona were not felt as at the present day. Sheltered by the island of Mull, the climate here is unusually mild. Snow seldom falls, and is speedily dissolved; nor does it often freeze; but, on the whole, the mildness of the climate is more evident in winter than in summer, when the heat is proportionally less than on the main land.

The population of the island seems nearly the same as in the year 1688, when Mr Sacheverell, governor of Man, during his excursion hither, was told it amounted to about 80 families. In 1782, the inhabitants were 277; in 1791, they were 323; and in 1808, they had increased to 386. They are chiefly contained in a small mean village near the bays of Martyrs, where, it is said, the illustrious dead were anciently landed for interment in this sanctified ground. Mr Sacheverell describes them as a harmless and ignorant people, but "more susceptible of religion and politure than the neighbouring islands." A century later, they enjoyed the same character, but all were deeply tinctured by superstitions. They were famous for the second sight; full of visions, seen either by themselves or others; and entertained many wild and romantic notions concerning religion and invisible things. Though entirely ignorant of popery, their sentiments and practices exhibited many vestiges of it. Every one had the traditional history of Columba, together with numberless legends, which had been handed down from remote antiquity. Being visited only once in three or four months by the clergyman within whose parish the island is situated, they repair on the Sabbath to their devotions in the ruinous abbey, to St. Columba's tomb, and the chapels of the different saints. It was lately their custom to carry the body of a person deceased round the whole ancient buildings on its way to interment, and it required the strenuous exertions of their pastor to effect the suppression of this ceremony.

Numerous antiquities, of the most interesting kind to Scotish history, are seen in Iona, which has, perhaps, been the spot most celebrated by surrounding nations of any within the limits of the British isles. St. Columba, a near relation of the kings of Ireland, and also of Conal, the fifth king of Argyle, having received a gift of the island from the latter, arrived here from Ireland, in the year 571, with twelve of his disciples, whose names are still preserved. They laboured during two years, erecting huts and a church of very slight materials. But as the fame of Columba increased, the buildings were augmented; the church became more spacious; and a monastery, together with various chapels and a nunnery, were successively built. The remains of these edifices, almost all constructed of fine sienite, together with crosses and sepulchral monuments, are the antiquities now extant. The exact date of none of the former is known, but the church is said to have been rebuilt by Queen Margaret towards the latter end of the eleventh century. This, though inferior to many other structures, was a magnificent edifice for that period. No polished work is employed; but the stone, which is compared to the finest used by the ancients, has been brought to a plain surface. Many blocks, five or six feet long, are seen in the walls, and also in the rubbish. Much architectural ornament is displayed in the arches and columns on a grey free-stone, which has been brought from the island of Mull; and among the sculptures, there is an angel with a pair of scales, weighing souls, one being kept down by the devil with his paw. The church is built in the form of a cross; the front measuring 116 feet in length, 23 in breadth, and the transept 70 feet by 18. Over the centre there is a handsome square tower, between 70 and 80 feet high, with a large circular window occupied by lozenges of free stone; a contrivance of the early ages to admit the light, while the winds and rain were excluded. Within the choir are several pillars sculptured with passages from Scripture history, and also the remains of an altar, which Mr Sacheverell declares was one of the finest pieces of white marble he ever saw. It was about six feet long and four broad, curiously veined and polished, and all entire except one corner. Only a small portion was left in the time of Mr Pennant, and it has undergone still farther dilapidation, as the possessors of a fragment anticipate good fortune from it, and also believe that it is a preservative from shipwreck. Not far from the monastery are the remains of a nunnery, now in a very ruinous condition; and, on the outside of the church, towards the west, is an enclosure, with a monument sunk among ruins, said to be the tomb of Columba. In the vicinity there is a chapel dedicated to St. Oran, reputed a disciple of that saint, equally ruinous as the rest, but containing numerous tomb-stones; and there is besides, a cemetery of greater celebrity, wherein many crowned heads were interred. The incredulous antiquary might doubt why so remote an islet should be selected for royal sepulture, and whether there are sufficient grounds in history to authenticate the fact. But Iona was viewed as consecrated ground; and it may be considered as one vast cemetery, to which the illustrious characters of ancient times were carried for inhumation by their own desire, or the pious wish of surviving relatives. Egfrid, king of Northumberland, having penetrated with an army to the Pictish territories of Scotland, was defeated and slain in 684, on which occasion Adamnan, the successor of Columba, opened the sacred soil of the island to inter his body. Here, it is said by the older historians, there were interred forty-eight kings of Scotland, four of Ireland, eight Norwegian monarchs, and one king of France. Monro, dean of the isles, visited the Hebrides, between 1540 and 1549, when he describes "a sanctuary, or church-yard, with three tombs like small chapels. In the gable of each was a broad grey stone, one inscribed, in Latin letters, with *tumulus regum Scotiæ*, another with *tumulus regum Hiberniæ*, and the third with *tumulus regum Norwegiæ*." It appears, from history, that, independent of earlier monarchs, the kings of Scotland, from Kenneth III. who died in 994, down to Edgar, who died in 1098, were interred in Icolmkill, after which Dunfermline became the place of royal sepulture. But the time when this practice commenced has not been recorded. Fordun relates, that Aidan, who died about the year 603, in Kintyre, was buried at Kilcheran, where none of his predecessors had been interred. No inscription of their names, at least known to be such, was extant; and the general title of the tombs of the kings, mentioned by Monro, seems to have been destroyed long ago. Black marble or basaltic effigies and reliefs cover some of the tombs; several have Latin inscriptions, and others appear in Gaelic, which fashion continued down to the seventeenth century; and it is said, a character somewhat resembling Hebrew, but which has never yet been deciphered, is engraven on a few. Most of the inscriptions being obscured by weeds and rubbish, would merit farther investigation. Dr Sacheverell was informed by John Frazer, dean of the isles, that his father, who held the same dignity, collected about 300 inscriptions, which he gave to the earl of Argyle. All the great families of the neighbourhood were buried here—a custom still partly preserved; and the males and females were interred, until recently, in different places. The latter were deposited in the chapel of a nunnery, which has been a handsome building, and still contains inscriptions and sculptures on the tombs of the prioresses. A causeway, about 300 paces in length, 15 feet broad, and consisting entirely of large blocks of the same red marble employed in the architecture of the cathedral, very artifically united, runs from the abbey to this edifice, which was also dedicated to St Oran. Its antiquity is unknown. Some authors have conceived it antecedent to the monastery, which is exceedingly improbable. Yet it was not uncommon, amidst the austerities of the times, for the saints, who established themselves among the western islands, to issue positive prohibitions against the approach of all females whatever. Whence it might be inferred that Columba found the nunnery here. Others affirm, that the nuns having originally resided on a neighbouring islet, yet called the Isle of Nuns, he permitted their transference to Iona. They were of the Augustine order; and Keith affirms, that they lived together in community long after the suppression of the religious houses, at the date of the Reformation, but in what place, we have not been able to learn. It is said, that above 100 crosses formerly stood on the island: but of that number only three remain; the others, together with all the edifices venerated by the inhabitants, having been demolished by a decree of the synod of Argyle, about the year 1559 or 1560. Adamnan speaks of crosses standing half way between the granary and the monastery, afterwards fixed on a pedestal, and still to be seen by the side of the road in his time, which existed in the days of St. Columba. Exactly in the same spot, one is yet extant, eight feet high. Another near it is fourteen feet high; and the third, which is ten feet fourteen inches high, and only three inches thick, is sculptured with various figures. Many other monuments of superstitious devotion remained at the date of the Reformation, some of so remarkable a kind, that posterity is left to conjecture their origin and purposes. Since this island came into the possession of the family of Argyle, considerable attention has been paid to the preservation of its antiquities.

Historians relate, that military trophies were dedicated to the church; that after Aidan gained a victory over the Picts and Saxons, he sent the banners of his vanquished enemies hither, because his fortune was ascribed exclusively to the intercession of the saint. Likewise Kenneth II. having finally overthrown the Picts, devoted the sword and armour of their monarch Durst to the abbey. These assertions would require strong corroboration; for we can form very imperfect opinions of the banners and armour of our ancestors of those periods.

It has been supposed, that the monastery possessed a valuable library; not that we can credit Boyce, that a chest of books was brought hither from the sack of Rome by Alaric the Goth, and presented by one of the Scotish sovereigns to the monastery. But even in the fifteenth century its library must have been celebrated, as Pope Pius II. when in Scotland in 1456, proposed to visit it in quest of the lost books of Livy. A small parcel was carried to Aberdeen, but from age and the fragility of the parchments, little could be unfolded. Some of the books and papers of Icolmkill were preserved and conveyed to the castle of Cairnburgh, where they were mostly destroyed by fire in the time of Cromwell. One manuscript, however, had still escaped in the 18th century, when it also was destroyed, for the sake of the vellum.

It is affirmed, that this island was a Druidical establishment previous to the introduction of Christianity, and long afterwards one of the Culdees; but the evidence respecting either of these points is considered by some as not entirely satisfactory. See our article CULDEES.

Antiquaries agree, on the authority of Bede, that the inhabitants of the southern parts of Scotland were converted to Christianity by St. Ninian, in the commencement of the fifth century. But it was only from the arrival of Columba in the year 563, that its precepts were diffused throughout the kingdom. Iona thenceforward became exclusively the seat of learning in the north. Soon after his settlement in this spot, Columba made excursions into some parts of the county of Inverness, where he preached to the rude inhabitants through the medium of an interpreter; from which it appears, that they did not understand the language with which he was acquainted. All the inhabitants of Scotland were converted during the life of Columba; and after his decease in 597, the island still preserved its celebrity. Aidan, having succeeded to the kingdom or territory of Argyle in 571, passed over to Icolmkill to be inaugurated. In 632, Oswald, kind of Northumberland, applied here for a bishop who might teach the Northumbrians Christianity, and he received a monk from the establishment, who was followed from it by several successors. This seminary of learning became the head of the Pictish church, and, in time, it is said to have been the source of 100 other monasteries. Probably its supremacy was considered in the same light as that of Rome was viewed by Catholic countries. Hither the young princes of Scotland and Northumberland were sent to obtain the necessary rudiments of education, and the island received frequent visits from the neighbouring potentates of ancient times; while others sought retirement from the world in its cloisters. These circumstances have conspired to preserve many incidents respecting a place otherwise inconsiderable. In the year 765, Neil Frasach, king of Ireland, abdicated his sovereignty, and retired to Icolmkill, where he died: and in 777, we read that Asglal, the son of Cutald, king of Connaught, became a monk of Icolmkill, where he died also. Aulaf, king of Dublin, died during a pilgrimage to this place in the year 980. In the annals of Ulster it is written, that Columba's relics were carried to Scotland in 828, and also into Ireland in 830, by the Abbot Diarmid. The pirates of the north were accustomed to ravage the island, and commit many cruelties on the defenceless monks. By them, the monastery was burnt in the year 797, and in 801 they killed 68 of the ecclesiastics. Besides other calamities, it was rifled in 985, and the abbot, together with 15 of his learned associates, put to death. They were likewise exposed to the resentment of neighbouring potentates; and Tighernac writes, that the monks of Iona were expelled beyond Drum Albin, by which is meant Braidalbin, by Nectan, king of the Picts, in 716, or 718. Historians relate, that a Norwegian invader of the Hebrides, in 1098, spared it and its inhabitants from the devastation which marked the rest of his progress. However, it was afterwards plundered by a fleet of 12 sail of Norwegian pirates, which committed many depredations in the Hebrides. About the twelfth or thirteenth century its importance probably declined, as all the churches and chapels in Galloway belonging to Icolmkill were conferred on the monks of Holyroodhouse by William the Lion. It seems to have been occasionally a seat, but certainly not the principal one, of the bishops of the isles. In the year 1507, John, bishop of the Isles, who was a privy councillor to King James IV. obtained the annexation of the abbey to his see. It must be observed, that this island derives much of its fame from the learned men who have dwelt in the monastery; and in reviewing its various antiquities, we should remember that they are not coeval, but belong to various epochs. Thus the original structures were most probably only formed of wattles, which, being decayed or destroyed, were replaced by more solid materials. Some of the buildings may be very ancient; others are considered to be fabrics of the twelfth, or, perhaps, the thirteenth century. Monro's brief narrative is exceedingly interesting; and all later observers have confirmed its truth, making suitable allowance for the progressive ravages of time. Most of the relics of popery having been sacrificed by the zeal of the presbyterians, in the middle of the sixteenth century, Iona only exhibits a field of ruins, which, when entire, were venerated for ages. The island is 36 miles distant from the mainland of Scotland. See Cuminius, *Vita Columbæ*; Adamnanus, *Vita Columbæ*; Bede, *Historiæ Ecclesiasticæ Gentis Anglorum*; Pinkerton's *History of Scotland*, vol. ii. p. 269, 272, 279. Chalmers' *Caledonia*, vol. i. p. 311, 319 376, 427, 474; Keith's *History of the Bishops*, p. 174, 280; Sacheverell's *Account of the Isle of Man*, p. 123; Pennant's *Tour*, vol. ii. p. 279. *Statistical Account*, vol. xiv. p. 198; Monro's *Description of the Hebrides in Manuscript*; Walker's *Essays on Natural History*; Macdonald's *Agricultural Survey of the Hebrides*, p. 690, Edin. 1811; *Short Account of Iona in Manuscript*. (*o*)

JONES, Inigo, an eminent architect, was the son of Ignatius Jones, a clothworker, and was born in London about the year 1572. At an early age he became apprentice to a joiner; the nature of whose work required some knowledge of drawing. In this situation young Jones acquired great skill in the art of design, and particularly in landscape painting; and his eminence in this respect was such as to attract the notice of the Earls of Arundel and Pembroke. The last of these noblemen, who was a great patron of the fine arts, was at the expence of sending Jones to Italy, for the purpose of obtaining a more perfect acquaintance with landscape painting.

When he was at Venice studying the works of Palladio, from which he contracted a particular fondness for architecture, he was sent for by Christian IV. king of Denmark, who gave him the honourable appointment of architect general. When the Danish king paid a visit to his sister the queen of James I. of England, Mr. Jones returned in his train; and having expressed a desire to remain in his native country, he was appointed architect to the queen of England. In the same capacity he served Prince Henry; and he was rewarded for his diligence by the reversion of the surveyorship general of his majesty's works.

Upon the death of Prince Henry in 1616, Mr. Jones revisited Italy for the purpose of prosecuting his professional studies. On his return he undertook the duties of the surveyor general; but finding that the Board of Works had incurred a debt of several thousand pounds under his predecessors, he not only offered to serve without any salary, but persuaded also the comptroller and paymaster to do the same till all the debt was liquidated.

In the year 1620, when the king was on a visit at Wilton, the seat of the Earl of Pembroke, his attention was directed to the magnificent druidical monument of Stonehenge, in the neighbourhood of Wilton. He engaged Mr. Jones to investigate the origin of this remarkable piece of antiquity, who immediately took accurate measurements of the whole, and carefully examined its foundation in order to trace its original form. From this investigation Mr. Jones concluded, that it was originally a Roman temple, dedicated to Cœlus, and built in the Tuscan order, between the time of Agricola and that of Constantine the Great. Mr. Jones presented this account to the king in 1620; and in the same year he was appointed one of the commissioners for repairing St. Paul's cathedral.

Having given designs for the banqueting-house at Whitehall, which was intended for the use of foreign ambassadors, he was now employed in executing it. It appears to have been begun in 1619, and finished in two years. In 1633 he began the repairs upon St. Paul's, and the design and execution of the work were confided wholly to himself. He gave uniformity to the body of the building from the steeple to the west end, and he added a fine portico, which, though Mr. Walpole has censured it as incongruous with the ancient building, has been highly admired by competent judges.

The talents of Inigo Jones were likewise displayed in his invention of machinery, scenes, ornaments, and dresses for masks and interludes, which were then in great repute. In 1614, he had a quarrel with Ben Jonson, the poet laureat, who ridiculed him in his comedy of *Bartholomew Fair*, under the character of Lanthern Featherhead, a hobby-horse seller. Jonson again attacked him in 1635, in a coarse satire, entitled *An Expostulation with Inigo Jones*. These attacks upon our author were highly disapproved of at Court, as appears from a letter from Howell to Jonson, where he remarks, "I heard you censured lately at Court, that you have lighted too foul upon Sir Inigo, and that you write with a porcupine's quill dipped with too much gall." As this friendly hint, however, had no effect upon Jonson, Howell sent him a second letter, in which he informs him, that, in consequence of his usage of Sir Inigo, "he had lost some ground at Court; the king, who had so great a judgment in poetry (as in all other things else) not being pleased therewith." This second expostulation induced Jonson to suppress his satire. It has since, however, been printed in the edition of his works which appeared in 1756.

As our author had now much employment in the line of his profession, he soon realised a handsome fortune;[*] but as he was not only a Roman Catholic, but also a favourite of Charles I. he suffered considerable pecuniary losses during the civil wars. At the instance of the parishioners of St. Gregory's, he was called before the House of Lords in 1640 for demolishing part of their church during his operations in repairing St. Paul's. This church had been taken down in consequence of an order of council in 1639, from its great proximity to the cathedral. This prosecution, however, involved him in great expence; and he was also fined *L*.545 in the year 1646 as a malignant. Stone the statuary and Mr. Jones agreed, during the civil wars, to bury their ready money in Scotland Yard; but as four persons had been acquainted with the transaction, they took it up and interred it in Lambeth Marsh.

At the restoration of Charles II. Mr. Jones was continued in his former offices; but he had been depressed by age and misfortunes, and he died at Somerset-house on the 21st of July, 1651. He was interred in the Church of St. Bennet's, Paul's Wharf; but his monument was destroyed during the great fire in London. A collection of Inigo Jones' designs was engraved in 2 vols. folio, by Mr. Kent, and some smaller ones in 1744. Mr. Ware published others in 1743. The celebrated Vandyke used to remark, that in designing with his pen, he was not to be equalled by any great master of his time, for the boldness, softness, sweetness, and evenness of his touches. The library of Worcester College possesses a copy of Palladio's *Architecture*, with MSS. Notes, by Inigo Jones, which were inserted in the edition of Palladio, that appeared in 1714.

The following is a list of his principal works:

Heriot's Hospital. The Banqueting House, Whitehall. Barber's Hall in Monkwell Street, London. The new buildings which front the gardens of Somerset House. The Church and Piazza of Covent Garden, the former of which has recently been destroyed by fire. Lincoln's Inn Fields, which has the same area as the base of the great pyramid of Egypt. The inner quadrangle of St. John's College, Oxford. The Queen's Chapel, St. James's. Shaftesbury House, lately the Lying-in Hospital, on the east side of Aldersgate Street. The garden front of Waller House, &c. The Queen's House at Greenwich. The Grange in Hampshire, the seat of the Earl of Northington. Cashiobury in Hertfordshire. Gunnersbury near Brentford, in Middlesex. Ambresbury in Wiltshire, designed by Jones, but executed by his pupil, Webb. Lord Radnor's House at Coleshill, Berkshire. Cobham-hall in Kent. Fronts of Holyrood House in Edinburgh. Surgeon's Hall, London. The South and East side of Castle Ashby. Holt Park in Northamptonshire. Inside of the Church of St. Catherine Cree, Leadenhall Street. Part of Glammis Castle in Forfarshire. An account of several of these buildings, particularly Heriot's Hospital, Castle Ashby, and Wilton House, will be found in our article CIVIL ARCHITECTURE.

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[*] In some MSS. notes upon "Stonehenge restored," the Earl of Pembroke remarks, that Jones had *L*.16,000 per annum for keeping the King's houses in repair. His fee as surveyor was 8s. 6d. per day, with *L*.46 per annum for house rent, beside an allowance for a clerk and incidental expences.

JONES, SIR WILLIAM, the celebrated orientalist, was born in London on the 28th of September, 1746. His father Mr. William Jones, was an eminent mathematician, and the cotemporary of Sir Isaac Newton.† His mother was the youngest daughter of Mr. George Nix, a respectable cabinet-maker in London.

Having lost his father when only three years old, the care of his education devolved upon his mother—a lady whose uncommon attainments eminently qualified her for the task. At the close of his seventh year he was placed at Harrow school, of which Dr. Thackeray, and afterwards Dr. Sumner, were head masters. During his residence at school, Jones greatly distinguished himself by his diligence and application; although the progress of his classical studies was suspended in his ninth year, in consequence of his having the misfortune to break his thigh-bone, which detained him at home twelve months. He soon, however, recovered his lost ground, and rapidly rose to the first influence and distinction among his school-fellows. In his twelfth year, he was moved into the upper school; and his active genius now began to display itself in spontaneous compositions. He translated into English verse several epistles of Ovid, and all Virgil's pastorals; and he composed a dramatic piece on the story of Meleager, which was acted during the vacation, and in which he himself performed the part of the hero. For two years he wrote the exercises of various boys in the superior classes. During the holidays, he turned his attention to other branches of study, and learned the rudiments of French and arithmetic.

Jones had attained his fifteenth year when Dr. Thackeray retired from the superintendance of the school at Harrow. This respectable tutor, who never applauded the compositions of his scholars upon any occasion, is said to have expressed his opinion of his distinguished pupil in private; that he was a boy of so active a mind, that if he were left naked and friendless on Salisbury Plain, he would find the way to fame and riches. Dr. Thackeray was succeeded by Dr. Sumner; and, in order that the new master might see at a glance the course of study at Harrow, Jones, at the suggestion of the principal assistant, drew up a plan of the lectures and exercises in the upper school, to which he annexed a collection of his own compositions, including his translations of Virgil's pastorals. Dr. Sumner soon perceived the talents of his pupil; who, during the two complete years which he passed under that excellent instructor, read and imitated the best ancient authors. But his studies were not confined to the Greek and Roman classics. His attention having been directed to the eastern languages, he learned the Arabic characters, and acquired a sufficient knowledge of the Hebrew to enable him to read some of the psalms in the original. His zeal for the acquisition of learning, indeed, was, at this period, so ardent, that he frequently consumed the night in study, taking tea or coffee to repel sleep. His reputation spread even beyond the precincts of the school, and strangers often inquired for him under the title of the Great Scholar.

When he had reached his seventeenth year, his friends thought it time to remove him to one of the universities. The law had been proposed to his mother as a profession, in which the talents of her son were likely to be rewarded with brilliant success. But he had, at this time, imbibed a distaste for forensic pursuits; and this, combined with other considerations, induced her to relinquish the plan, and to adopt the suggestion of Dr. Sumner, that he should complete his education at the university. Accordingly, in the spring of 1764, he was matriculated at University College, Oxford; and in the following term, he fixed his residence at that seat of learning. Here he had resided but a few months, when he was unanimously elected one of the four scholars on the foundation of Sir Simon Bennet. From this period he began to devote a great deal of his attention to oriental literature; and his application to the study of Arabic was encouraged by the example and the liberality of a fellow-student, who offered him the use of the best books. In acquiring the pronunciation, he was assisted by Mirza, a native of Aleppo, whom he had accidentally discovered in London, and carried with him to Oxford; and who, although without pretensions to the character of a scholar, spoke and wrote the vulgar Arabic with fluency. At the same time his classical studies were not neglected. He assiduously perused all the Greek poets and historians of note, and travelled through the entire works of Plato and Lucian, with their vast appendages of commentary. Having discovered the intimate connection between the Arabic and the dialect of modern Persia, he resolved to acquire the latter; in which, with such helps as were then extant, he made a rapid progress. His vacations were passed in London; and during each recess, he regularly attended the schools of Angelo, in order to cultivate the elegant accomplishments of riding and fencing. When at home, he was constant in his attentions to the modern languages, and read the best Italian, Spanish, and Portuguese authors.

Being sensible that the expence of his education, with the utmost economy upon his part, made a very material deduction from the moderate income of his mother, Jones anxiously looked forward to the period when a fellowship would relieve her from the pressure. But while that advantage seemed remote in prospect, he received, through Mr. Arden, whose sister was married to his friend Dr. Sumner, an offer of the situation of private tutor to Lord Althorpe, eldest son of the Earl of Spencer. Jones cheerfully entertained the proposal, and, in his nineteenth year, was introduced to the family at their splendid town mansion. He returned for a few months to Oxford; whence, in the summer of 1765, he removed to Wimbledon Park, and assumed the charge of his pupil's education.

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† He was the author of some valuable mathematical treatises, viz. *A New Compendium of the whole Art of Navigation*, 8vo. 1702; *Synopsis Palmariorum Matheseos, or a new Introduction to the Mathematics, containing the Principles of Arithmetic and Geometry, demonstrated in a short and easy Method*, 8vo. 1706; and several Tracts in the *Philosophical Transactions*, on logarithms, on the properties of conic sections, and on the disposition of equations for exhibiting the relations of geometrical lines. He was also the editor of some mathematical works of Sir Isaac Newton, under the title of *Analysis per quantitatum Series, Fluxiones, ac Differentias; cum enumeratione Linearum Tertii Ordinis.* Our readers will find a full account of him in Lord Teignmouth's *Memoirs of the Life, Writings, and Correspondence of Sir William Jones.*

In the following summer, an unexpected concurrence of circumstances conferred a fellowship, to which he was elected, on the foundation of Sir Simon Bennet, in the month of August 1766. Having visited Oxford, in order to go through the forms of admission, on his return to Wimbledon he received from the Duke of Grafton an offer of the situation of *interpreter for Eastern languages*, which he however declined. In his 21st year, he began his *Commentaries on Asiatic Poetry*, in imitation of Dr. Lowth's *Prelections*. But the summer of 1767 opened to him a new scene. Lord Spencer made an excursion to Spa, for the recovery of his health, and was accompanied by Mr. Jones as part of the family. Here he devoted a part of his time to the acquisition of the German language, the pronunciation of which he had formerly learned from a fellow collegian. During the following winter, he resided with his pupil at Althorpe. At the close of that year, curiosity prompted him to peruse the little treatise of Fortesque in praise of the laws of England; a work from which he appears to have imbibed much more correct ideas, and an increased veneration for the legal institutions of his native country. From Althorpe he removed to Wimbledon, in the spring of 1768. The king of Denmark, who was at that time upon a visit to England, had brought with him an eastern manuscript, containing the Life of Nadir Shah, of which he was anxious to procure a translation. An application to this purpose was made to Mr. Jones, whose reputation as an oriental scholar then stood high. At first, however, he declined the task; but afterwards, upon a renewal of the application, and finding that no other individual in this country seemed willing to undertake it, he agreed to execute the work. He completed the translation, in French, in the course of a year, with a wonderful degree of elegance and correctnesss. The work, however, was not published until 1770. Forty copies, in large paper, were sent to Copenhagen, among which was one splendidly bound for the royal library. A few months after the receipt of the work, his Danish Majesty sent publicly to London a diploma, constituting Mr. Jones a member of the Royal Society of Copenhagen; and, at the same time, in a particular communication, strongly recommended him to the favour of his own sovereign. To the *Life of Nadir Shah*, Mr. Jones added a *Treatise on Oriental Poetry*, also in French; a work which, in an eminent degree, combines taste with erudition.

In the beginning of the year 1768, he formed an acquaintance with Reviczki, afterwards the imperial minister at Warsaw, and ambassador at the court of England, with the title of Count. Both were deeply captivated with the charms of Oriental literature, and their pursuits being thus in a great measure congenial, their acquaintance ripened into an intimacy. After their separation, they commenced a correspondence, which was sedulously cultivated for many years. They generally wrote in Latin, occasionally in French, chiefly on literary subjects, but more particularly on Oriental literature. Of this correspondence much has been lost; but a part of it has been fortunately preserved, and published by Lord Teignmouth in the Appendix to his *Life of Sir W. Jones*.

Towards the end of the year 1769, Mr. Jones accompanied the family of Lord Spencer to the continent. After spending some time at Paris, the party proceeded rapidly down the Rhone to Lyons, and from thence by Marseilles, &c. to Nice. From Nice, Mr. Jones made an excursion to Geneva, but was disappointed in his expectation of seeing Voltaire. About this time, he appears to have been employed in writing a small tract on education, and had commenced a tragedy on the story of Soliman, whose son perished by the treachery of a step mother. Of the former, however, nothing has been preserved but the plan; and of the latter, not even a fragment remains. In 1771, he printed a letter, in French, addressed to M. Anquetil du Perron, who, in a discourse prefixed to the *Account of his Travels in India*, &c. had spoken with ridicule and disrespect of the university of Oxford, and some of its learned members, including some of Mr. Jones' personal friends. In this anonymous letter, he vindicated his friends with much asperity indeed, but at the same time with such fluency and correctness of style, that the attack on Du Perron was generally ascribed to some *bel-esprit* of Paris.

The desire of obtaining public distinction, and of acquiring an honourable independence by the exertion of his own talents, now induced Mr. Jones to yield to the advice of his friends, and devote himself to the study of the law. With this view, he resigned his charge in Lord Spencer's family, and was admitted a student in the Temple on the 19th of September 1770. He did not, however, abruptly abandon his oriental pursuits and literary amusements, but continued to prosecute them, for some time, in conjunction with his legal studies. During the year 1771, he had been occupied in preparing for the press *Poems, consisting of Translations from the Asiatic Languages, with two Essays*; and it appears from his correspondence in the beginning of 1772, that he was on the eve of publishing an *Essay on the History of the Turks*. This last work, however, although apparently so forward, was never published; and the *Prefatory Discourse*, which points out the best depositaries of Turkish history, is the only part which has reached us. On the 30th of April 1772, he was elected a Fellow of the Royal Society; but he does not appear to have contributed any papers to the *Philosophical Transactions*. From the period of his entrance into the university, until Michaelmas 1768, when he took the degree of Bachelor of Arts, he kept his terms regularly; from thence to 1773, only occasionally. During Easter term in the latter year, he took his Master's degree; upon which occasion he composed an oration, with an intention, which he did not execute, of delivering it in the theatre. The speech, however, was published ten years after. It breathes an ardent love of liberty, and contains a warm and discriminate eulogium on those learned men, who devoted their talents and their labours to the cause of religion, science, and freedom. Early in 1774, he published his *Commentaries on Asiatic Poetry*; a work which he had undertaken in 1766, and finished in 1769, and which, on its publication, was received with applause by the oriental scholars of Europe. The learned Dr. Parr expressed his admiration of it, in a letter to the author, in the following terms: "On the whole, there is a purity, an ease, an elegance in the style, which shew an accurate and most perfect knowledge of the Latin tongue. Your Latin translations in verse gave me great satisfaction. I am uncommonly charmed with the idyllium, called Chrysis. The flow of the verses, the poetic style of the words, and the elegant turn of the whole poem, are admirable. On the whole, I have received infinite entertainment from this curious and learned performance, and I look forward with pleasure, to the great honour such a publication will do our country." In the preface to this work, the author pays an affectionate tribute of regard to the memory of his friend and instructor, Dr. Sumner, who died in September 1771. As a proof of gratitude to his *alma mater*, he dedicated his *Commentaries* to the university of Oxford.

In the month of January 1774, he was called to the bar;

and from this period he began to spend a considerable portion of his time in courts, and to prosecute his legal studies, for a series of years, to the exclusion of Asiatic literature. At this time, his reputation was so extensive, that his correspondence was eagerly courted by many of the most eminent scholars in Europe; and he received many flattering testimonies of the regard in which his talents and character were generally held. The Infant, Don Gabriel, transmitted to him, through Dr. Perez Bayer, a splendid copy of his translation of Sallust into Spanish; and he received many valuable literary curiosities from persons to whom he was only known by fame. Jones acknowledges these honourable communications with modesty and grace: "I am conscious," says he, in a letter to Mr. Howard, "how little I have deserved the many honours I have lately received from the learned in Europe and Asia; I can ascribe their politeness to nothing but their candour and benevolence."

In 1775, Mr. Jones attended the spring circuit and sessions at Oxford; and in December 1776, he began to practise at the bar, and to give opinions on cases, having previously been appointed one of the sixty commissioners on bankrupts. During the latter end of the year 1777, and the beginning of the following year, he resided at Bath. In 1778, he published a translation of the speeches of Isæus, in causes concerning the law of succession to property at Athens, with a commentary, a prefatory discourse, and critical and historical notes. During the years 1778 and 1779, his time was principally consumed in forensic duties and studies. He had long been invited to direct his expectation to the situation of a Judge in India, for which his oriental acquirements peculiarly qualified him; but the prospect of such an appointment seemed yet rather remote. In the mean time, however, his professional practice greatly increased; and, by the kindness of Lord North, he was authorised to expect the vacant seat on the bench of Fort William in Bengal.

In the month of May 1780, Sir Roger Newdigate having declared his purpose of resigning his seat in parliament, Mr. Jones was induced, by the encouragement of many respectable friends, to announce his intention of presenting himself as a candidate for the representation of the university of Oxford. The unexpected dissolution of the parliament in August, however, obliged him to make a precipitate estimate of the promises and ability of his friends, and to decide whether he would stand a poll, or decline the contest. He had received many unsolicited offers of support from persons of the first respectability, and the canvass by his friends among the non-resident electors had been very successful; but, upon the whole, the members of the university did not evince any lively interest in his favour; and even in his own college, his pretensions did not receive any very flattering countenance. An *Ode to Liberty*, which he printed about this time, is said to have lost him near twenty votes; and there undoubtedly existed a radical difference between the political principles of the candidate, and those of the majority of the electors. These circumstances induced him to withdraw; and he accordingly declined standing a poll. In the mean time, his professional success equalled his highest expectations; and the general election, which occasioned a great influx of business, obliged him to delay the completion of two short literary works,—the one a treatise *On the Maritime Jurisprudence of the Athenians*, illustrated by five speeches of Demosthenes in commercial causes; and the other a dissertation *On the manners of the Arabians before the time of Mahomet*, illustrated by a translation of the *Seven Arabian Poets.* Notwithstanding the various occupations of this period, he found time to publish *An Inquiry into the legal mode of suppressing Riots, with a constitutional plan of future defence*, a pamphlet of which the subject was suggested by the riotous occurrences in the capital. The principles proposed by Mr. Jones have been since adopted with success.

About this time, he had the misfortune to lose his mother, who, as a parent, had the strongest claims upon his gratitude, and for whom he had ever cherished the warmest filial affection. In the winter of 1780-1, he finished his translation of the *Seven Arabian Poets*, but suspended the publication until the beginning of the year 1783. About the same time, he also published a professional work, his *Essay on the law of Bailments;* and translated an Arabian work *On the Mohammedan law of Succession to the Property of Intestates.* In March 1782, he became member of the *Society for Constitutional Information*, and soon afterwards delivered a political speech at a meeting of the inhabitants of Southwark, Westminster, London, Middlesex, and Surry. About the same period, he composed a very spirited ode, in imitation of Callistratus, which appeared in a variety of periodical publications, and has been published in his works. In the summer of that year he again visited France, with the intention of proceeding from thence to America, for the purpose of soliciting the restitution of a very large estate of a client and friend, which the States had attached. The latter part of the plan, however, was abandoned, and he returned to England through Normandy and Holland. While at Paris, upon this occasion, he wrote the *Dialogue between a Farmer and a Country Gentleman on the Principles of Government*, which, in a letter to Lord Althope, he calls a *jeu d'esprit.* This pamphlet was originally printed and distributed *gratis*, at the expense of the *Society for Constitutional Information;* and the Dean of St. Asaph having afterwards reprinted and circulated this dialogue in Wales, a bill of indictment was found against that dignitary for the publication of a libel. Previous to the trial, the author wrote a letter to Lord Kenyon, in which he avowed his production, and maintained that every position in it was strictly conformable to the laws and constitution of England.

In the month of March 1783, Mr. Jones at length attained the accomplishment of his wishes. Under the administration of Lord Shelburne, he was appointed one of the judges of the supreme court of judicature at Fort William in Bengal, and the honour of knighthood was, at the same time, conferred upon him. In the following month of April, he married Anna-Maria Shipley, the eldest daughter of the Bishop of St. Asaph; a lady to whom he had formed an early attachment. In the same month, he embarked in the Crocodile frigate for India. During the passage, the ship remained a few days at the island of Hinguan, or Joanna, of which Sir William has published an entertaining description. He landed at Calcutta in September, and entered upon the discharge of his judicial functions in the month of December, 1783. At the opening of the sessions, he delivered his first charge to the grand jury, in an elegant, concise, and appropriate address, which fully justified the high estimate that had been formed of his oratorical talents. The intervals of leisure from professional duties were devoted to scientific pursuits; but Sir William soon perceived that the field of Indian research was too extensive to be explored by the exertions of any individual. He therefore devised an institution at Calcutta, with the view of promoting inquiry, and of concentrating the valuable knowledge collected in Asia. The members held their first meeting in January 1784, and solicited the patronage of the governor general and council, which was granted in very flattering terms. To Mr. Hastings, the governor general, was offered the honorary title of president, which he however declined, resigning his pretensions to the gentleman who had planned the institution, as most capable of conducting it.* At the first meeting after the institution was completed, Sir William Jones, in his capacity of president, unfolded, in an elegant and appropriate address,the objects proposed for their researches, and concluded with a promise, which he amply discharged, of communicating the result of his own studies and researches; and in order that he might be enabled to perform this promise, he determined to commence, without loss of time, the study of the Sanscrit; a dialect which he deemed indispensably requisite to the acquisition of accurate and satisfactory information on the religion, laws, and literature of India.

During the vacation of 1784, while labouring under an indisposition produced by the change of climate, Sir William undertook an excursion into the country, in the course of which his illness increased to an alarming degree, and frequently interrupted the course of his scientific pursuits. His ardour in the pursuit of knowledge, however, was unabated; and he continued his journey as far as the city of Benares, the seat of the most ancient and celebrated university of India, where he terminated his excursion, being obliged to return to the discharge of his official duties. During this journey, he produced *The Enchanted Fruit, or Hindoo Wife*, an elegant poetical tale; and a *Treatise on the Gods of Greece, Italy, and India*, afterwards revised and presented to the society.

Sir William's conversational talents having attracted invitations and visits, which materially interfered with his studies, and proved incompatible with his multifarious pursuits, he retired during the vacations of the court, to a moderate distance from Calcutta. The place he chose for his residence was Chrishdelnagur, in the vicinity of Nadeya, an ancient Hindu university. To the first and second volumes of the *Asiatic Miscellany*, a periodical work which was undertaken at Calcutta in 1785, Sir William liberally contributed his *Enchanted Fruit; Hymns addressed to Hindu deities; literal translations of twenty tales and fables of Nizami*, and various minor pieces. During the recess of the court in 1786, he undertook, along with his lady, (whose health had suffered more than his own from the effects of the climate,) an excursion in the Phœnix frigate, to Chatigan, the eastern limit of the British dominions in Bengal; where they remained until the month of May, and returned by land to Calcutta.

It is unnecessary to proceed with a minute chronological enumeration of Sir William's various occupations during the remainder of his residence in India. We must not, however, omit to mentión the great design, which so long employed his hours of leisure, of compiling a digest of Indian law, especially of the laws relating to contracts and succession, with the view of conferring greater security on the property of the natives. Having obtained the sanction of government, he entered upon the execution of this great work before he had resided four years and an half in the country. Other pursuits, at the same time, occupied a considerable share of his attention. In the beginning of 1789, the Calcutta Society published the first volume of their *Researches*; and the indefatigable president, besides supplying about a third of the contents of the volume, undertook the laborious office of selecting the papers, and superintending the printing. In the same year he presented the public with a translation of *Sacontala, or the Fatal Ring*, an ancient Indian drama, by Calidas.

In the mean time, the delicate constitution of Lady Jones had suffered much from repeated attacks, and a change of climate had long been prescribed by the physicians, as the only expedient to preserve her life. Sir William's engagement to translate the *Digest of Hindu and Mahommedan Laws* was an insuperable obstacle to his accompanying her to England; and she was, at length, reluctantly prevailed upon to undertake the voyage without his society. The ship, in which she embarked, sailed from Calcutta in December 1793; and Sir William proposed to follow her in the ensuing season.

In the beginning of 1794, he published a translation of the *Ordinances of Menu*, containing the Hindu system of duties, religious and civil. This proved to be the last of his labours: for the useful life of this eminent scholar was now drawing to a close. In the month of April 1794, he was attacked by an inflammation of the liver, which, with a progress uncommonly rapid, terminated fatally in the course of seven days. He expired on the 27th of April, 1794. The funeral ceremony was performed on the following day, with the honours due to his public station; and the numerous attendance of the most respectable British inhabitants of Calcutta evinced their sorrow for his loss, and their respect for his memory. His death, indeed, was universally lamented, both at home and abroad. A society of gentlemen in Bengal, who had received their education at Oxford, subscribed a sum to be presented, as a prize, to the student at that university, who should compose the best dissertation on Sir William's character and merits. The premium was adjudged to Henry Philpotts, A. M. Fellow of Magdalen College. By an unanimous vote of the East India Directors, a characteristic monument to the memory of a public functionary, who had so many claims to distinction, was erected in St. Paul's Cathedral; and a statue of the great orientalist, from the hands of a British artist, has likewise been placed in a conspicuous situation in Bengal. As a memorial of her affection and esteem, Lady Jones employed Flaxman to erect, in the antichamber of University College, Oxford, an elegant monument, with a suitable inscription, to the memory of her husband; and, at the same time, fixed his reputation on a solid and durable basis, by presenting the public with a complete edition of his works in six volumes quarto. His life has been written with accuracy and elegance by his friend, Lord Teignmouth.

After the foregoing sketch of the life and pursuits of Sir William Jones, it is unnecessary to expatiate on his character; in which we cannot fail to perceive a rare union of the attainments of a scholar, the accomplishments of a gentleman, and the principles and conduct of a Christian. As a linguist, his acquisitions are perhaps unparalleled. His knowledge of Greek and Roman literature was extensive and profound; and in the universality of his attainments as a philologer, he had no rival. He wrote French with the correctness and elegance of a native; and he understood, more or less perfectly, no less than eight-and-twenty different dialects. His poetical productions exhibit no ordinary portion of vigour and elegance; and his translations from the oriental poets are peculiarly happy. Although a great share of his attention appears to have been devoted to philological pursuits, yet he successfully cultivated general science, without neglecting the studies peculiar to his profession. His botanical, philosophical, and chronological disquisitions, together with his historical researches, are rendered uncommonly interesting by the novelty, depth, or importance of the knowledge they display, as well as by the elegant diction in which his information is conveyed to the reader; and his legal tracts sufficiently evince his laborious study of the principles of jurisprudence, and his intimate acquaintance with the laws and institutions of his native country. His works attest, at once, the depth and the variety of his acquirements. To him our Indian empire is deeply indebted for the zeal he displayed in exploring its learning, laws, and manners; for kindling that spirit of research which has since produced such successful results; and for his laborious exertions to secure the property and promote the comfort of the native inhabitants, by dispensing justice according to the principles of their own established laws and usages. It is certainly a matter of great regret, that Sir William Jones did not live to translate the digest of Hindu law, on the compilation of which he had bestowed so much time and attention. This laborious work, however, has been undertaken and completed by Mr. H. T. Colebrooke, in a manner which does the highest credit to his talents and industry. See *The Works of Sir William Jones; and Memoirs of the Life, Writings, and Correspondence, of Sir William Jones*, by Lord Teignmouth. (*z*)

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* Among the original members of this society will be found the names of several gentlemen, who have greatly distinguished themselves by their proficiency in Oriental learning; of Mr. William Chambers, who possessed a critical and extensive knowledge of the dialects on the coast of Coromandel; of Mr. Francis Gladwin, the author of many elementary works on the Persian language, and the translator of various Oriental manuscripts, particularly of the Institutes of Akbar; of Captain Charles Hamilton, who published a translation of the Hedaya, a code of Mahommedan laws; and of Charles Wilkins, Esq. whose critical knowledge of the Sanscrit is so well known, and whose talents and industry were so successfully exerted in inventing and casting types for several of the Indian dialects

JONES, John Paul, Chevalier of the French order of Military Merit, and of the Russian order of St Anne, a distinguished officer in the navy of revolutionary America, and afterwards a rear-admiral in the service of Russia, was the son of Mr John Paul, a respectable gardener. He was born at Arbigland, in the parish of Kirkbean, and stewartry of Kirkcudbright, in the month of July 1747, and received the rudiments of his education at the parochial school. The contiguity of his residence to the shore of the Solway Firth, inspired him with an early predilection for a seafaring life; and while yet a mere child, he hoisted his flag on board his mimic ship, and issued audible mandates to his imaginary officers and crew, with all the consequence of a legitimate commander. Nor was he content with this. As his skill in manœuvring improved, he ventured to criticise the nautical knowledge of practical sailors; and in the eager and confident tone with which, from the eminence on which he took his station, he thundered forth his orders to the vessels which were entering the port at Carse-thorn, might be remarked the ardent and enterprising mind of one who felt that he was born to future command.

At the time of which we speak, the town of Dumfries carried on a very considerable trade in tobacco with America; and as the Nith was not navigable to foreign vessels, the cargoes were unshipped at Carse-thorn, near the mouth of that river. There, from his earliest years, Paul had opportunities of conversing with mariners from the discontented colonies; and it is probable that he thus first imbibed that enthusiastic attachment to the United States, and those revolutionary principles, which exerted so decided an influence on his conduct when he grew up to maturity, and eventually led him to renounce his allegiance, and raise his hand against the country which gave him birth.

His partiality to a sailor's life was so determined, that his friends resolved to indulge it; and accordingly, at the age of 12, he was sent across the Firth to White-haven, where he was bound apprentice to Mr Younger, a respectable merchant in the American trade. His first voyage was made on board the Friendship, Capt. Benson. His course was steered for the Rappahannoc, and before he had completed his 13th year, he had landed on the shore of that country which he was destined to adopt as his own. His home, while the ship was in port, was the house of an elder brother, who, having married a native of that country, had previously settled there. Here his early prepossessions in favour of America were confirmed, and from that period, as he afterwards expressed himself to Baron Van der Capellan, that became "the country of his fond election."

In the mean time, his intelligence and good conduct acquired him the esteem and confidence of his employer, who promised to give him a substantial proof of his favour, by promoting him to the command of a vessel; and he would have kept his word, had not the embarrassed state of his affairs deprived him of the power to do it.

Our adventurer, being at length freed from the trammels of apprenticeship, made several voyages to the coast of Africa; but he soon became disgusted with a traffic which had too long been the disgrace of civilized nations, and confined his services to the command of vessels engaged in a more reputable and legitimate commerce.

In the year 1773, he went to Virginia to arrange the affairs of his brother, who had died there without leaving any family, and about this time, in addition to his original surname, he assumed the *patronymic* of Jones, his father's Christian name having been John. This custom, which is of classical authority, has long been prevalent in Wales, and in various other countries, although it is not practised in that part of the island in which he was born.

This visit revived and rivetted the attachment which young Paul Jones had conceived for America; and in spite of the native ardour and restless activity of his mind, he resolved to withdraw from the vicissitudes of a sea-faring life, to fix his residence in that country, and to devote the remainder of his days to retirement and study. He was little aware of the turbulent scenes in which he was destined soon to perform a part, nor of the conspicuous figure he was to make in them.

The discontents of the colonists had by this time occasioned much commotion, and their murmurs became daily deeper and more frequent, till at last they fairly broke off all connection with the parent country. Towards the conclusion of the year 1775, it was determined by Congress to fit out a naval force to assist in the defence of American independence, and an anxious search was made for friends to the cause who should be at once able and willing to act as officers on board their vessels. It now appeared that Paul Jones had, in his romantic schemes of tranquil enjoyment, falsely estimated the natural bent of his genius. With deep interest he had watched the progress of those political events which were to decide the fate of his adopted country; and when an open resistance was made to the dominion of Britain, he could no longer remain an inactive spectator. Having only just completed his 28th year, he was full of bodily vigour and of mental energy, and he conceived that his nautical skill would qualify him to be a distinguished assertor of the rights of the colonists. He was immediately appointed first lieutenant of the Alfred, one of the only two ships belonging to Congress, and on board that vessel, before Philadelphia, he hoisted the flag of independent America with his own hands, *the first time it was ever displayed*. In the course of a very active and successful campaign, having found means to gain the confidence of the marine committee by his zeal and intrepidity, he had not served many months before the president sent him a captain's commission.

In November 1777, he sailed for France in the Ranger, a new sloop of war of 18 guns, with dispatches of the victory of Saratoga. It was intended that, "as a reward for the important services'' which he had already rendered to America, he should be appointed to the command of the Indian, a fine frigate, just built for Congress at Amsterdam, and that the Ranger should act under his orders; but the American commissioners at Paris found it their best policy to assign this vessel over to the King of France, and Captain Paul Jones continued with the Ranger. Having convoyed some merchant ships to Quiberon Bay, he there received from the French commander the first salute that was ever given to the flag of Congress.

Eager to retaliate upon Britain for some successful exploits of her sailors on the American coast, and exasperated by the resolution which the English government had taken, to treat all the supporters of independence as traitors and rebels, Captain Paul Jones soon after this entered the Irish Channel, and approached his native shores, not as a friend, but an implacable enemy. On the night of the 22d April 1778, he came to anchor in the Solway Firth, almost within sight of the trees which sheltered the house in which he first drew the breath of life. Early next morning, he rowed for the English coast, at the head of 31 volunteers, in two boats, with the intention of destroying the shipping (about 200 sail) which lay in the harbour of Whitehaven. In this daring attempt he would probably have succeeded without difficulty, had not the strength of the opposing tide retarded his progress so much, that day began to dawn before he could gain the shore. He dispatched the smaller of the two boats to the north of the port to set fire to the vessels, whilst he led the remainder of the party in person to the more hazardous duty of securing the fort, which was situated on a hill to the south. It was a cold morning; and the sentinels, little aware that an enemy was so near, had retired into the guard-room for warmth, affording Jones an opportunity to take them by surprise, of which he did not fail to avail himself. Climbing over the shoulders of the tallest of his men, he crept silently through one of the embrasures, and was instantly followed by the rest. Their first care was to make fast the door of the guard-room, and their next to spike the cannon, 36 in number. Having effected this without bloodshed, they proceeded to join the detachment which had been sent to the north; and finding that a false alarm had deterred them from executing their orders, Jones instantly proceeded to set fire to the vessels within his reach. By this time, however, the inhabitants were roused, and the invaders were glad to retreat, leaving three ships in flames, of which one alone was destroyed.

Of all our hero's exploits, there is not one which reflects so much discredit on his name as that which we have just now mentioned; for, although it is lawful for a commissioned officer to annoy the enemy of his sovereign by all possible means, there is something extremely revolting in the idea of a man's deliberately stifling all his early associations, and availing himself of his familiar acquaintance with the place of his youthful enjoyments to effect its destruction.

On the same day with this adventure, another memorable occurrence took place, which contributed, for a time, to add greatly to the odium which the first had brought on his character, but which, in the end, enabled him to prove that he was possessed of the most disinterested and heroic qualities. In cruising off the coast of Galloway, it occurred to him, that, if he could get into his power a man of high rank and influence in the state, he should be able, by retaining him as a hostage, to ensure to the American prisoners of war more lenient treatment than was threatened by the British government. Knowing that the Earl of Selkirk possessed a seat in St. Mary's Isle, a beautiful peninsula at the mouth of the Dee, and being ill-informed with regard to the political connections of that nobleman, he destined him for the subject of his experiment. With that view, he landed on the Isle, about noon, with two officers and a few men; but before they had proceeded far, he learnt that his lordship was from home, and that there were none but ladies at the house. Finding his object frustrated, he now wished to return; but his crew were not so easily satisfied. Their object was plunder; and as they consisted of desperadoes in a very imperfect state of discipline, and with whom it would have been dangerous to contend, he allowed them to proceed. He exacted from them, however, a promise that they should be guilty of no violence; that the men should not enter the house, and that the officers, after having made their demand, should accept of what might be put into their hands without scrutiny. These conditions were punctually obeyed. The greater part of the Selkirk plate was carried off in triumph by the crew, and Paul Jones was, for a time, stigmatised as a free-booter: but he nobly vindicated his character, by taking the earliest opportunity of purchasing the whole of it, out of his own private funds, and remitting it safe to its original owner, without accepting the smallest remuneration. National prejudice has misrepresented this transaction; and in order to heighten the popular indignation against our hero, it has been common to state, that his attempt on the person, and as it was supposed the property, of Lord Selkirk, was aggravated by ingratitude, his father having eaten of that nobleman's bread. Nothing can be more false. Neither Mr Paul, nor any of his kindred, ever was in the Earl's employ, or had ever the most distant connection with his lordship or his family; and in a correspondence which took place betwixt our hero and Lady Selkirk, relative to the restitution of the plate, a most honourable testimony was gratefully paid by the latter to the Captain's character.

The day succeeding the two events just mentioned, Paul Jones encountered the Drake, a king's ship of 20 guns, in Carrick Fergus bay, and took her after a very brave resistance, in the course of which the English captain and his first lieutenant were mortally wounded. With this and another large prize, Captain Jones returned to Brest, after an absence of 28 days of very active service, in which, besides taking and destroying many valuable vessels, he had thrown the coasts of Scotland and Ireland into consternation, occasioned the Irish volunteers to be embodied, and obliged the English government to expend considerable sums in fortifying the harbours.

A teazing period of hopes and disappointments followed. The French ministry, to testify their good will to the United States, had promised to furnish Paul Jones with a ship, in which, however, he was to display the American flag; but, after various written memorials, no progress seemed to have been made towards the fulfilment of this engagement. At length he determined to apply in person, and having gone to Paris, he soon obtained the command of the Duc de Duras of 40 guns. The name, however, he changed to *Le Bon homme Richard*, in compliment to the wise saying of Poor Richard, "If you would have your business done, come yourself; if not, send." In this vessel, badly manned, and not much better furnished, Paul Jones sailed as Commodore of a little squadron, consisting, besides his own ship, of the Alliance of 36 guns, the Pallas of 32, the Serf of 18, the Vengeance of 12, and two privateers, which requested leave to share the Commodore's fortunes. After taking several prizes, the Serf, the privateers, and at length the Alliance, deserted the squadron. The Commodore's good fortune, however, did not desert him. On the 15th September, he was, with his own ship, the Pallas, the Vengeance, and several prizes, at the entrance into the Firth of

Forth, where they made every necessary disposition to seize the guard ship, and two cutters, that rode at anchor in the roads, and to lay Leith, and perhaps Edinburgh, under contribution. The wind, which was fair, in the night, opposed them in the morning. However, on the 16th, the little squadron continued all day to work up the Firth. At this time, a member of the British Parliament observing them from the coast of Fife, and mistaking them for the king's ships, sent off a boat to inform the Commodore that he was greatly afraid of Paul Jones, and to beg some powder and shot. Our hero, much amused with the message, sent him a barrel of gunpowder, with a civil answer to quiet his fears, and an apology for not including shot in the present. Next morning, at day-break, every thing was in perfect readiness to commence the engagement, and two tacks more would have brought the strangers along-side their enemies, when, at that critical moment, a sudden gale of wind swept down the Firth, raging with such violence, as completely to overpower them, to sink one of the prizes, and drive all the rest of the squadron fairly out to sea. By this failure, the captains of the Pallas and Vengeance were so much disheartened, that they could not be prevailed on to renew the attempt.

Continuing their cruise, after various adventures, the squadron suddenly discovered the homeward bound Baltic fleet, off Scarborough castle, escorted by H. M. S. the Serapis, and the Countess of Scarborough. After a long engagement, in which Paul Jones displayed the most astonishing skill, intrepidity, and presence of mind, the Countess of Scarborough struck to the Pallas, and the Serapis to the Bon-homme Richard, which latter ship was reduced to so shattered a state, that next morning, after all hands had left her, she went to the bottom. The Serapis was not in much better condition, the Commodore having, with his own hands, lashed the two ships together, to prevent the enemy from availing himself of his superiority in weight of metal. The Commodore now took the command of the Serapis, erected jury-masts, and with some difficulty conveyed his prizes to the Texel. Paul Jones, who never suffered the interests of his fellow-citizens to be lost sight of, exerted all his influence with the French court to have it arranged that his prisoners should be exchanged against American prisoners in England, and he completely succeeded. Dr Franklin, the minister of the United States at Paris, soon cheered his heart, by writing to him, that "he had then completed the glorious work he had so nobly begun, by giving liberty to all the Americans who then languished for it in England." On this occasion, too, the King of France directed his ambassador at the Hague to communicate to Commodore Paul Jones the high personal esteem he bore for his character, especially for his disinterestedness and humanity.

The captain of the Alliance being ordered to Paris, to answer for his insubordination, P. Jones took the command of that vessel; but he now found himself environed with dangers. The Dutch were summoned to deliver him up to the vengeance of the English government, as a pirate and a rebel; and they were most reluctantly constrained to order him out to sea, where an English squadron was watching to pounce upon him as their certain prey. The acceptance of a commission from the King of France would have saved him from this dilemma, and the ambassador from his most Christian majesty repeatedly urged him to adopt that alternative, but he thought his honour engaged to decline it. He would not, at whatever risk, abandon the flag of his beloved America. He, however, contrived to make his escape, passing the Straits of Dover, and the Isle of Wight, before the very beards of the English fleets.

Towards the end of 1780, our hero sailed for America, in the Ariel, with important dispatches, and having encountered in his passage the Triumph, an English vessel of 20 guns, forced her to strike.

A little before this time, the King of France had testified his approbation of Paul Jones' services, by presenting him with a superb gold sword; and a letter from M de Sartine now reached the President of the United States, requesting liberty "to decorate that brave officer with the cross of the order of military merit." The demand was laid before Congress, and a law having been passed on the 27th February, acceding to it, he was formally invested by the Chevalier de la Luzerne, at a public fête given to the members of that legislative body. In April following, on the report of a committee, Congress passed a vote of thanks to the Chevalier John Paul Jones "for the zeal, prudence, and intrepidity with which he had sustained the honour of the American flag; for his bold and successful enterprizes to redeem from captivity those citizens of America who had fallen under the power of the enemy; and, in general, for the good conduct and eminent services by which he had added lustre to his character, and to the arms of America."

During the remainder of the war with England he had no opportunity to signalise himself. After it was over, Congress, as an expression of gratitude, caused a gold medal to be struck, with appropriate legends and devices, to perpetuate the memory of his valour and services.

In 1787, the United States having charged the Chevalier with a mission to the court of Denmark, he set sail for that country in the month of November, and, passing through Paris in his way, was strongly solicited to assume the command of the Russian fleet in the Black Sea. Soon after his arrival at Copenhagen, a courier, sent express by the Empress Catharine, conveyed to him an urgent invitation to St Petersburgh. Although he saw many reasons for declining to engage in the service of that Potentate, he was flattered by the offer, and felt himself bound at least to thank her Majesty in person. He, therefore, set out instantly for her court by the way of Sweden; but at Greshelham found the passage of the Gulf of Bothnia blocked up by ice. After several unsuccessful attempts to proceed to Finland by the islands, he conceived that it might be practicable to effect his object by doubling the ice to the southward. The enterprise was formidable and altogether new; but our hero was not easily daunted. Without making known his intentions to his companions, he set sail from Greshelham one morning very early, in an open boat about 30 feet long, followed by a little one to haul over the ice. Towards evening, having got nearly opposite to Stockholm, our adventurer, producing his pistols, ordered the astonished boatmen to pursue the route which he had secretly devised. Resistance was vain, and he was obeyed. All night the wind was favourable, and they hoped to reach the coast of Finland in the morning; but they found themselves opposed by an impenetrable barrier of ice. Neither was it possible, from the state of the weather, to return. The only resource was to make for the Gulf of Finland. When night came on, they steered by the aid of a pocket compass, lighted by the lamp of the Chevalier's carriage; and, at the end of four days, after having lost the smaller of their two boats, they terminated a perilous and fatiguing voyage at Revel in Livonia.

The Chevalier was graciously received at the court of St. Petersburgh; and, no longer opposing the wishes of the Empress, attached himself to her service, under this single condition, "That he should never be condemned unheard."

He proceeded, without delay, with the rank of rear-admiral, to take the command of the fleet stationed at the Liman, or mouth of the Dnieper, and oppose the Turkish fleet under the Captain Pacha. On the 26th May, 1788, he hoisted his flag on board the Wolodimer. His squadron was supported by a flotilla under the Prince of Nassau, and land forces under Prince Potemkin. Our limits forbid us to follow Admiral Jones through this campaign. It afforded him many opportunities of displaying his characteristic intrepidity and professional skill; but mean jealousy and malignant cabals deprived him of much well-earned glory. He was, however, invested with the order of St. Anne, as an acknowledgment of his fidelity; and, on his arrival at St. Petersburgh, he was told that he was destined for a more important service. Disgusted, however, by the intrigues of selfish men, he left Russia in August 1789, and never returned.

The remainder of his days he spent partly in Holland, and partly in France. He collected a number of important documents relative to the public transactions in which he had been actively concerned; and, as if he had foreseen that he was not to be long-lived, he devoted much of his leisure to the arrangement of his affairs, and to the preparation of papers, which should exhibit his character and his services in their true light to his friends and to posterity. He died at Paris of a water in the chest, in July, 1792, having barely completed his forty-fifth year. His funeral was attended by a deputation of the National Assembly, and an oration was pronounced over his tomb by M. Marron.

Among the Admiral's papers were found Memoirs of his life, written with his own hand; a most interesting literary production, which it is in contemplation with his friends to present entire to the eyes of the public.

The above sketch has been drawn up from some of the documents above referred to. (Θ Τ Δ)

IONIAN Islands, is the name given to the islands in that part of the Mediterranean, between the coast of Greece and the island of Sicily. There are seven detached islands along the shore, which are ranked among the Ionian islands; namely, Corfu, Santa Maura, Ithaca, or Thiaki, Cephalonia, Zante, and Cerigo, together with several islets, extending from about 36° to 40° N. Lat. and from 19° 30′ to 23° 10′ E. Long. But this, perhaps, may be more properly considered a political association than an arrangement to be recognised in geography, unless it were restricted to narrower limits, where the juxta position of Santa Maura, Ithaca, Cephalonia, and Zante, would naturally admit of it. Corfu and Paxo are removed at a considerable distance north-west, and Cerigo more to the south-east, with few intermediate points of approximation. The number included under the general name of Ionian Islands has been different at different times; and there were formerly annexed to the jurisdiction under which they were placed five sea-port towns on the neighbouring continent,—Bucintro, Gomenitza, Parga, Prevesa, and Vonitza.

The climate of these islands is in general temperate; but, at certain seasons, the transitions from heat to cold are so sudden, that the inhabitants are compelled to use great precautions against their effects. Copious rains, attended by thunder, commence about the same period as winter in Britain; yet roses blow during the coldest weather. Hot and scorching winds sometimes destroy the vegetation; violent squalls are continually felt in the channels separating their respective shores; and the hurricanes on the west and north-west of Paxo have rooted up the olives, and obliged the islanders to substitute vines. All the islands are subject to earthquakes, which have repeatedly overthrown cities, and buried their inhabitants in ruins. Scarcely a month passes without shocks being experienced in Santa Maura. Zante was almost totally destroyed by one in 1790, and in the summer of 1811 several shocks daily were common. The sphere of their operation is not extensive, seldom affecting any but the isles in the vicinity, or the neighbouring continent; and sometimes it is confined to a single island exclusively. They are also described to be undulations, rather than vibrations or concussions. Water is scarce throughout the islands. There is no large stream or river discharged into the sea; and the inhabitants are supplied from wells, or, in many parts, with cisterns excavated from the rocks to retain the residue of the rains. Corfu, which extends about 35 miles in length, and is esteemed the chief of the Ionian islands, contains a population of 60,000 souls. Paxo, distant 8 miles south of its extreme point, is 18 or 20 miles in circumference, and has about 4000 inhabitants. Santa Maura, lying considerably to the south-east, is about 50 miles in circuit, and contains about 20,000 inhabitants. Ithaca is interposed between it and Cephalonia, extending 18 miles in length, and having a population of 8000 souls. Cephalonia exceeds all the others in size. It is 100 miles in circuit, or, following the curvature of the coast, about 150, and its population is equal to that of Corfu. Zante lies 6 miles to the south of Cephalonia, and is about 12 miles in length, and 30 in circumference, but more populous in proportion than the others, as its inhabitants amount to 40,000. Cerigo lies at the distance of about 150 miles from Zante, in a straight line S. S. E., but farther by navigation. It is about 17 miles long, 10 broad, 45 in circuit, and its population amounts to about 10,000 persons. Antipaxo lies south-east of Paxo, the Strophades between Zante and Cerigo, and Cerigotto to the east of the latter.

Almost all the Ionian islands are of irregular figure, presenting coasts which are rugged and of difficult access, with several harbours, for the most part insecure. Towards the north of Corfu there is a deep bay, with a narrow entrance, called Port Guvine, at the bottom of a great road, which, in the year 1799, contained the Russian and Turkish squadrons. Here it has been proposed to establish a naval yard, from the facility with which materials could be brought to it at small expense; and it is well defended by military posts and batteries. A spacious bay nearly separates Ithaca into two parts. Cephalonia has several ports formed beside its long peninsulas, but some of them are choking up by earth washing down from the hills, together with the sand of the sea. Cerigo is begirt by rocks and shoals, which are sometimes fatal to mariners, and the navigation of the channels separating the islands from each other, or dividing them from the continent, appears difficult and hazardous.

Some of the islands in the Mediterranean are of volcanic origin; but this is not said to have been the case with those now under consideration. A large portion of them consists of lime-stone. There is a quarry of grey marble in Corfu, and a vein of coal has also been found there. Petrifactions seem numerous, and the islands are penetrated by spacious caverns, where the abundance and diversity of stalactites exhibit most fantastic forms, resembling the works of art. There are petroleum wells in Zante, near the shore, about 10 miles from the city, which produce yearly 80 or 100 barrels, of 150 pounds each. The largest is about 50 feet in circuit, but only a few feet in depth; and there are others at a short distance, wherein the petroleum is continually accumulating. Sulphureous exhalations, and the frequent earthquakes, denote uninterrupted subterraneous fires.

The Ionian islands are in general hilly and unequal. The highest ground of Cephalonia rises 3000 feet above the level of the sea. Much of the surface is rocky, some parts stony, and there are fertile grounds interspersed. The extensive plain of Zante, in particular, resembles one continued vineyard, with patches in tillage or pasture, and is the source of great wealth to the inhabitants. The principal productions of the Ionian islands are, grain, fruit, cotton, honey, wax, oil, hareskins, and lambskins; but, of the first, the quantity is not nearly adequate to the comsumption of the inhabitants, who draw their supplies from the neighbouring continent, as the inequality of the surface affords little scope for the improvements of agriculture. Nevertheless, every advantage is taken of the smallest portions of soil. Terraces are formed on the declivities, their culture is carefully attended to, and rich harvests are obtained. Vines and olives grow universally in great luxuriance, and are the chief objects of notice; the first on account of their fruit for home consumpt and export, the second for the oil afforded by them. The grapes are of a diminutive kind, known in Britain, when dried, by the name of currants, of which the average crop is about seven million of pounds in Zante alone. In some years it is nine or ten, and has even amounted to twelve millions. They are gathered somewhat earlier than other grapes, and spread out for eight or ten days previous to being packed; but there are instances of the harvest being totally ruined by rains. Cephalonia produces five or six million pounds of the same fruit; Ithaca only 5.000 or 6.000; Cephalonia likewise yields 80,000 or 90,000 pounds of honey yearly; and, in the island of Cerigo, it was computed there were 1,480 bee hives in the year 1811. About 100.000 pounds of cotton of very fine quality are produced in Cephalonia, 3,000 hareskins, and 5,000 lambskins.

The fish on the coasts of Corfu, Paxo, Santa Maura, and some of the other islands, and large eels caught in the inland pools, afford a plentiful subsistence to the inhabitants. Seals retreat to the caverns of Zante, where they are hunted for the sake of their skins. This island seems to be more infested with noxious animals than the rest. A small kind of musquitoe, whose bite is extremely painful, appears in myriads; a species of centipede, described as an inch or an inch and a half in length, is said to inflict a mortal wound. A singular spider is also much dreaded here, though probably with little reason, which, like some others of the genus, constructs a door with a hinge, and lies in wait behind it for the prey. Its poison is reputed very active, and the only cure is the excision of the wounded part. Scorpions, lizards, and small snakes, are not uncommon. Birds of prey, and poultry in general, are scarce, nor are there many of other species, except birds of passage, and water fowl among the marshes. Mules are employed in agricultural operations, and horses and cattle are brought from the continent. Goats and sheep are numerous in Cerigo; and the wild animals of the islands are foxes, hares, and rabbits.

In regard to the products of human industry. Salt works are carried on to a great extent in Corfu at three different places, Potamos, Kastrados, and Lefkimo, or Dragotino, producing what is both of coarse and fine quality. The Venetians had 800 pans at Lefkimo, from which fine salt was obtained; and it has been suggested lately, that very great profits may be derived from its fabrication. Five or six thousand tons of the same commodity are made in Santa Maura. Oil of olives is expressed in large quantities in Corfu, Cephalonia, and a small portion in almost all the rest of the islands. It is observed, that the quality of the oil depends greatly on the nature of the soil, and the mode of manufacture. Thus, from the greater care of the inhabitants, that of Paxo is esteemed the best. The oil of Corfu is divided into four classes; first, eatable oil, which is selected from the second, the ordinary oil of commerce; thirdly, kernel oil, produced by passing kernels a third time through the press, which is, in general, of a chesnut-brown colour, and in a congealed state. It is of inferior quality, and serves for little else than the manufacture of soap. The fourth kind is black and thick, which is not put into casks until it has been mixed with a third of kernel oil. Abundant harvests produce towards a million of jars, or 250,000 casks annually, in Corfu. About 25,000 or 30,000 casks of oil are made in Cephalonia, commonly green and thick, and not affording above 3,000 or 4.000 from that quantity of good eatable oil. Paxo produces only wine and oil; Santa Maura, wine, oil, and salt. From 30.000 to 35.000 casks of wine, both white and red, are made in Cephalonia yearly. The red, consisting of 15.000 casks, is dry and spirituous. Of the remaining 20.000. there are 12.000 of agreeable taste, and 8,000 muscadel, one third of which is of inferior quality. In the same island, 3.000 or 4,000 casks of brandy are made annually; and there are two establishments for the preparation of liqueurs from aromatic herbs and flowers. Two kinds of liqueurs are likewise made in Cerigo. As the cotton of Cephalonia is very fine, muslins equal to those of India may be manufactured of it. Coarse cotton cloths are likewise fabricated here, and in the neighbouring islands, among which is nankeen, used by the Venetians for clothing their troops. Silk stuffs, and carpets of goats' hair for the Venetian gondolas, are made in Zante.

The trade of the Ionian isles is either reciprocal among themselves, or foreign, with the Morea and Albania, or with Venice and Trieste, and other ports of Europe. They export their own produce and manufactures, such as great quantities of currants, to England, the trade in which has increased much of late years, including also the produce of part of the neighbouring continent: Salt from Corfu and Santa Maura, chiefly to the Port of Goro at the mouth of the Po. Traffic in oil has been more flourishing since the year 1802, and most part of it is exported to Venice, from whence it is distributed to various quarters of the continent. Brandy is sent from Cephalonia to Trieste, and to Venice, Leghorn, England, and Russia. Cotton is carried from the same islands to Zante, where it is manufactured into goods suitable for turbans, and thence exported to Constantinople. The honey is principally consumed at Venice, hare skins are sent to Corfu, and lamb skins to Trieste and Senigaglia.

The imports of the Ionian islands consist of cattle and grain from the Morea, in proportion to the necessities of the population. Pasturage is scanty in the greater number of the islands. Paxo does not produce more grain than is adequate to one month's consumption, and it remained a long time uninhabited, owing perhaps to its natural sterility. Between 4000 and 5000 peasants annually repair from Zante to the Morea, for the purpose of assisting the inhabitants in reaping their harvests; and as their services are paid in grain, each returns with several months provision for his family. A large quantity of salted fish is imported, which meets a ready sale. There are likewise brought sugar, spices, drugs, and dyeing materials, as indigo and alum; woollen cloths, linen, velvet, and some other articles of wearing apparel. Bar-iron, nails, and lead, are all in demand. Most of the imports of Cephalonia have been introduced through Venice and Trieste, and the Greeks trading in colonial produce, are accustomed to repair to Leghorn for supplies. A considerable number of vessels belong to the Ionian Isles, particularly Cephalonia and Ithaca; but their commerce has laboured under many restrictions, partly resulting from political circumstances. Yet their position is esteemed extremely favourable for traffic. They might be formed, it is said, into a common centre for the commerce of Albania, of a part of Thessaly and of Macedonia, as well as of Epirus and the Morea. They are situated in front of the avenues of all the great communications between the interior of the Ottoman empire and the western coast of Greece. It has been remarked farther, that "since Venice has become almost a neglected city of a continental power, instead of being the capital of a trading republic, Corfu may easily take its place with regard to Italy, and seize on the commerce which the other nations of Europe came to carry on for their own account in her ports." The Ionian islands being almost in contact with Greece, means might be adopted to attract the commerce of its provinces. Thus new sources of wealth would be opened up, and the government, as the population became more flourishing, would be the better able to preserve its independence. Still it must appear very doubtful, how far it would be easy to realize projects of such magnitude, in territories where the resources are so limited.

According to a return made to the French government in 1807, the population of the seven principal islands constituting the Ionian republic, amounted to 206,000 souls. But some of them are greatly underpeopled, as Corfu; whereas the nature of others would only render a greater supply of provisions necessary, were the population considerably augmented. It is probable that all have been peopled from the Grecian continent; and it is said that the population of one is known to have been twice renewed. There is little doubt that the manners of the inhabitants were originally those of Greeks exclusively; but of later years, and at present, they participate with those of the Italians; nevertheless, the lower ranks have retained the customs of their forefathers more conspicuously. Their dress is nearly the same as on the neighbouring continent, and their language is Greek; while the higher ranks speak Italian, use the European costume, and preserve the same style of society. The Venetians, on assuming the sway of the Ionian Islands, introduced their own language into all the public acts, and it was used both at the bar and in the pulpit, as well as in the ordinary intercourse of life. But when this republic fell under the dominion of the French, the Greek language was encouraged, and superseded in a great degree the dialect of the Venetians. We believe, that two newspapers in Greek, and one in Italian, have been recently printed in these islands. The education of youth, along with instruction in languages, was much neglected under the former rulers, and was conducted usually at Venice and Padua; but several schools are now established, and men of considerable information dwell in Corfu, Ithaca, and Zante. The islanders in general are fond of shows and exhibitions: they even had an Italian opera, which maintained its place notwithstanding the war. But there is a great intermixture of eastern manners to be seen; and amidst the restrictions of sociality, the women are so strictly watched in some of the islands, as scarcely to be accessible by their nearest relatives.

The population of the Ionian islands is dispersed in several cities, villages, and hamlets. The former sometimes have the name of their respective islands, as Corfu, a very strong place, containing about 15,000 inhabitants; Zante, which in every thing resembles an Italian city, containing 16,000 or 18,000; Santa Maura, containing 6000; and Paxo, containing 4000. The principal town of Cephalonia, Argostoli, has a population of 5000; Vathi in Ithaca, of 2000; and Kapsali in Cerigo, of 4000 souls. Strophades contains only a monastery, which is a tower 90 feet square and 60 high, defended by a battery of four small cannon; and behind the gate, which consists exclusively of plates of iron, is a draw-bridge with a guard-house. This monastery is inhabited by about 40 monks, the sole population of the island. Parties of pleasure resort thither from Zante; but no women are allowed to land, nor are any female animals permitted to be brought on shore. The dwellings of the inhabitants of the Ionian islands are, for the most part, very much dispersed, and few are collected together into villages. Churches, chapels, and priests, are extremely numerous. Though we suspect the truth may be exaggerated, Cerigo is said to have 260 of the former, and 165 of the latter.

The Ionian islands are all celebrated in the writings of the ancients, under the names of Corcyra, Paxus, Leucadia, Ithaca, Cephalonia, Zacynthus, and Cythera. Some of them were independent states, and some subordinate to other governments. In the fictions of the poets also, they are stated to have supplied their respective quotas for the siege of Troy. After experiencing various reverses of fortune, under the authority of the Greeks and Romans, these islands were subdued by the Venetians, who had for a long time the predominance or maritime power in the Mediterranean. Desirous of keeping them in a state of absolute dependence, a proveditore or proconsul was sent from Venice, who frequently paid more attention to his own profit than the advantage of the people; dissensions were rather fomented than quelled; and civil wars at last resulted from the imprudence of the governors. The fall of the Venetian republic subjected the Ionian islands to the French, and notwithstanding the substitution of their democratic principles, attended by unfavourable impressions, for a despotic aristocracy, they were relieved from an oppressive yoke, and by the aid of a strict police harmony was restored. By the war between France and Turkey, the French were expelled in 1798, and the islands taken under the mutual protection of Russia and the Ottoman Porte in 1800, under the name of the Ionian Rupublic of the Seven Islands. But the contending interests of these two empires opposed the permanence of this arrangement: a rivalry for pre-eminence arose among the islands, anarchy was making rapid advances, and the public safety endangered, when the aid of the Emperor Alexander was solicited by the inhabitants. On the arrival of his troops, the protection of the republic was transferred to Russia exclusively; a constitution was framed, and an executive government appointed. Meantime a new candidate for the sovereignty appeared in Ali, the Turkish Pasha of Joanina, who had long cast a wishful eye on the Ionian islands. He had gradually rendered himself master of an extensive territory surrounding his capital; he had expelled the Venetians from four of their continental stations, and nothing was now more essential to his security and aggrandisement than the completion of this favourite object. He besieged Santa Maura, and took an active part against the Russians, whose unfortunate war with France enabled the latter to resume the protection of the Ionian republic in 1807. The maritime superiority of Britain, however, was speedily interposed to intercept supplies and reinforcements: Santa Maura, besides, was regularly invested in 1810, and a French garrison captured, though with some loss to the assailants. The reduction of all the islands successively followed, until nothing remained of the whole republic excepting Corfu alone. On the restoration of general peace in Europe in the year 1814, provision was made for new arrangements: and by a treaty between Russia and Austria, Prussia and Britain, signed at Paris in 1815, it was agreed that the Ionian Islands should be recognized as an independent state, and put under the protection of Great Britain; that the custody of the fortresses, and the command of the army, should be committed to his British majesty; and that a code of civil and political institutions, such as were supposed most beneficial to the interests of the islanders, should be framed. These terms have been fulfilled; and very recently a deputation from the islanders has arrived in this country, in order to attain the final adjustment of all that remained to be carried into execution under the treaty. (*c*)

IONIC ORDER. See CIVIL ARCHITECTURE, and Plate CLIX.

JONSON, BENJAMIN, (or, as his name is commonly abbreviated, BEN) the dramatic poet, was born in the early part of the year 1574. His grandfather was a man of some family and fortune, originally settled at Annandale in Scotland, from which place he removed to Carlisle, and was subsequently taken into the service of Henry VIII. His father, who is believed to have been about the court, suffered a long imprisonment under Queen Mary, probably for religion, and was deprived of his estate; but became afterwards (as Wood informs us) "a grave minister of the gospel." Our poet was a posthumous child, and came into the world about a month after his father's death.

His mother, in somewhat less than two years after the death of her first husband, married a master bricklayer of the name of Fowler. From this step-father, it could hardly be expected that our poet should have received a liberal education; but there was happily a generous friend, (whose name, however, is not recorded,) who sent him at his own expence to Westminster School. At that seminary, Jonson's youthful genius was submitted to the guidance of the illustrious Camden; and we find him in more than one part of his writings alluding with reverence and affection to the guardian of his favourite studies.

Mr. Gifford, in his memoirs of this poet, supposes that he left Westminster about the age of sixteen, and that he went from thence at once to the university. The person who had hitherto befriended him, procured for him as Aubrey informs us, an exhibition at Cambridge; but whatever might be its value, it was found inadequate to his support, and he was obliged too soon to quit the university, from the inability of his parents to assist him. How long he continued at College cannot be known. Fuller says a few weeks; but Mr. Gifford reasonably infers, from the expressions of obligation which he uses to the members of the university, that his connection with them must have extended to a much longer period. It seems undeniable, however, that poverty cut short the term of his education, and that he returned from college to follow the vocation of his father-in-law,—that of a bricklayer. Several stories that have been told by his biographers about the manner of his leaving this occupation, turn out, when examined, to be perfectly groundless. There is no truth in Fuller's account, of his being found by some gentlemen with the trowel in one hand and Horace in the other, and of his "*being manumized by their bounty*," to follow his ingenuous inclination. Equally absurd is the story of his being tutor to the son of Sir Walter Raleigh, and of his being sent home in a basket whilst asleep with intoxication, by the witty contrivance of young Raleigh,—an anecdote which Mr. Malone himself has been weak enough to repeat. Jonson's own account of his early life is, that he could not endure the occupation of a bricklayer; and having enlisted as a volunteer in the army, went over to Flanders.

His stay in the Low Countries did not extend much beyond one campaign; he had, however, an opportunity of signalizing his courage, having (as he told Drummond) encountered and killed an enemy, whose spoils he carried off in the sight of both armies. From the Low Countries, he returned with the reputation of a brave man, a smattering of Dutch, and an empty purse. He was now about nineteen, and betook himself to the stage for support, at first as an actor, but undoubtedly at no great distance of time as a writer. In the mean time, however, he was involved in a second affair of the sword, which was likely to have terminated more fatally than the first. Having had a dispute with some person, probably a brother player, he was challenged by his antagonist to the field. Jonson killed his opponent in a duel; but he was himself severely wounded, and thrown into prison for murder. During his confinement, he was beset by the artifices of a Popish priest, who persuaded him to embrace the Catholic faith, and it was not till twelve years afterwards, that he was again brought back to the mother church. He was annoyed also, during his imprisonment, by the visits of spies, who must have been employed about him, no doubt, in consequence of his connection with the Romish priest; as in those days the idea of Popery carried that of conspiracy along with it to the minds of all sound and zealous Protestants. He does not appear, however, to have remained long in prison. The prosecution for murder was probably dropt.

On his release, he thought proper to marry. He was now only in his 20th year, and his means of support cannot be supposed to have been affluent. It is not indeed, perfectly clear, whether he was at this period merely an actor, or whether he wrote for the stage, in conjunction with other dramatic poets, who had been longer in the employment of the managers. The latter supposition seems to be very probable. It was at that time the custom for theatrical managers to have writers in regular and permanent hire, who frequently united their talents in the fabrication of the same piece, and to whom money was advanced upon the credit of their abilities, and the progress of their work, as it was shewn or reported. It has been found impossible to ascertain the names of the dramas in which Jonson exerted his earliest efforts for the stage, either singly or in partnership. The first piece that can be appropriated in the list of his plays is, the comedy of Every Man in his Humour. The play had been popular, and had been acted eleven times by Henslowe's company of players, between the 25th of Nov 1596, and the 10th of May in the succeeding year. Before this period, however, he must have written for the stage, both alone and with others. The comedy of his youth was successful in its first production. The lofty tone of defiance to criticism which the author assumes in the prologue, and his subsequent alterations and high improvements of the piece, are eminently characteristic of Jonson. The prologue breathes all his personal pride, and discloses the energetic ideas of poetry which he early entertained. His changes of the piece announce the still ripening progress of his taste and his patience, to elaborate and finish even what had satisfied the public judgment, though not his own. The scene of Every Man in his Humour, had at first been laid in the neighbourhood of Florence, and the characters were Italian. Jonson, in altering the piece, made the scene and characters English, and rendered the whole effect more congruous and native. The play, thus re-modelled, was acted in 1598 at the Black Friars, and Shakspeare's name stands at the head of the principal performers in it. This period, the year 1598, is that which the commentators of Shakspeare have fixed upon as the era of Jonson's acquaintance with Shakspeare, an acquaintance which, according to their account, commenced with an act of kindness on the part of Shakspeare, which was returned with ingratitude by Jonson. Mr. Gilchrist and Mr. Gifford have on this subject answered all the charges of ingratitude brought against the memory of Jonson, with a shew of facts which appears to us to be decisive. Ben Jonson was not altogether unknown to the world in 1598, as Mr. Malone has asserted; he was, on the contrary, very well known, and ranked among the most eminent dramatic geniuses of the time. As such a pre-eminent genius, he is expressly mentioned by Meares at this very period. He had not, indeed, as his censurers tell us, (at the very time when they describe him as a person altogether unknown,) he had not killed Marlowe the poet in a duel, and he had not been young Raleigh's tutor; but he was well known already as an able writer for the drama; and there is not a shadow of proof that he was indebted to Shakspeare, either for his introduction to the players, or for the extension of his popularity. To anticipate something in our account of this eminent man, we conceive the readers of Mr. Gilchrist's and Mr Gifford's respective vindications of him will be left without a doubt upon their minds, that the proofs of malice towards Shakspeare, which Jonson's writings are supposed to contain, have been as falsely and gratuitously assumed as those of Shakspeare's ideal services to Jonson.

His next piece was entitled, Every Man out of his Humour, which was exceedingly well received. Three distinct notices of Jonson appear in Henslowe, the theatrical manager's memorandum book for the year 1599, which are nearly contemporary with the appearance of this comedy. The sum of 40 shillings was advanced to him and Decker for a play, which they were writing in conjunction; a like sum for another, in which Chettel was joined with them; and a third sum for a tragedy, which he was probably writing alone. None of these are now extant. His "Comical Satire (as he entitles it) of Cynthia's Revels," was acted in 1600. Its chief objects of ridicule seem to have been the ceremonious fopperies of courtiers; and the offence which it excited, we should have expected to have been in that quarter; but the real enemies which it raised up to Jonson, were his fellow labourers for the theatre, Marston and Decker, who conceived that the principal personages in the pieces were designed to ridicule themselves. His angry rivals were concerting a plan of revenge for this injury, how far it was real or imaginary we have now no means of ascertaining, when Jonson anticipated their attack, by bringing out his "Poetaster."

This attack upon Decker and Marston was favourably received; and its only disagreeable consequence to the author was, the accidental offence which it gave to some of the military and legal profession, who chose to consider their callings as satirized by the poet. It appears, that from the persecutions of the latter he had some difficulty in getting free. The Satiromastix, in which Decker replied to the Poetaster, was rather an angry than an amusing attack, and though its bitterness excited a temporary interest, it cannot be considered as having formed any reverse in the tide of Jonson's popularity.

About this time, says his biographer already quoted, Jonson began to acquire that turn for conviviality, for which he was afterwards noted. Sir Walter Raleigh had instituted a meeting of "choice spirits" at the Mermaid, a celebrated tavern in Friday-street. Of this club, which combined more talent than perhaps ever met together before or since, Jonson was a member, and here for many years he repaired, with Shakspeare, Beaumont, Fletcher, Selden, Cotton, Carew, Martin, Donne, and many others, whose names even at this distant period call up a mingled feeling of reverence and respect. Here were Jonson's wit combats with Shakspeare; and in allusion to those joyous scenes of conversation, Beaumont breaks out in raptures in his letter to Jonson:

> What things have we seen
> Done at the Mermaid—heard words that have been
> So nimble and so full of subtle flame,
> As if that every one from whom they came
> Had meant to put his whole wit in a jest.

Upon the accession of James, he was one of the earliest poets who were employed to grace the public festivities that were exhibited in honour of the new sovereign, with appropriate compositions. In those times, the visit of the sovereign to any public corporate body, or to any of his gentry or nobility, was generally received with an entertainment, in which the pageantry was emblematic, and often accompanied with poetry.

Even when the sovereign was not present, there was a poetical play of imagination in public festivities, which is altogether unknown to the colder manners of later times. Jonson's reputation stood so high, that few public solemnities were thought perfect without his assistance. For this assistance, it is well known that our poet received periodical sums, not only from public bodies, but from several of the nobility and gentry. A year seldom passed without some royal progress, and corporate bodies were frequently encouraged to feast their sovereign. As these visits were irregular, and without much previous notice, it became an object of no small importance to have a person always at command, on whose abilities they could rely for an entertainment that should neither disgrace themselves nor their guests. Hence sprung the several pensions which were regularly paid to Jonson, and which may be considered in the light of retaining fees. His pension from the city alone amounted to an hundred nobles a year. King James seems to have looked with no ordinary degree of favour on the learning and ingenuity of Jonson; but, at an early period of the reign, our poet was accidetally involved in a disagreeable affair, which did not seem to augur that he should ever be the favourite poet of the court. He had taken some slight share, along with Marston and Chapman, in the comedy of *Eastward Hoe;* a play in which some satirical expressions about the Scotch gave so much offence, that Chapman and Marston were committed to prison as its authors. Jonson, though he had no share in the offensive passage, thought himself bound in honour to share the fate of his associates, and voluntarily accompanied them to prison. They were all speedily liberated, but not before a report had gone abroad, that it was intended to punish them by slitting their ears and noses. Had this barbarous sentence been passed, the mother of our poet intended to have given him a poison, and to have drank it along with him. From such a parent, it has been justly observed, that he must have derived no small share of that personal resolution which so strongly marked his character.

His *Sejanus* (for we need not stop to notice the dates of his masques and entertainments) was first acted in 1603, and unfavourably received. In the first state, the author himself informs us that another hand had a good share in it; but when recast, with alterations entirely his own, it was again brought on the stage, and experienced a much better reception. It was not published till 1605. It is remarkable, that it is not divided into scenes in any of the editions; it has neither exits nor entrances, and is, upon the whole, the most involved and puzzling drama, in its internal arrangements, that was ever produced. *Sejanus* has all the learning of Jonson, and it also displays the peculiar force and loftiness of mind that belonged to him. It has passages of great eloquence, and a masculine tone of morality; but its merit is more historical and oratorical than, strictly speaking, dramatic. We come, however, (anno 1605) to the very brightest period of his dramatic career, when, in the course of a few years, successively came out, his *Volpone*, or *Fox*; his *Epicene*, or *Silent Woman*; and his *Alchymist*. The *Fox* was first acted at the Globe theatre in 1605. It kept the stage till the dispersion of the players by the Puritans: Was revived at the Restoration, and made its last appearance in the life-time of the elder Colman, but unfortunately at a period when the dramatic taste of the age was giving way, not to the hatred of the Puritans, but to the growing affection of the public for the exhibition of quadrupeds on the stage. The *Epicene*, or *Silent Woman*, also continued a popular favourite in the best times of the stage. Garrick attempted to retrieve it also from the neglect which it began to experience in the latter part of last century, but is said to have been unsuccessful. From what is recorded of his power of acting in Abel Drugger, it must be supposed that he succeeded better with the Alchymist. Indeed, we cannot willingly believe public taste to be at any period so degraded as to make the *Alchymist* unwelcome. The *Alchymist* has, indeed, been well pronounced in the words of Tate,* to be astonishing. It has a full popular breadth of humour—a vast strength and well adjusted complexity of characters—and a rich minuteness of information respecting the profound mummerirs of alchemy, that leave the mind as much amused with the learning, as exhilarated by the wit and humour of the poet. He speaks like an initiated mystic in alchemy, whilst he makes us laugh at its exposed imposture; and he exhibits so much knowledge of the pretended secrets of the science, that we feel as if he had taken to pieces in our presence some curious automaton, which had deceived the eyes of the ignorant with an imitation of life.

Catiline, which followed the *Alchymist*, was brought out in 1611. It was not, as Mr. Malone asserts, deservedly damned; it met, indeed, with opposition, but continued on the stage until the civil wars. Whatever may be the faults of *Catiline* as a tragedy, it has pages of Roman eloquence, which neither deserve to be damned nor forgotten. We allude particularly to the speeches of Petreius, which are not, as has been rashly asserted, mere translations from the classics. That one which begins with the following lines is wholly original:

> The straits and needs of Catiline being such
> As he must fight with one of the two armies
> That then had near inclosed him; it pleas'd fate
> To make us the object of his desperate choice,
> Wherein the danger almost poised the honour.
> And as he rose the day grew black with him,
> And Fate descended nearer to the earth,
> As if she meant to hide the name of things
> Under her wings, and make the world her quarry.
> At this we rous'd, lest one small minute's stay
> Had left it to be inquired what Rome was,
> And, as we ought, arm'd in the confidence
> Of our great cause, in form of battle stood;
> Whilst Catiline came on, not with the face
> Of any man, but of a public ruin
> His countenance was a civil war itself,
> And all his host had standing in their looks
> The paleness of the death that was to come;
> Yet cried they out like vultures, and urg'd on,
> As if they would precipitate our fates.

In the same year King James settled upon Jonson a pension for life, of a hundred marks *per annum*. This has been in courtesy termed his appointment to be laureate, and perhaps it was so. Hitherto, any one who chose to write verses for the court, called himself, and was often called by others, the laureate; but the title has since been confined to those who receive a pension.

In the summer of 1618, our poet made a journey to Scotland; and in the April of the following year, after having resided for several months on visits to different noblemen and gentlemen who shewed him hospitality, reserved his last visit for his poetical acquaintance William Drummond of Hawthornden. From the record of his conversations with Drummond, no pains have been spared to draw matter of detraction upon his character. It has certainly been Jonson's fate to be calumniated. His memory has absolutely been loaded with persecutions sufficient to shake the confidence of a mind conscious of its own virtue in that justice, which, it is common to say, that posterity exerts towards the virtuous. At the late vindications of Jonson's memory, who would not rejoice? It is from no wish to cavil at those vindications, that we beg leave to differ in some points from the sentiments which Jonson's latest editor and biographer has expressed respecting Drummond. Jonson came to the house of Drummond, who took notes of his conversation, and threw them into his repositories, without the slightest discoverable intention of ever giving them to the public. Those notes, however, were found among Drummond's papers after his death, and they contain some unfavourable reflections on Jonson's manners and character. After he had taken those notes, Drummond received some affectionate letters from Jonson, and answered him with kindness and civility. For this Mr. Gifford pronounces Drummond a cankered hypocrite, who decoyed his friend under his roof, for the express purpose of defaming him, as one who sat down complacently to destroy Jonson's character for ever; and who, having framed a libellous attack on the reputation of a friend, kept it carefully in store for thirty years, and finally bequeathed it, fairly engrossed, to the caprice or cupidity of his executors.

This language is intemperate and unjust. Whatever Drummond thought of Jonson, he was at liberty to make a memorandum of it, and that memorandum which he made was, to all appearance, a private one. The words, "bequeath, and fairly engrossed," are either without meaning, or insinuate what is untrue. Mr. Gifford does not know whether the notes were fairly engrossed, (by which we generally mean very distinctly written,) or very indistinctly scrawled. Nor can he, or any man, pretend to decide whether they were left among the writer's papers by accident or design. Their being found, implied no bequest of them to any one. Drummond was apparently disgusted by Ben's propensity to intoxication, and by his arrogance. And we know, from other testimony than Drummond's, that Jonson was fond of his bottle, and could talk very loftily of himself. Drummond's general private character is sufficient to make us believe his testimony. After all, what he has even privately recorded, as his own impression of Jonson's character, does not amount to its total condemnation. There are many men as intemperate and overbearing as Jonson is described by Drummond, for whom we find it possible to retain a considerable share of esteem, especially when splendid talents accompany their foibles. We cannot believe that Drummond had the [illegible] intention to decoy Jonson under his roof with the view of destroying his reputation; or that his memory deserves to be blasted for those remarks which he never published.

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* Tate's Preface to *Duke and no Duke.*

In the year 1621, his Majesty, by letters patent, gave to Jonson a reversionary grant of the office of master of the records, to be held by him and his assigns for life, from and after the date of the decease of Sir George Bue and Sir John Astley, the present masters, or as soon as the office should become vacant by resignation, forfeiture, or surrender. In contemplation, perhaps, of his speedy accession to this office, James was desirous of conferring upon our poet the honour of knighthood. Jonson, who was probably well aware that a distinction of this nature would only expose him to farther envy, shrunk from the meditated kindness of his sovereign, and persuaded some of his friends about the court to dissuade his royal master from the purpose. Jonson derived no advantage from the reversionary grant which has been mentioned; the patent, towards the conclusion of his life, was suffered by King Charles to be transferred to Jonson's son. From the year 1616 to 1625, our poet's labours for the theatre were entirely suspended, although he produced, during that period, some of the most beautiful of his masques and entertainments. Necessity at last drove him back to the stage. Profusion and thoughtlessness had now brought him to poverty, and sickness was superadded to his indigence. During the life of James we never hear of Jonson's poverty; but, by the death of that monarch in 1625, he lost a most indulgent and liberal patron. He was attacked, towards the end of the same year, by the palsy, and his decaying constitution also betrayed a tendency to dropsy. While this decay was coming on, he wrote his play, *The Staple of News*. Though the language of this comedy is forcible, and the satire well directed, its plot labours under the same difficulties and defects as that of the plots of Aristophanes, which the poet had in view, namely, a confusion of real and allegorical characters. The gossiping credulity of the age is, however, admirably held up to ridicule. While his wants and infirmities were increasing, he applied once more to the theatre, and produced his comedy of the *New Inn* in 1629-30. The fate of this drama was, to be driven by his enemies from the stage. An allusion to the king and queen, which was made in the epilogue of this play, awoke the slumbering kindness of Charles, and he instantly sent him a present of 100*l.* The monarch also liberally acceded to our poet's petition, "that he would be pleased to make the 100 marks of his father 100*l.*;" and he added, unsolicited, to the grant, a tierce of Canary wine.

Notwithstanding this accession to his income, his circumstances continued to decline together with his health. It is acknowledged, that he was utterly devoid of worldly prudence; what was liberally given him was lavishly spent. A dispute, in which he was involved with the architect Inigo Jones, contributed to embitter his last days, in which it appears that Jones was at least as vindictive as the offended poet. Under these melancholy circumstances he was employed in writing his *Magnetic Lady*, which appeared in 1632. It was indifferently received. There is, indeed, too much reason for acknowledging the remark of Dryden, "that Jonson's last plays were his dotage." The *Tale of a Tub* was his last comedy that was submitted to the public (in 1633.) It was not liked by the court, before whom it was represented. The mantle of his comic inspiration was now worn to thinness. Still, with his faint and faultering tongue, he continued to pay his annual duty to his royal master, and to compose occasional interludes. One bright and sunny ray, says his biographer, yet broke through the cloud which hung over his closing hours. In this he produced the *Sad Shepherd*, a pastoral drama of exquisite beauty; the better half of which, however, was unfortunately lost in the confusion that followed his death. This was apparently the close of his labours. Among his papers were found the plot and opening of a domestic tragedy, on the story of Mortimer, Earl of March, together with the *Discoveries and Grammar of the English Language.* His death took place on the 6th of August 1637, and he was buried on the 9th, in Westminster Abbey, in the north aisle, in the path of square stone, opposite to the scutcheon of *Robertus de Ros.* His friends designed to raise a noble monument to his memory by subscription, and, till this was ready, nothing more was required than to cover his ashes decently with the common pavement stone which had been removed. While this was doing, Aubrey tells us, Sir John Young, of Great Melton, in Oxfordshire, whom he familiarly calls Jack Young, chanced to pass through the abbey, and not enduring that the remains of so great a man should lie without a memorial, gave one of the workmen eighteen-pence to cut the words, "O rare Ben Jonson." The subscription was successful, but the troubles of the civil war prevented the execution of the monument; and the money was returned to the subscribers. Jonson in his person was large and corpulent. He had, Aubrey says, been fair and smooth faced, but a scorbutic humour seems to have fallen at an early period into his face, and to have seared it in a very perceptible degree. Randolph the poet, and others of his admirers, traced a resemblance in him to the head of Menander, as exhibited on ancient medals.

Jonson, whatever his last biographer may say of the candour and amiableness of his disposition, was certainly not endowed with the meekness and modesty which are sometimes known to accompany transcendant talents, and which disarm the envy that naturally follows the possessor of great genius. Unfortunate as he sometimes was, in being embroiled with his contemporaries, he seems, however, upon the whole, to have been more fully and fairly appreciated in his lifetime than he has generally been in the course of two succeeding centuries. He was deeply learned, and he was laborious in the execution of his art. An invidious conclusion has been too often drawn, that because he was learned, he was pedantic; and that, because he wrote upon fixed principles, he must necessarily be for ever stiff and artificial. But the scholarship which he brought to our drama was in many respects subservient to the purest objects of excellence. He brought the truth and simplicity of the ancient stage upon our own, at a time when our dramatic poets had nothing but extravagance and absurdity in the scenes and incidents of their pieces, which they generally drew from some novel or romance. His vein of humour was powerful and original; his sense of moral truth keen and sagacious. The latter quality of his mind often predominated as the more dignified over his humour, and he would often sacrifice ludicrous effect in his pieces, to give them the stern and severe graces of propriety. He was happy in discriminating character by its slightest shades of difference, as well as in picturing it forth in bold, broad, and prominent forms. His plots have a masterly conformation, and their complex parts are adjusted with the firmest unity of design. His style on the stage is manly, though it is almost only in his shorter lyrical effusions that we find him graceful and beautiful. It must, however, be deducted from his merits, that his severity of manner too often leans to hardness; that, instead of interesting passions, he sometimes treats us to abstract displays of humours in human character, which are neither amusing nor edifying in their exposure; and that he labours too minutely on his important characters. His lyrical poetry forms, perhaps, the most delightful part of his poetical character. In songs and masques, and interludes, his fancy has a wildness and sweetness that we should not expect from the severity of his dramatic taste. It cannot be said, indeed, that he is always free from metaphysical conceit, but his language is weighty with thought, and polished with elegance. Upon the whole, his merits, after every fair deduction, leave him in possession of a high niche in our literature, and entitle him to be ranked (next to Shakspeare) as the most important benefactor of our early drama. (*n*)

IOORIA, is a seaport town in Guzerat, situated on the Gulf of Cutch. A very brisk trade is carried on between this town and Mandavee, as well as other places on the Gulf of Cutch, and occasionally with Bombay. The exports are principally cotton, ghee, oil, and hides, to the southern ports; and coarse Dungaree cloth for Persia and Arabia. Its imports are spices of all kinds, powder, lead, and cocoa nuts. The vessels of Iooria carry from 50 to 60 candies. The larger vessels are unloaded at a place about three miles from the town, and the goods brought to within one mile of the fort by means of lighters. The value of the port is about 30 000 rupees per annum. Iooria is subject to the Rajah of Annan; and a treaty was entered into between this place and the British government in 1808. See Hamilton's *Gazetteer*.

JOPPA. See Jaffa.

JORDAENS, Jacob, a celebrated Dutch painter of historical and allegorical subjects, and bacchanalians, was born at Antwerp in the year 1594: Nothing remarkable concerning his parentage has been preserved; but at an early age he became a pupil of Adam Van Oort, a native of the same city, who died in 1641. Van Oort was a man of irritable temper, and coarse and forbidding manners, whereby he not only lost the regard of his pupils, among whom was the famous Rubens, but forfeited the esteem of his friends. Jordaens, however, from his own mild and pacific disposition, could accommodate himself to the caprice of his master, to which also an attachment to his daughter is supposed to have contributed. He married her soon after, and hence forward began to apply with all possible assiduity to his profession. Sandsrart, indeed, in his *Academia Nobilissimæ Artis Pictoriæ*, seems to infer, that it was perhaps to that sedulous attention which always distinguished him, that he obtained so much of Van Oort's favour.

Jordaens speedily employed his pencil on subjects both sacred and profane, as well as those of his own composition. Among the earliest specimens of his art was a painting of the Satyr from Æsop's Fables, who, having entered a peasant's cottage, retreated in disgust on seeing him blow hot and cold with the same breath; and this work gained him such celebrity, that it was engraved by Luca Vasterman. Next he painted Christ on the Mount of Olives, betrayed by Judas, and bound by the Jews, while Peter with his sword struck off the ear of Malchus, the high priest's servant: a night scene, admirably executed. A parallel now began to be drawn between Jordaens and Rubens; and the most skilful, who were inclined to bestow the palm of invention on the latter, ascribed the stricter representation of truth, and more forcible expression, to the former. Perhaps Jordaens had not equal opportunities of studying the most celebrated works; for although he always entertained a strong desire to visit Rome, the circumstances attending on his marriage prevented him.

Rubens was accustomed to employ many other artists in assisting him to complete his works, as they gained access to him, for the purpose of receiving instruction. Jordaens appears to have been of this number. It is said, that Rubens occupied him for a considerable time in painting designs for tapestries in distemper after his own sketches; and Sandsrart affirms, that he was engaged by the King of Spain to execute some tapestries for the royal palace at Madrid, a work which he finished with wonderful elegance; but that, by addicting himself to this style, he weakened his own knowledge of the principles of colouring, and enfeebled the tints whereby he so accurately represented nature. Rubens being then the most flourishing painter of the age, is accused of entertaining great jealousy of his talents, and of having taken that method to depreciate them; but, independent of this being inconsistent with the general character of that eminent artist, the works of Jordaens, executed at an advanced age, are considered to be not inferior to those of Rubens himself, in the very points wherein his master is supposed to have wished his deficiencies to be most prominent.

Jordaens worked with so much ease and expedition, that all Belgium began to be full of his paintings. He completed a fine representation of Pan and Syrinx, who was metamorphosed into a reed, within six days, though the figures were as large as life. A painting of Satyrs carrying cornucopia of fruit and grain, apparently of the same description, is equally celebrated for its harmonious proportions and colouring. He executed paintings for a banqueting-house for the King of Sweden; and another work for his native city, wherein a vast intermixture of mankind and animals was introduced. Jordaens was much employed in painting altar-pieces, many of which are yet preserved throughout the Netherlands.

This painter during his whole life was in constant occupation; but it is owing to the remarkable expedition with which he produced them, that the public are in possession of so many of his works. He is said never to have left his native city; and he died there in the year 1678, aged 84.

Jordaens was of a cheerful temper, and of a disposition particularly friendly and affable, and he enjoyed much gratification in the society of his friends. His industry enabled him to accumulate considerable wealth. He ranked high in his professional art; and he is thought to have carried the precepts of Rubens farther than any of his other pupils, Vandyke excepted. His compositions are full of taste and effect; his style brilliant and harmonious; and his designs are peculiarly characterized by truth and accuracy. He was most skilful in giving relief and rotundity to his figures; and from the nature of their execution, he is supposed to have studied the objects in candle light, or bright sunshine. For a free and spirited touch, no painter is accounted his superior. Yet Jordaens had conspicuous faults. His design, though distinguished by accuracy, is deficient in taste. He is charged with grossness of subject and form, and with images of low and common life. Jordaens, however, must be considered a great painter; for his beauties in every piece predominate over his imperfections. (*c*)

JORDAN, a celebrated river of Asia in Palestine, which has been venerated from the most remote ages by Jews, Christians, and Mahometans. No river in the whole universe perhaps has attracted so much notice, the Ganges excepted; yet both its source and its efflux have proved the most embarrassing problems to modern geographers. Even the ancients themselves seem to have laboured under considerable difficulties regarding them. This is the largest river in Palestine. Its name, according to Reland, ought to be read *Jorden* in Scripture; it is called *Jarde* by the Jews; and *Schereia* by the Arabs. St Jerome affirms, and many others have followed him, that it arises from two sources, a mile asunder, the one called Jor, the other Dan, and that the name Jordan is compounded from them after the formation of the river by their union. Some authors interpret Jordan the *river of judgment.*

There is a mountainous and nearly uncultivated district called Hasbeia, at the foot of Mount Hermon, or Jebel Skeikh, among the mountains of Antilibanus, containing a town of the same name, situated on a steep declivity. Not far distant are various streams, to which the source of the river is indefinitely ascribed. But that which seems to be so with greatest certainty is the river Hasbenay, about half a league west of the town of Hasbeia; for Europeans reject the opinion of the inhabitants of the country, that it is the stream *Tellkady.* Hasbeia is situated five leagues south of Rascheia, and apparently at no great distance from Panias, or Baniass; but the geography of this part of Syria and Palestine is so obscure, that we are unable to point out the exact position of these places by positions well determined. The ancients believed, that the ample source of the river of Baniass, which springs in the vicinity of a remarkable rock, was that of the Jordan. According to others, however, the river rose from the small lake Phiala, now called Birkel-el Ram, two leagues east of the town; and Josephus relates, that Philip the Tetrarch threw a straw into it, which was absorbed, and discharged at what may be supposed the source of the river of Baniass. All these facts illustrate the difficulty of ascertaining the truth. Near Baniass, it is evident that several small streams contribute their waters to form the Jordan, which about three leagues below the town expands into a small marshy lake, which is enlarged or diminished by the melting of the snows in the mountains, or the evaporation occasioned by the heat of summer. This lake is the Samachonitis of the ancients, and the waters of Merom of Scripture, and the Bahr el Houly of the moderns. Its circuit when full does not exceed 7 or 8 miles, and at times it is almost dried up. The river, now considerably enlarged, issues from it with a turbid stream, which is soon purified, by passing over a rocky bed, wherein its mud is deposited. About a mile from the lake, it is crossed by an ancient structure called Jacob's Bridge, consisting of three arches, built of basalt, in good preservation, which is said to derive its name from Jacob having returned by it from Padan Aram. This bridge is the mutual boundary of the Turkish Pachalics of Damascus and Acre; and at each end is a fortress, occupied by the troops of the respective pachas; but both were dilapidated by the French troops when they invaded Syria. Here the river is 64 feet wide, its current rapid and boisterous; but a modern traveller says he found its breadth 35 paces in January. Indeed, in considering the dimensions ascribed to this river, too little attention is paid to the measures of different nations, as well as the season of observation; for there is sufficient reason to conclude, that it receives large accessions from the melting of the snows. Here the banks of the river are finely wooded by trees, chiefly of the species *Platanus;* and the country becomes wild, mountainous, and entirely basaltic. Thirteen miles lower, the river passes through the beautiful lake Tiberias, or the Sea of Galilee, 18 miles in length, and issues from its southern extremity in a stream 40 paces wide. It now enters a fine plain called Al-Gaur, or El Gor, by the Arabs, and soon after receives a considerable river, the Scheriat Manadra, formerly called Hieramack, or Jamuk, from the east, some leagues below the lake. The Scheriat Manadra is crossed by a bridge of five arches, which indicates that it is of considerable size; and at the west side there is a very spacious fortress, with a small garrison. Apparently the principal accessions to the Jordan are henceforward from the east; but few of them are distinctly ascertained. Some inconsiderable streams flow from the west. Below the Scheriat Manadra there is the Wady Musch, which is discharged into it opposite Beisran, or Scythopolis, from the east; and still lower the Serka, which is the Jabok of the Jewish historians, and the boundary of the country of the Amorites. Between the confines of Syria and Arabia, the extensive valley, bounded on each side by lofty chains of mountains, contains in its centre the Jordan, now pursuing a languid course through the space of 75 miles, from the lake Tiberias to the Dead Sea, into which it rolls the volume of its waters. The total course is about 125 or 130 miles. But the intermediate country in the latter part of it is almost as little known as that approximating its source; and no modern traveller, except Hasselquist, seems to have beheld the efflux of the river, whose observations are restricted to its having there thrown out a quantity of willow. Probably he traversed the plain of Jericho to the Dead Sea, extending about three leagues in length, as he says that it is in general barren and level, with some small rising grounds interspersed; that the soil consists of greyish sandy clay, so loose that the horses sunk up to the knees in it; and that the whole surface of the earth was covered with salt, the same as in Egypt. All computations of the size of the Jordan are taken from its appearance at the distance of several miles from the mouth. It there appears dull and turbid, flowing at the rate of about two miles an hour. So many discrepancies prevail in the accounts of travellers regarding its breadth, that the only mode of reconciling them is, to suppose that it does not continue uniform for any considerable space, that their observations were made at different seasons, and have been given in the measures of different nations. According to Thomson, it is 75 feet; Chateaubriand calls it 50 paces; but Shaw, who probably has been more minute, remarks, that, excepting the Nile, it was by far the largest river he had seen in the Levant or Barbary; however, he did not estimate it at above 30 yards wide, and three deep close to the brink; therefore, combining the rate of its course with its size, he calculated that it would discharge six millions and ninety tons of water daily into the Dead Sea.

The natural history of the Jordan is not well explained, and there are few geological illustrations of the country which it traverses. Limestone, basaltes, different salts, and asphaltum, seem to be the more remarkable substances. The banks in some places are woody, and abounding in reeds, from which the Arabs obtain materials for the shafts of their lances and arrows; and the Turks employ the more slender kinds for writing. Wild beasts and game are exceedingly plentiful around Baniass, and the huntsmen set fire to the reeds on the confines of the lake Samachonitis, to dislodge the wild beasts from among them. Lions, tigers, and bears, descend from the neighbouring mountains, to which must be added many other ferocious animals of prey. Chateaubriand found the waters of the Jordan bitterish; but though he drank a great quantity, he suffered no injury. They hold in solution the same ingredients as the Dead Sea, but in very small portions; nor is this surprising, considering that there are salt streams in the neighbourhood. It is related in Scripture, that a bitter stream, which ran through the plain of Jericho, was converted by the prophet Elijah to a limpid brook to fertilize the fields. Notwithstanding the mineral impregnations of the Jordan, it contains plenty of fish, which are sometimes carried down to the Dead Sea, where they perish. It is generally understood that the waters of this sea are alike pernicious to animal and vegetable life. Troilo affirms that he has collected the dead fishes as they were thrown on the banks; but Chateaubriand, having encamped on its banks, heard a noise towards midnight, which his companions from Bethlehem assured him "proceeded from legions of little fishes leaping towards the shore." It is said that the peculiar quality of the Dead Sea is derived from a great mountain towards the southwest extremity, composed of numerous strata of sal gem, and that from a high rock, probably not distant from the mountain, an island of considerable extent may be discovered.

But whatever be the physical nature of the waters of the Jordan, the credulous have conferred on them the property of washing away sin. Originally this river only served for the necessities of the human race, and as a boundary to the restless tribes of the Jews; but it was viewed with peculiar veneration by succeeding generations. While the Christians had possession of Palestine, during the Crusades, its waters were carefully transported to Europe, for the purpose of baptizing the families of Potentates. The Jordan is yet a place of great resort to those troops of pilgrims who continue to visit the Holy Land, and they endeavour to bathe in the very spot where our Saviour was baptized by John. The pilgrims desire total immersion; but the female part of them only strip to their under garments, and have the water poured on their heads. The Greeks bathe at a place three or four miles distant from the other Christians, on account of a dispute concerning the precise site of the sanctified spot. It appears that, independent of other times, an annual excursion for bathing takes place on Easter Monday, when all the pilgrims, men, women, and children, leave Jerusalem in a great caravan, with the governor of that city at their head. The road leads past several places mentioned in Scripture; among which is the city of Jericho, now an inconsiderable village. About half a mile from the river there is a ruinous convent, dedicated to St John, up to which, according to tradition, it formerly flowed; but modern observers consider the fact improbable, from the height and steepness of its present banks. The pilgrims descend to a place still lower, yet their immersion is not accomplished without danger; and there are instances of many, who had entered the river incautiously, being carried away and drowned. A tax is imposed upon each on the way to the river, and something is also exacted by the governors on their return. In the year 1807, fifteen hundred pilgrims visited Jerusalem; and bathing in the Jordan is always one of the principal objects of pilgrimage to the Holy Land. See Mariti, *Viaggi*, tom. iii. Shaw's *Travels*, p. 374. Pococke's *Description of the East*, vol. ii. p. 72. Thompson's *Travels*. Hasselquist's *Travels*. Volney, *Voyages*, tom. ii. p. 279. Chateaubriand, *Voyages*, tom. i. La Roque, *Voyage en Syrie*. (*c*)

JOSEPHUS, the Jewish historian, was born in the first year of the reign of Caligula, A. D. 37, and was descended from one of the noblest families in Judea. His father Mathias was sprung from one of the principal branches of the race of the priests, and his mother from the royal blood of the Asmoneans or Maccabees, who had held, for a considerable time, the supreme authority among the Jews. He speaks rather boastingly of his early proficiency in learning; and professes to have been able, at the age of fourteen years, to confer with the principal men of Jerusalem on the more intricate points of the law. At the age of sixteen, he united himself with a celebrated Essenian philosopher, sharing, for the space of three years, in all the austerities of his sect; but, at the end of that period, he returned to Jerusalem, and attached himself to the sect of the Pharisees. In the 26th year of his age he made a voyage to Rome, in order to employ his influence in behalf of certain priests of his acquaintance, whom Felix had sent thither to take their trial before the Emperor. He was shipwrecked on his way in the Adriatic Sea; and was one of 80 out of 600, who were saved by a vessel of Cyrene, which providentially came in sight after their own had gone down. Upon landing at Puteoli, he became acquainted with one of his countrymen, an actor of plays, and a favourite of Nero, through whose interest he was enabled to accomplish the object of his journey. After his return to Judea, he found the nation in general ripe for an insurrection against the Roman government, and exerted his utmost endeavours to dissuade his fellow-citizens from so desperate an enterprize. Upon the breaking out of the war, he was appointed to the chief command in Galilee, where he distinguished himself by his able and prudent management of affairs in a period of general insubordination. Upon the arrival of Vespasian in that quarter, he was unable to withstand the Roman legions, and was closely besieged in the city of Jotapata. After a resolute defence of seven weeks, he was compelled to take refuge, with forty of his most determined followers, in a cave, where for some time they endured the greatest privations; and at length, seeing no prospect of escape, adopted the resolution of putting one another to death, rather than surrender to the Romans. Finding it impossible to divert his companions from their desperate purpose, he persuaded them to decide, by drawing lots, the order in which they should be put to death; till at last only he and another remained alive, whom he prevailed upon to submit with himself to the conquerors. He was highly favoured by Vespasian, whose future accession to the empire he had confidently foretold; nor was he less kindly treated by Titus, whom he attended during the siege of Jerusalem, and from whom he obtained the freedom of many friends and acquaintances at the destruction of the Jewish capital. He accompanied his patron to Rome, where he obtained from the Emperor an annual pension for his support, and was also honoured with the privilege of a Roman citizen. He experienced similar protection under Titus and Domitian, and enjoyed full leisure for the prosecution of his literary labours. He wrote, in Greek, "The History of the Jewish War," in seven books, which Titus approved by his own signature, and commanded to be placed in the imperial library; "the Antiquities of the Jews," in twenty books, in which he has accommodated the sacred history too much to the taste of the Gentiles, from a wish to recommend his unhappy countrymen to the favour of the Greeks and Romans; "Two Books against Appion" of Alexandria, an enemy of the Jewish people; "An Account of his own Life;" and "A Discourse on the Empire of Reason," or the martyrdom of the Maccabees, which is esteemed the most eloquent of his works. He proposed also to compose a treatise on the Jewish opinions and laws, which there is no appearance of his having ever accomplished; and in which he was perhaps interrupted by his want of encouragement under Nerva and Trajan, and his removal from Rome to Judea, which seems to have taken place between the 56th or 60th year of his age.

He was a man of great learning, singular abilities, and reputable character; and, in what regards the transactions of his own times, may be considered as an impartial, accurate, and candid historian. The best edition of his works is that by Havercamp, published at Amsterdam in 1727, in two volumes folio. (*q*)

IPECACUANHA. See MATERIA MEDICA.

IPHICRATES. See ATHENS.

IPSWICH, formerly GIPPESWICH, is a burgh town of England, and principal town of the county of Suffolk. It is situated on the side of a hill, on the northern bank of the river Orwell, and is about one mile long, and 3-4ths of a mile broad, forming a portion of a circle round the bend of the river. The town is ancient, but well built; and the principal streets are clean, and well paved and lighted. Some of the houses are adorned, both externally and internally, with carved and stuccoed devices. The principal public buildings and establishments are, the town-hall, the shire-hall, a new county jail, a palace belonging to the bishop of Norwich, an hospital, a market-place, a custom-house, and a good library. The town-hall, which was formerly the parish church of St Mildred's, is a very ancient building; and adjoining to it is a spacious council-chamber, with kitchens, &c. underneath. The walls, and the brick gate-way, are all that remain of Wolsey college, the site of which formerly comprised about six acres of ground. The market-place, which is large and commodious, was finished in 1811 from the designs of Mr Brown. It consists of a series of buildings, on pillars, arranged round two quadrangular courts, and cost about 10,000*l*.

The county gaol is an admirable building. Its boundary wall, which encloses 1½ acres of ground, is 20 feet high. The prison consists of four wings, having spacious courts, about 75 by 45 feet, and three smaller ones, about 44 feet square. These different courts are seen from the keeper's house in the centre of the prison, from which there is an avenue 98 feet long to the turnkey's lodge, upon the top of which the executions take place. The house of correction has an airy situation near the burgh gaol, and has a boundary wall 17 feet high, and three court yards, each 50 feet by 30. Besides these public buildings, there is the town and borough gaol in Matthew Street, chapels for the Unitarians and Anabaptists, an assembly-room in Tavern Street, a custom-house on the quay, which borders the Orwell, and a handsome stone bridge, connecting the town with Stoke Hamlet.

Besides three charity schools, Ipswich has a school on Lancaster's plan, which was opened on the 8th July 1811 with 200 boys.

There are at present twelve parish churches in Ipswich, viz. St Clement, St Helen, St Lawrence, St Margaret, St Mary at Elms, St Mary at Kay, St Mary at Stoke, St Mary at Tower, St Matthew, St Nicholas, St Peter, and St Stephen. The monastic establishments were once numerous, but nothing more than their names have been preserved.

About a mile from the town is a good race course, which was sold in 1811 to several private individuals; and extensive barracks, capable of accommodating 10,000 or 12,000 men, have lately been erected for infantry and cavalry.

Extensive manufactories of broad-cloth and sail-cloth were formerly carried on in this town, but they have long since declined; and malting, and spinning for the merchants of Norwich, are the only ones which are carried on. The chief trade of the town, which is still considerable, consists in malting and corn, and has the accommodation of a port and a quay; great quantities of wheat, and other grain, are annually shipped for the London market; a considerable timber trade was carried on for the use of the royal dock-yards, particularly Chatham; ship-building still flourishes, from building yards being attached to the port; the Greenland fishery is prosecuted with success; and though the coal trade has decreased, yet more than 30.000 chaldrons of coal are annually imported into the town.

The river Orwell has the advantage of a tide, in general from 10 to 12 feet, and though it was formerly much neglected, yet it has been rendered capable of bringing vessels of large burden within a very short distance of Ipswich.

The civil government of the town consists of two bailiffs, a recorder, 12 justices, including the two bailiffs, a town clerk, the two chamberlains, two coroners, and 24 common councillors. It sends two members to parliament, and the right of election is vested in between 600 and 700 persons. Ipswich possesses many rights and privileges peculiar to itself, and an admiralty jurisdiction extending beyond Harwich on the Essex coast, and on both sides of the Suffolk coast.

Ipswich has five annual fairs, on May 4th and 18th, July 25th, August 22d, and September 25th.

Cardinal Wolsey was a native of this town. The population in 1811 amounted to 2 221 houses, and 13 459 inhabitants. See Oldfield's *History of the Boroughs*; *The Suffolk Traveller*; Tanner's *Notitia Monastica*; and the *Beauties of England and Wales*, vol. xiv. p. 230.

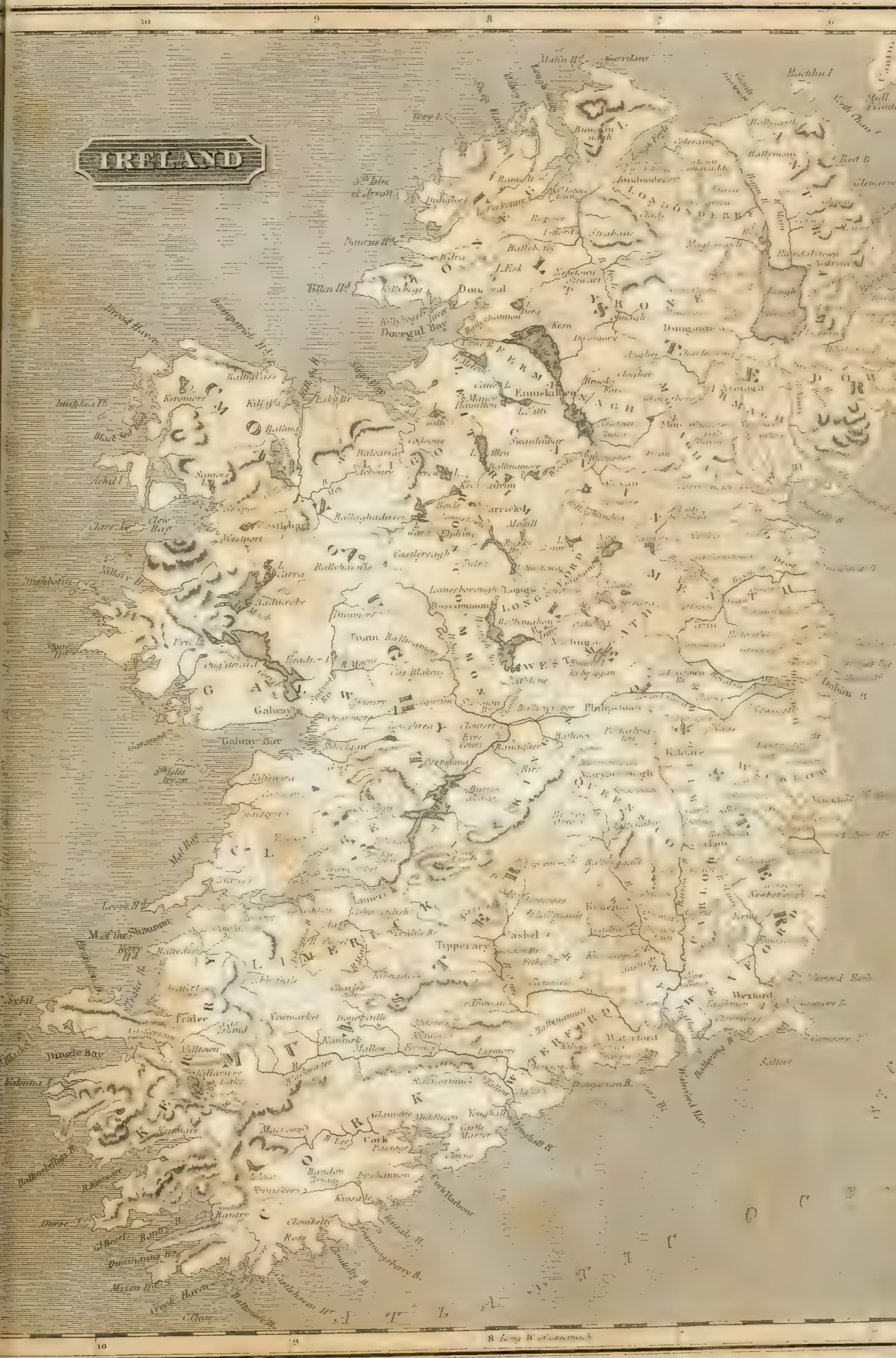
IRAC. See PERSIA.

IRELAND.

The materials for the history of Ireland, prior to the invasion of that country by the English, in the reign of Henry II. are so ill authenticated, so scanty and unconnected, and, in the very few instances where they are not so, they are so barren of interest and importance, that we cannot deem ourselves justified in dwelling upon them at any length. Nevertheless it would be improper to pass them over entirely; we shall therefore notice them cursorily, so far as they seem to us supported by direct evidence, or great probability, and as they are interesting and important from their connection with the more luminous portions of Irish history.

That the Celts either passed of their own accord, or were driven by the Goths, into Ireland, there is no reason to doubt; but it is not clear at what period this event happened, nor which of the two branches of the Celts colonized this island. It is also probable, that, after the Goths of England had driven the Celts into Ireland, some tribes or families of the former passed over also; at least the traditions of the Irish—the names they give to some of their ancient inhabitants and invaders, and the names of many of the tribes, who, according to Ptolemy, possessed Ireland in his time, evidently point to a Gothic population. The first authentic glimpse we possess of Irish history is drawn from Tacitus; according to him, an Irish prince, who had been obliged to leave his native country in consequence of unsuccessful domestic war, endeavoured to persuade Agricola to invade Ireland, assuring him that a single legion of Roman soldiers could accomplish the subjugation of that country, or, more probably, of that part of it from which he came. The account of Orosius, that, in the fifth century, a number of Scythians, who had been driven out of the north of Spain by the Emperor Constantine, landed in Ireland, and there met with a people of the same origin and language with themselves, the Scyths or Scots, does not appear to rest on very good foundation, though there is undoubted evidence that Ireland, at least from the 4th century down to the 10th, was known under the appellation of Scotia, and its inhabitants under the appellation of Scots.

The period and the circumstances of the first introduction of Christianity into Ireland, notwithstanding the numerous, particular, and confident traditions of the Irish respecting St Patrick, are not well authenticated. It has been sup-

IRELAND
10
9
8
7
6
Malin Hd
Garvilans
Rachlin I
Tory I.
Coleraine
Ballymony
Red B
Londonderry
LONDONDERRY
Glenarm B
N. Isles of Arran
Dunfanaghy
Strabane
Ballybofey
Newtown Stewart
TYRONE
Randalstown
Antrim
Lough Neagh
Killybegs
Donegal
Donegal Bay
Ballyshannon
Dungannon
Armagh
DOWN
Inishkea Is
Keromore
Ballina
Killala
Esky Br
Enniskillen
Black Sod Bay
Achil I
Clew Bay
Clare I
Westport
Castlebar
Sligo
Boyle
Carrick
Elphine
Castlereagh
Cavan
Killary H
Inishbofin
Ballinrobe
L. Carra
L. Mask
Lanesborough
Longford
Roscommon
LONGFORD
Dunmore
Tuam
Slyne Hd
Galway
Galway Bay
S. Isles Arran
Athlone
Philipstown
Kildare
Dublin
Dublin B
Wicklow
Wicklow Hd
Loop Hd
Limerick
Tipperary
Cashel
Kilkenny
Carlow
Wexford
Waterford
Tralee
Dingle Bay
Valentia I
Killarney Lake
Kenmare
Macroom
Cork
Passage
Bandon
Kinsale
Youghall
Dungarvan B
Bantry
Dursey I
Mizen Hd
Cape Clear
Baltimore H
Cork Harbour
Kinsale H
Waterford Har
Saltees
Carnsore Pt
ATLANTIC OCEAN
ST GEORGES CHANNEL
8 Long West Greenwich

posed, from some passages in St Jerome, that it was introduced in the 4th century; but if this was the case, its progress must have been very slow, and its hold on the minds of the inhabitants very feeble; for, in the 6th century, there appear to have been scarcely any vestiges of it. Soon after this period, however, Christianity made rapid progress, and manifested its influence by effects much more decidedly advantageous to the interests of religion and learning than any which it produced in the other Christian countries of Europe. The number of learned and holy men that sprung up in Ireland, and of monasteries and academies that were founded in it, during the fifth and two following centuries, was so great, and so many were the missionaries who proceeded from it to propagate the Christian religion, that it was dignified with the title of *Insula Sanctorum*, or the island of Saints. Attracted by its justly acquired character, and by the tranquillity and prosperity with which Ireland was favoured, amidst the barbarism and warfare of the rest of Europe, men distinguished for their piety and learning took refuge here. According to Bede, in the year A. D. 646, many of the Anglo-Saxons, both noble and of the middling classes, left their own country, and took up their abode in Ireland, either to indulge their taste for reading, or to lead a life of stricter religious observance: all of these the Scots received and treated in the most hospitable manner, lending them books, and affording them gratuitous instruction and sustenance.

What effect the labours of these pious and learned men produced on the character of the great mass of the people, we are not informed; but it is probable that the political state of the country would most thoroughly counteract their most zealous and judicious efforts to enlighten and civilize the inhabitants, (if they were made,) and would keep them down, at least to the level of that intellectual and moral state, in which the great mass of all the nations of Europe at this period existed.

Respecting the political state of Ireland at this time, our information, where it is accurate, is general; for we must carefully separate the fulness and minuteness of the romantic history of this country, from the brief and naked circumstances of its authentic history. That it was divided among several independent chieftains, or princes, there can be no doubt; but the number of these is uncertain, and probably varied at different times. Whenever any of these princes gained a great accession to his territories, he assumed to himself the title of King of Ireland, but the title never was supported by the power, and generally continued for a very short time. There were several subordinate lords under each of the chief princes; in the principality of Munster alone there were eighteen; under these again there were other chieftains. But the power of the superior lord over his feudatories was very precarious, depending more on his ability to enforce it, than on any sense of duty or strong attachment.

Notwithstanding this form of government (if such it can be called) contained within itself the seeds of disunion and warfare, and thus presented a strong temptation, and a favourable opportunity to foreign invaders, yet Ireland seems to have enjoyed comparative peace and prosperity till near the end of the seventh century. At this time, A. D. 684, it was invaded by order of Egfrid, King of Northumberland, and its lands, churches, and monasteries were laid waste. This invasion was soon followed by another, still more dreadful and destructive; for, towards the close of the ninth, or beginning of the tenth century, the northern barbarians, called by the Irish Duff-galls and Fin-galls, black and white foreigners, the Ostmen of the English, who came from Norway and Denmark, invaded Ireland with a considerable force. One of their most celebrated leaders was Turgesius, a man who, to all the ferocity and barbarism of the times, his country, and the life he led, seems to have united a considerable degree of activity and vigour of mind. The era of his landing in Ireland is not accurately known; but it took place either in the beginning or middle of the ninth century. His success seems to have been very great, and for thirty years he retained the power and the dominion which he had forcibly acquired. At the end of this period he was seized and put to death by the Irish King of Meath, in what manner is not accurately recorded, and his countrymen were compelled to retire to the sea coast.

The Norwegians, however, having experienced the facility of the invasion of Ireland, soon re-appeared on its coasts; not indeed as enemies, but under the pretence of commerce. Their chiefs were three brothers, who possessed so much precaution and adroitness, that, without the aid of force, they obtained possession of Dublin, Waterford, and Limerick, at this time the most important and populous cities in Ireland. Thus fixed firmly in different parts of the country, they were ready to take advantage of the domestic quarrels of the Irish; and by these they profited so much, that they soon extended their possessions far beyond the lands immediately adjacent to these cities

For nearly 300 years, that is, from the death of Turgesius to the landing of the English, the Irish annals are filled with uninteresting details of the wars between the natives and the Ostmen. In those wars the latter generally proved successful; and the Ostmen, who were settled at Dublin, increasing in strength by their victories over the Irish, as well as by accessions of force from their own countrymen, found themselves so secure in their conquests, that they even ventured, and were able to carry on, a piratical warfare against the Welsh. In one of these plundering invasions of Wales, they laid waste the city of St. David's, and carried off the riches of the shrine of that saint.

These invasions appear to have afforded a pretext to Henry II. to attempt the conquest of Ireland. In the year 1155, this monarch summoned a council at Winchester, to consult about the expediency of such a measure, having the year before obtained from the Pope a bull to authorise his attempt, whenever a favourable opportunity should be afforded. It is probable that the state of Ireland, almost always distracted, and weakened by domestic broils, would have afforded this opportunity in a very short time after the bull was granted, but Henry's affairs in France did not permit him to attend to the conquest of Ireland till some years afterwards.

In the year 1162, Dermod was the sovereign prince of Leinster. To great strength of body, he added a degree of courage and activity that rendered him formidable to the Ostmen, whom he defeated in battle, and kept within their own boundaries. Contemporary with him was Roderick O'Connor, who was styled King of Ireland. It was not likely that two Irish chieftains should long continue at peace with each other. A cause of quarrel soon arose. In the district of Breffney, which consisted principally of the modern county of Leitrim, O'Roirk reigned; Dermod seduced, or ravished his wife; and, not content with this outrage, he also drove O'Roirk from his territories. The exiled prince sought the assistance of Roderick. The province of Leinster was invaded: The inhabitants, wearied and dispirited by the tyranny of Dermod, received the invader as their friend and liberator; and Dermod, in his turn, was compelled to flee from Leinster, and seek refuge in England.

At this period, Henry was unable himself to assist Dermod, or to invade Ireland; but he caused an edict to be issued in his favour, in which he stated that he had received

Dermod under his protection, and promised the royal licence to such of his subjects as would aid him in the recovery of his territories. As soon as Dermod obtained this edict, he proceeded to the neighbourhood of Wales, both on account of keeping up an intercourse with Ireland, and because in Wales there were several of the nobility, who, from various causes, were most likely to assist him in his endeavours to be reinstated in his territories. In this expectation he was not deceived; for soon after the royal edict was read, and money and land were offered to those who would assist him, Richard, son of Gilbert de Clare, Earl of Strigul and Chepstow, engaged to come over to Ireland the following spring, on condition that he should receive in marriage Eva, the only daughter of Dermod, and with her the right of succession to all his property in Ireland. Other adventurers followed his example. Of these, the most famous was Robert Fitzstephen, a man who seems to have possessed most of the virtues, with but a small proportion of the vices of that age.

In A. D. 1169, Dermod returned to Ireland; and the following year, Fitzstephen, with 130 of his own kinsmen, 60 men in armour, and 300 archers and foot soldiers, landed at a short distance from Wexford. The first attempt of the united forces of Fitzstephen and Dermod was against this city, but they were repulsed by the inhabitants. The attack, however, was renewed the next morning by the English, and the inhabitants capitulated. Wexford was delivered up to Fitzstephen. Roderic, alarmed at the success of these formidable strangers, and sensible of his inability to cope with them, concluded a treaty, by which Dermod regained the province of Leinster, on condition that he acknowledged Roderic as sovereign of Ireland. Dermod having thus attained his object, and having been reinforced by the arrival of some more English troops under Maurice Fitzgerald, marched to the attack of Dublin, the inhabitants of which he obliged to take the oath of allegiance. Strongbow or Strigul was still in England; but being called upon by Dermod to fulfil his engagement, he applied to King Henry, requesting either the restoration of his paternal property, of which he had been deprived, or liberty to seek his fortune in Ireland. To this application Henry gave an ambiguous answer; but Strongbow construed it to his own desire and advantage, and resolved to go to Ireland. Previous to his embarkation, however, he sent over a young man attached to his family, on whom he could depend, accompanied by 10 gentlemen of service, and 70 archers. In the meantime, Earl Strongbow was active in his preparations; and in August 1171, he landed in the bay of Waterford with about 200 gentlemen of service, and 1000 soldiers. Previous to his arrival, his forerunners had attempted to gain possession of this city; and though this did not succeed, yet they had greatly weakened its means of defence, so that it fell easily before the forces of Strongbow. As soon as this great enterprize was effected, and the promised marriage between Eva and the English chieftain solemnized, the allies marched towards Dublin, which seems to have revolted from the allegiance it had sworn to Dermod, and to have farther roused his indignation and spirit of revenge, by having murdered his father. The inhabitants, intimidated and divided, were unable to defend the city, which soon and easily fell into the hands of Strongbow. The next object of the allies was the invasion of the territories of O'Roirk. Roderic O'Connor, alarmed at their progress, threatened to put to death the son of Dermod, who had been left with him as a hostage, if he did not desist from his purpose; and on Dermod's paying no attention to his message, he carried his threat into execution.

At this period, the clergy of Ireland held a grand and general meeting at Armagh, to take into consideration the arrival of the English. At this meeting it was unanimously agreed, that "their sins, and particularly their custom of buying English subjects from pirates, and keeping them as slaves, had exposed them to the divine wrath:" and it was therefore resolved, "that the English should be released from slavery, and henceforth that the practice of purchasing them should be abandoned."

As Henry was still unable, or disinclined, to invade Ireland himself, and as he was jealous, if not afraid, of the success of his subjects in that country, he issued a proclamation, prohibiting any vessel laden with supplies from entering the ports of Ireland, and commanding all his subjects to return home, within a specified time, under the penalty of the forfeiture of their estates, and banishment. For some time the king refused to recall this proclamation, and, during this period, the affairs of the English in Ireland were in a precarious state. In 1171 Dermod died; and, in the same year, the Danes attempted to regain Dublin, but without success. Obliged to be on his guard against the invasions of the Danes, and the intrigues and open wars of the Irish, Strongbow had continued and ample occasion for all his activity and presence of mind. As soon as the Irish princes were convinced that he had in vain applied to Henry to revoke his proclamation, they formed a confederacy against him, which was headed by Roderic O'Connor, and assisted by the king of the Isle of Man. This powerful body at the same time besieged Earl Strongbow and his troops, in the city of Dublin, and Fitzstephen and his troops, in a fort which he had built at Carreg. After much deliberation, it was resolved by Strongbow to sally forth from the city, and to direct their efforts against Roderic. This plan was executed with so much promptitude and silence, that the Irish were surprised and defeated, and Roderic himself escaped with difficulty. The city of Dublin and the province of Leinster being thus rendered secure, Strongbow marched to Wexford, near which the fort of Carreg was situated; but, before his arrival, Fitzstephen, alarmed by the report that Dublin was taken, had been induced to surrender himself to the enemy. Strongbow, however, marched forward. On his approach the Irish set fire to the city, and threatened to murder Fitzstephen and the rest of the prisoners, if he advanced farther.

Under these circumstances, and having received information that if he went to Henry himself, he might probably induce him to assist in the conquest of Ireland, he embarked for England. An agreement was at length settled between the king and him, the terms of which were, that the Earl should swear allegiance to the king, and give up to him the city of Dublin, with all the other cities and forts on the sea-coast; and, on the other hand, that the Earl should hold under the king the rest of his acquisitions in Ireland.

On the 18th of October, 1172, Henry landed at Waterford; his army consisted of 500 knights, and about 4000 troops; which were conveyed in 440 large ships. Soon after his landing, Fitzstephen was given up to him; and the kings of Cork and Limeric, as well as the princes of Ossory and the Decies, voluntarily took the oaths of allegiance, and agreed to pay tribute. On his march to Dublin, other Irish princes followed his example; but Roderic O'Connor refused to come and offer his obedience to the English monarch; he, however, took the oath of allegiance before two of Henry's courtiers, who were sent into Connaught for that purpose.

Thus the whole of Ireland was nominally subject to Henry, but he was soon obliged to return to England, for the purpose of doing penance on account of the murder of Becket. Before his departure, he committed the custody of the principal cities and castles to the most trusty of his subjects and took such other measures as he thought would at once serve to keep the Irish in awe and obedience, and would check the ascendancy of Strongbow. But though these two objects seem to have been tolerably well secured, yet Henry could not guard against dissensions among his knights; two parties were formed, at the head of one was Raymond, already distinguished by his courage, enterprize, and success; at the head of the other was Harvey. The former was so popular, as well as a man of such sound judgment, that it was deemed prudent to appoint him the general of the army, in order to appease their discontent, and to render them capable of resisting the Irish. In both these points he succeeded; but, being obliged to return into Wales, on the death of his father, the command devolved on Harvey, and a reverse of fortune speedily took place. The English were defeated in the neighbourhood of Cashel, by the prince of Limeric; and Roderic O'Connor, crossing the Shannon, invaded Meath, and advanced to the very walls of Dublin. To add to their misfortunes, Strongbow was at this time besieged in Waterford. Raymond was again summoned; he obeyed the summons, relieved Waterford, and received Strongbow's sister in marriage. The next enterprize of Raymond was the relief of Leinster, which had been invaded by Roderic; but no sooner did the Irish prince hear of his approach, than he returned into Connaught.

Scarcely was this object accomplished, when the Prince of Limeric threw off his allegiance, and took up arms: Raymond marched against him; at first he found some difficulty in persuading his troops to cross the Shannon; but this being effected, the Irish were put to flight, and the city of Limeric occupied. These successes of Raymond, and his influence with the troops, were so represented to Henry by his rival Harvey, that he was ordered to return to Wales; and two councillors were sent by the king for that purpose; but they, as well as Strongbow, were so firmly convinced of the necessity of Raymond's continuance in Ireland, that his departure was put off, and he reassumed the command of the army. His authority and talents were at this period of great service; for Limeric was invaded by its prince, who was assisted by a powerful chieftain of Kinsale. Against these Raymond marched, and having forced the pass of Cashel, the Irish princes were intimidated, and agreed to renew their oaths of allegiance.

From this part of Ireland the victorious general was recalled by the death of Strongbow; this event, and the necessity of his own departure for England, rendered it prudent to abandon the city of Limeric, as being at too great a distance from the principal seat of the English power. The troops were also withdrawn from the towns and forts of Leinster.

As soon as Henry was informed of the death of Strongbow, he appointed William Fitzandelin to the chief command in Ireland. About the same time, a bull of Pope Adrian, constituting Henry its lord, was read before an assembly of the Irish clergy at Waterford. One of the first acts of the new governor was to render the situation of some of the original adventurers so uncomfortable, that they went in quest of new settlements: hence were formed the settlement of Ulster by John de Courcey, and that of Connaught by Milo de Cogan. The expedition of the former succeeded, though not without much difficulty, and several obstinate battles with the Irish. De Cogan, on the contrary, was obliged to abandon his settlement.

As Ireland now began to assume the appearance of an important and valuable acquisition, Henry resolved to appoint one of his sons its feudatory sovereign. Accordingly, in the year 1178, John, his youngest son, was declared lord of Ireland, in a council of barons and prelates; but he did not go to Ireland till the year 1185, when he was 18 years old. It soon appeared, that neither he nor his followers were qualified, either by their behaviour or intelligence, to conciliate or improve the Irish. The Norman courtiers mocked and insulted the uncouth garb and manners of the Irish lords; and increased the indignation thus raised, by seizing the lands of such of them as held under English lords by English tenure within the pale, that is, in those parts which had been colonized by the English. The fiery temper and high spirit of the Irish being thus roused, they fled into those parts of Ireland where they were most likely to gain assistance. The British possessions were invaded on all sides; so that, in less than a year, Henry found it necessary to recall his son, and appointed John de Courcey governor. The circumstances in which he was placed would probably have rendered his efforts to retrieve the misconduct of his predecessor unavailing, had not the Irish princes quarrelled among themselves. Even then he was unable to take advantage of the death of Roderic, by gaining possession of Connaught; and it was not without great difficulty that he maintained the English settlements.

On the death of Henry in 1189, De Courcey was recalled, and Hugh de Lancey appointed in his stead. De Courcey, however, refused to obey the summons, and, retiring into Ulster, assumed the character of an independent chief. The Irish princes, as usual, roused themselves as soon as they found that their English rulers were divided among themselves; and, among these, Cathal, who succeeded Roderic in the government of Connaught, was the most remarkable for his enterprize and success. The English government, weakened by dissensions, and by the sudden and repeated attacks of the Irish, was entrusted to different noblemen, but with no decisive or permanent amelioration. At length, in 1199, Fitzhenry, descended from a natural son of Henry I. of England, was appointed by John, who now filled the throne of that country, chief governor of Ireland. He was extremely well qualified for his situation; but, opposed by De Burgo, who held Limeric, he for some time was unable to carry into effect the plans he had formed for the tranquillity of Ireland, and the establishment of the English power. At last, in 1203, having succeeded in collecting an army of native Irish, he marched against De Burgo, and compelled him and his Irish allies to renew their allegiance. As soon as this was effected, Fitzhenry resolved to reduce De Courcey, who still maintained an independent authority in the province of Ulster, and refused to acknowledge King John. In this enterprize he also succeeded.

In 1210 John resolved to visit Ireland. His object is not clearly known; but the only exploit which he performed, during his stay of three months, was the reduction of the fortresses in Meath and Ulster, belonging to the Lacies, who had incurred his displeasure. In one most important point, however, this visit of the English sovereign was highly beneficial to Ireland, for a regular code of English laws was promulgated; and, in order that these laws might not become a dead letter, through the want of proper and efficient means to carry them into execution, courts of judicature were established in Dublin. The territory which the English possessed was divided into counties, over which sheriffs and other civil officers were appointed. It does not clearly appear whether the English pale, as it was called, at this time comprised twelve or fifteen counties, though it is probable that there were only twelve, in Leinster, Munster, and Ulster: and that the three others, which lay in Connaught and the southern parts of Munster, were soon afterwards added.

The benefit thus conferred on Ireland by John was followed by another still more important in the year 1216; for at this period Henry III. extended Magna Charta to Ireland. During the space of nearly 100 years from this time, that is, through the reigns of Henry III. and his successor Edward I. till the invasion of Scotland by Edward II. the history of Ireland presents a confused and uninteresting series of petty warfares among the Irish princes and chieftains, and the English lords. The English monarchs, occupied with more immediate and momentous concerns, had neither leisure nor inclination to attend effectually to the affairs of Ireland. One circumstance, however, demands and deserves our notice during this period. In 1295, the first regular Irish parliament was held; and, from their proceedings and acts, we may glean some curious and instructive information regarding the state of Ireland, and the causes of its domestic feuds, its ignorance, and barbarism. The defence of the English borders was entrusted to the lords of the marches, but they neglected their duty, living at a distance from the borders. The defence, and the improvement also, of the English settlements were weakened and impeded by the non-residence of many of the great proprietors; but the circumstance which proved most unequivocally the desperate state in which the English settlements were, and at the same time pointed out one of the principal and most deeply seated sources of the civil wars, was the jealousy and ill-will that existed among the English themselves. Instead of uniting against the Irish when any of them were attacked, they were supine and inattentive spectators of the attack, and seemed rather to rejoice than to grieve at the misfortune of their countrymen and neighbours. The conduct of many of the English lords was proved to be unjust, both towards their own vassals and towards the Irish; the former they pressed down to the earth by exactions the most oppressive, and the latter they frequently attacked in defiance of the most solemn and very recent treaties. Another proof that the English settlements were retrograding into barbarism, existed in the circumstance, that the English were gradually assuming the dress and manners of the Irish, instead of using their endeavours to raise the Irish in the scale of nations, by introducing their own among them; and the motives which thus led the English to assimilate themselves to the Irish spoke still more decidedly in proof of their degeneration, for they thus hoped to free themselves from the wholesome and necessary severity of the English laws, by passing themselves off as native Irish.

Such is the picture of Ireland, which the acts and laws of the first regular parliament held here enables us to draw; but it was almost impossible to administer any sufficient remedy for the evils thus brought to light. The English government at that period did not possess either sufficient intelligence or sufficient power to remove these evils; and, even when intelligent and conscientious governors were appointed, they were so much thwarted in their plans, by the open opposition or secret machinations of the English lords, and so much occupied in defending the English settlements from the attacks of the Irish, that they could effect little or nothing, before the jealousy of the sovereign, or the influence of some favourite, produced their recall.

In the mean time, the Irish were naturally anxious to throw off the English yoke. They had beheld their country, to which they were devotedly attached, become the prey of foreign invaders, who, not content with the conquest of great part of the island, seized every opportunity to dispossess the Irish lords of their possessions, and to oppress and destroy the common people; and, indeed, by every act, seemed to proceed on a regular and fixed plan of repeopling the island with English colonists. Towards the English, therefore, the feelings of the Irish were very naturally extremely hostile; but, to indulge these feelings with effect, to digest any plan, and carry it into execution, for expelling the English, seemed beyond their power. They were divided among themselves; and that strength which they ought to have reserved and nourished, for the purpose of pouring it down upon the common enemy, was almost always wasted in mutual quarrels.

For a long period of time there was no hope of assistance from any foreign nation. At last, about the beginning of the 14th century, their eyes were turned towards Scotland, which country, from its hostile disposition towards England, in consequence of the invasion of Edward I. they trusted would feel disposed to assist them; and, from the decisive battle of Bannockburn, which it had gained against Edward II. they hoped it would be able to render that assistance effectual. As the north of Ireland, from its local situation, seemed more naturally connected with Scotland than any other part, so it first applied to that country for assistance. Soon after the battle of Bannockburn, the Irish of Ulster offered the sovereignty of Ireland to Robert Bruce, if he would expel the English. This he declined; but he sent his brother Edward with about 6000 troops to the north of Ireland. Against such a force, joined as they were by the Irish, breathing revenge, and acquainted with all the paths and resources of the country, the English were totally unable to make any resistance. The chief governor at this time was Lord Edmund Butler. On him of course devolved the protection of the English settlements; but, besides the army which he collected, one was formed, and headed by Richard de Burgo. The latter nobleman had long been jealous of the chief governor, and the jealousy now broke out to the prejudice of their own cause; for, though the Earl of Ulster had accepted the assistance of the Irish under Fedlim, Prince of Connaught, he refused a reinforcement sent him by the governor. The effects of this jealousy were soon apparent; for the Earl sustained a severe defeat from the Scotch, who were still laying waste the province over which he presided. As Bruce was sensible, that without the co-operation of the Irish he would be totally unable to keep his ground, and as he had reason to believe that Fedlim might easily be detached from the cause of the English, he turned all his thoughts to effect this object; and, at the same time, carried on a secret negociation with Roderic, who had claims on the province of Connaught. As soon as Fedlim learnt that Roderic was endeavouring to take advantage of his absence, he left the English, and returned to Connaught; and his rival being slain in an engagement, he then openly deserted his allies, and turned his arms against them. As this circumstance might have had a fatal effect on the cause of the English, a strong force was sent against him, and, after a most desperate resistance, he himself was killed, and his army completely routed, at the battle of Athenree, in the year 1316.

The defection of Fedlim from the English cause was followed by that of several other Irish princes; so that the Scotch were enabled to march from the north towards Dublin; and having reduced the strong fortress of Carrickfergus, they invested the capital. But though Edward's army was now still further increased by a body of troops which his brother Robert brought from Scotland, and by the junction even of some English families of distinction, yet he found himself unable to make any impression upon Dublin; and at the same time, he learnt that very formidable measures were taking to arrest his further progress. In fact, an army amounting to nearly 30,000 troops, most of them indeed ill disciplined and ill equipped, was assembled at Kilkenny, and a new governor, Roger Mortimer, was sent over. Retreat now became absolutely necessary; but Ulster, into which the Scotch retreated, having been utterly devastated by them on their first landing, could not support them. Famine and pestilence attacked them so dreadfully, that they were soon greatly reduced in numbers. The new governor resolved to take advantage of this circumstance; but he did not entrust the attack to the rabble assembled at Kilkenny. A regular army of 1500 men, under Sir John de Birmingham, was sent against the Scotch, whom, though nearly double their numbers, they defeated with great slaughter at Dundalk in 1318. In this battle Edward Bruce was slain. The English government, after this great effort to preserve their Irish territories, seem to have relapsed into their accustomed indifference about them; and the usual consequences followed. Instead of the native Irish being stimulated or guided towards improvement by the English, the latter in great numbers renounced the name, character, and privileges of English subjects; the English troops, unpaid and undisciplined, were permitted, and even ordered to levy exactions, to supply the place of their pay; and this they did with so much rapacity and cruelty, that the settlements in the south, over which, as at the greatest distance from the seat of government, they tyrannized in the most dreadful manner, were deserted by the English, and occupied by a horde of lawless and savage banditti, over whom even some of the English lords placed themselves, with the title of Irish princes. These princes were constantly at war either with one another, or with the English; but the circumstances of these petty warfares are too uninteresting for detail.

Ireland, thus reduced to a state of barbarism, and its constant attendants misery and poverty, was doomed to suffer still more from the unjust, as well as impolitic measures of Edward III. This prince, impoverished by his wars with France, resolved to draw money from Ireland, by the only mode in which it was capable of supplying it. With this view he resumed all grants of estates made by himself or his father; and declared, that none except Englishmen, who possessed property in England, should hold offices in Ireland. This violent measure naturally excited deep and general alarm, while, at the same time, it as naturally gave rise to two parties or factions, viz. those that were English by birth, and those who were English only by blood. Edward probably was soon sensible of his error, for he returned a gracious and favourable answer to the remonstrances of the parliament on the subject of his ordinances, and at the same time promised a redress of the grievances which they enumerated.

As a repetition of the disturbances and petty rebellions by which the history of Ireland is at this period, and for some time afterwards, principally distinguished, would be tiresome and uninstructive, we shall pass them over, and select only such circumstances and transactions as tended to improve the condition of this country; these, unfortunately, have always been few, and "far between;" and, till within a very recent period, indeed, rather deviations from, than in strict conformity with, the principles on which the English have ruled over Ireland.

In 1356, Ireland was favoured with a wise, humane, and just governor, Sir Thomas Rokeby; his favourite saying was, "let my dishes be wooden, rather than my creditors unpaid." Convinced that no good could be done to Ireland, which did not proceed from the highest source, and that the mass of the people must remain barbarous and unrestrained by law, so long as the higher orders were so, his first steps were to improve the latter. He brought the Irish parliament as nearly as possible to the model of the English, and when, by this means, he could depend upon their judgment and impartiality, he assigned to it the decision of all appeals from inferior courts: these had been carried heretofore into England. He thus lessened the expence and trouble of law-suits, while at the same time he habituated the Irish to a knowledge of law, and by putting confidence in them, rendered them worthy of confidence. Unfortunately, however, the wise measures of the chief governor were counteracted by the unjust and impolitic proceedings of the king: he forbade any more Irishmen from being admitted into any office or place of trust, in any city, borough, or castle, or into any ecclesiastical benefice; thus proclaiming his suspicions of the Irish, without doing any thing to remove their dislike of the English. Finding this measure not productive of all the benefit he expected, he next adopted a most bold measure. His second son, Lionel, in right of his wife, claimed the lands and the title of Earl of Ulster; and to enable him to carry these claims into effect, he was appointed by his father chief governor, and sent over with an army of 1500 men; but his attempts were ineffectual; and he left Ireland with no other proof of his having been there, except an increased hatred between the two factions, occasioned by his preference of those of English birth, and his persecution of those of English blood. It is probable that experience taught him the folly of his proceedings, for during both his subsequent governorships, his conduct was extremely politic and judicious.

The parliament, which enacted the statute of Kilkenny in 1367, was summoned by him. The leading object of this statute was, to keep the English distinct from the Irish in character, manners, feelings, and interests. For this purpose, all connection with the Irish, by marriage, or fosterage, was forbidden under the penalty affixed to high treason: if an Irish name, or the Irish language, dress, or customs, were adopted, the forfeiture of lands, or imprisonment, was the punishment. War was not to be levied against the Irish without special license from government; no Irishman was to be received into a monastery, or presented to a benefice, nor was any Irish bard or newsmonger to be entertained. The quartering of soldiers on English subjects, without their consent, was forbidden, under the punishment attached to felony. It is evident that if it had been practicable to have carried this statute into full and regular operation, it would have entirely cut off all connection between the Irish and the English; but its execution was impracticable from various causes, and it probably became rather the instrument of tyranny and oppression, even to those it was meant to benefit, than of any real good.

Richard II. twice visited Ireland during his reign. The object of his first visit was to reduce the Irish chieftains, and, as they were disunited, nearly all of them were obliged, or deemed it prudent, to submit. But no sooner had he quitted Ireland, than they revolted, attacked the English, defeated them, and slew Mortimer, Richard's cousin, who had been appointed chief governor. These dissensions induced Richard to come over to Ireland again in 1399; but, though he was at the head of an army of 30,000 men, he was unable to reduce one Irish chieftain, who, with only 3000 troops, eluded him among the bogs and woods, and when he retreated, harassed him incessantly, and with dreadful effect. At length Richard was obliged to return to England, in consequence of the attempts made upon his throne by Henry Duke of Lancaster.

Henry IV. was so busily occupied in laying the foundation of his newly acquired government, that he paid little attention to the affairs of Ireland; and the conquest of France drew off the mind of his son from the same object. The English settlements, which were always in a feeble state, even when nurtured by attention and supplies from England, sunk into still greater weakness during the reigns of these monarchs: the Irish chieftains harassed them incessantly, and the English lords, constantly jealous of one another, and engaged in quarrels, were neither able nor disposed to repel the attacks of the Irish. Under these circumstances, the English settlements must have been utterly destroyed, if the Irish lords had acted in concert, or been faithful to one another; but each followed their individual and separate interests, and on receiving revenues from the colonists, protected them from their own countrymen.

In the civil wars of the houses of York and Lancaster, the English in Ireland took a decided part. The most powerful families were the Geraldines of Desmond and Kildare, and the Butlers, or house of Ormond. The former adhered to the house of York, and the latter to the house of Lancaster. Soon after the accession of Edward IV. the power, influence, and property of the Butlers were greatly reduced by the Irish parliament, while the Geraldine faction increased in influence. In the year 1463, Thomas, who was the head of this faction, was appointed lord deputy; but he was rash and ill advised enough to march into Meath against the Irish chieftains, where his army was defeated, and himself made prisoner; but afterwards liberated, through the affection and gratitude of an Irish chieftain. This reverse, however, had rendered him unpopular at the English court, by which he was deprived of his government, and afterwards beheaded, on the plea that he had contravened the statute of Kilkenny against forming connections with the Irish. The Earl of Kildare was accused at the same time of the same crime, but escaping into England, he not only obtained his pardon from the King, but also the appointment of lord deputy.

In the midst of these events, the English settlements were still feeble and ill protected; and at last, in 1474, a fraternity of arms was instituted by act of parliament. This fraternity was composed of thirteen of the most powerful and well disposed persons in that district, which was more immediately and completely under the dominion of the English, viz. the counties of Dublin, Meath, Louth, and Kildare. By these persons was to be elected annually a captain, under whose command were placed 120 archers on horseback, and 40 other horsemen, beside one person to attend on each. Thus a force of 213 men (for the fraternity were themselves to act as soldiers) was raised; but it is evident, that this small force was inadequate to the defence of the extensive borders of the English settlements, and even to the preservation of tranquillity within their settlements. In fact, the security of the English in their possessions was regularly purchased by a tribute to the Irish chieftains. The pay assigned to each archer raised by the fraternity was sixpence per day, and five pence to each other horseman with his attendant. The sum necessary for this purpose was supplied by taxes, and, though to a trifling amount, they were levied with great difficulty. The family of the Butlers, though greatly reduced in numbers and in power, was not annihilated; and the chief surviving member, by his address, obtained from the King the reversion of the act of attainder, and the removal of the Earl of Kildare from the office of lord deputy. For some years there was a struggle between the Geraldines and the Butlers for the King's favour. At last, in 1478, Gerald Earl of Kildare was appointed deputy. Scarcely, however, had he obtained this office, when he was superseded by Lord Grey. Against this appointment he remonstrated with such effect, that he was reinstated in his office, the duties of which he performed with great prudence and address, till some years after Henry VII. ascended the throne of England. His being continued deputy by this monarch, who must have been prejudiced against him, as an adherent of the house of York, may partly be ascribed to Henry's apprehension of disturbances while he was yet unsettled on his throne; but it probably also arose, in part, from his sense of the good conduct of Kildare. This nobleman, however, soon afterwards swerved from the line of conduct he had hitherto pursued, and Henry's suspicions were excited against him, and his Irish subjects in general, among whom the cause of the house of York had always been popular. Their attachment to this cause they openly manifested, by the encouragement they gave to Lambert Simnel. This impostor was sent, by those who supported him, to Ireland, where he was proclaimed by the lord deputy and the council by the title of Edward VI. Having thus committed themselves, they prepared to uphold the cause which they had espoused; and the Yorkists in England gladly co-operated with them; besides English troops, 2000 Germans were sent by the Duchess of Burgundy, sister to Edward IV. into Ireland, in the hopes that they would draw Henry into that country, and thus leave England open to the operations of the Yorkists. But not succeeding in this, the army was sent over to England. Before their arrival, however, the imposture of Simnel had been detected, and the people received them every where rather as foes than as allies or friends. They still, however, pushed on, and as Henry was also advancing against them from London, the hostile armies met at Stoke, in Nottinghamshire, on the 6th of June, 1487. The battle was long and obstinate, but at length terminated in the complete victory of the king. Henry, with his usual prudence, which always with him was superior to mere feeling, pardoned, with scarcely one exception, the supporters of Simnel.

The state of Ireland, at this period, presents the same picture of intrigue, domestic feuds, and poverty, which we so frequently have had occasion to exhibit before. Henry seems to have been fully sensible, that territories in this state could be no source of power or revenue to the monarch, but must rather tend to weaken and distract those parts of his dominions which were in a sounder and quieter condition: but it was very difficult, in the first place, to detect the causes of this state of Ireland; and it would have been still more difficult, had the causes been detected, to have removed them by the effectual application of the proper remedy.

After much inquiry and deliberation, Sir Edward Poyning was appointed lord deputy, with instructions to probe the evil thoroughly, and to direct his whole thoughts to its removal; and, in order that his measures might be properly executed, and well supported, he was attended by 1000 soldiers, and by a number of English, who were qualified to fill the offices of lord Chancellor, lord Treasurer, and judges in criminal and civil causes. His administration is particularly remarkable for the acts passed by the Irish parliament, called after him Poyning's Acts.

Some of these acts were evidently calculated and intended to repress the power of the barons, and to prevent the recurrence of their mutual quarrels. For this purpose they were forbidden to have any followers, except their household officers and servants; and even the lords of the marches, who necessarily had a large retinue, were obliged to give in the names of their attendants. In order that the sheriffs should execute their duties with effect and impartiality, they were to be henceforward appointed by the lord treasurer. None but those of English birth were to command in the forts and other strong places. These enactments were calculated to preserve tranquillity among the barons, and, if possible, to insure their fidelity; but there were also enactments, the object of which was to relieve the mass of the people from the oppressions under which they laboured; by levying the taxes in a more equal manner, and by protecting the people from the exactions of their lords and the military. But the act, which is more generally and particularly known by the name of Poyning's Act, was of a different description from those first described; by this act, it was provided that no parliament should be held in Ireland, without previously stating to the king the reasons on account of which it was to be summoned, and the laws which it was intended to enact. Whatever might have been the necessity, the expediency, or the benefit of such an act, at the time it was passed, it is evident that it rendered the parliament of Ireland a mere mockery, while it enabled the English sovereign to enslave and tyrannize over the Irish, as well as to keep them back in civilization and resources by means of their own parliament. Just before Poyning returned to England, he had an opportunity of crushing the power of the Yorkists, the chief, the Earl of Kildare, having imprudently joined the adventurer Warbeck in Munster, and on his defeat having been taken prisoner. Henry, however, had penetration enough to discover, that if he could make Kildare his friend, no man was so well qualified to govern Ireland in tranquillity; and as Kildare seemed equally disposed to attach himself to the king, and on his trial repelled the charges against him in a satisfactory manner, the king appointed him governor of Ireland.

The great objects which Kildare had in view were, the external defence and the internal tranquillity of the English settlements: The former he succeeded in effecting, and, indeed, rendered these settlements more secure than they had been for a very long period; but his attempts to conciliate the Butlers were unsuccessful, though he succeeded so far as to form a matrimonial connection with that family. Still farther to increase his own influence, he married his daughter to the Lord of Clanricard, who was the head of a large number of those English who had assumed the manners, the language, and the dress of the Irish; but this marriage proved unfortunate, for such an inveterate quarrel arose between the earl and his son-in-law, that open and regular hostilities took place between them; each party strengthened themselves by alliances, so that, from a petty dispute, it increased to a civil war. The Irish Prince of Connaught, the O'Briens of Thomond, and in general the chieftains of Munster, ranged themselves on the side of the Lord of Clanricard. On the side of the governor were the English barons, the O'Neils, and some other chieftains of the northern provinces. The hostile armies met at Knocktow, near Galway, on the 19th of August, 1504. The forces of Clanricard were much superior in respect to numbers; but in discipline, skill, and steadiness, they were far inferior; their first attack was very impetuous; but that being received with coolness and firmness by the archers in the governor's army, the assailants gave way, and in the confusion with which they fled, upwards of 2000 were slain.

Kildare continued governor till his death in 1513: at this period Henry VIII. was on the English throne; and, occupied with various schemes of vanity and ambition, the affairs of the English settlements in Ireland were so little attended to, that on the death of Kildare they relapsed into their former disorder and weakness, and would probably have become much worse, had not Gerald, the son of Kildare, been appointed governor. He was, however, by no means equal in talent to his father; and the Butlers resolved to seize this opportunity of ruining the Geraldines, and recovering their former power and influence. At the head of this family was Peter Butler, who had married a Geraldine; but this woman, so far from feeling any family attachment to her blood relations, stimulated her husband against them. Butler succeeded so far as to procure the removal of Kildare; but it does not appear that he immediately benefited himself much by it, for Howard Earl of Surrey was appointed Lord Lieutenant of Ireland in the year 1520. Howard's administration lasted two years, and was principally occupied in reducing such of the Irish chieftains, as from their vicinity and hostile disposition were most formidable to the tranquillity of the English pale. In this object, as well as in his other plans, which were judicious and prudent, he most probably would have completely succeeded, had he been promptly and properly supported by his sovereign; but this not being the case, he requested to be recalled, and his request was complied with. For a short time Butler now engrossed the power which he had long coveted, but he was supplanted by Kildare, who, by his powerful family connections in England, and by his flattery of Henry, was reinstated in the office of chief governor. Again he fell under the displeasure and suspicion of the king, and was deprived of his situation, because he did not obey the commands which were given him, to seize the person of the Earl of Desmond, who had, at the instigation of Francis the First, agreed to take up arms against Henry. This fact deserves notice, as it presents the first instance of that policy of the French, which has so often subsequently led them to rouse the Irish against the English. Perhaps in no respect was the instability of Henry more conspicuous, than in the rapid and extreme changes which he effected in the government of Ireland; for, soon after Kildare was a third time appointed governor, he was succeeded by Butler. The consequences were such as might have been anticipated: vacillating councils, imbecile proceedings and measures, and an increase of the family hatred which had so long existed between the Geraldines and the Butlers.

At length Kildare, who was then governor, being ordered to repair before the king to answer the charges against him, prepared his plans before his departure, for open rebellion, and committed the government to his son Thomas. This young man, rash and violent in his temper, was too well disposed to second the views and schemes of his father; and a rumour being spread that he was put to death by Henry, the son immediately embarked in open and avowed rebellion. His movements were rapid and bold; he first marched to the attack of Dublin, but he was unequal to the reduction of this city; he was more successful against the Butlers, defeating their troops, and laying waste their country, on their refusal to unite with him. Elated with his success, he prevented for some time the landing of the English forces, but being obliged to retreat, and the winter setting in, he spent this season in recruiting his forces in the west of Ireland.

The next year witnessed the termination of this rebellion; for his troops were so disconcerted and alarmed at the reduction of the castle of Maynooth, that they either deserted or fled in confusion on the approach of the English. Lord Thomas immediately surrendered himself on promise of a pardon, which, however, was not performed, for he and his five uncles were executed. As his father had previously died, only one of the Kildare family remained, a brother of Thomas, about twelve years old, who was secretly conveyed into the Netherlands out of the reach of Henry's vengeance.

Lord Grey, who was appointed deputy, met with few difficulties or obstacles from the Irish chieftains, but the Butlers were still active in intrigue, and it was deemed necessary to accept their professed allegiance, though their actions were by no means accordant with it. It was not, however, to be expected that the Irish chieftains would long remain tranquil. At the head of those of the north was O'Neil, formidable for his own power, and for the influence which he possessed. Suddenly, in the year 1539, he advanced into the neighbourhood of Dublin, but, on the approach of the Lord Deputy's forces, he retreated with his booty till he reached the borders of Meath. Here, strongly posted, with a river on his front, he awaited the issue of a battle at Bellahoe. Lord Grey immediately crossed and attacked the enemy, who, after a slight resistance, fled in all directions. Grey, however, did not live long to witness the fruits of his victory, which were sufficiently manifested by the submission of the chieftains, even after his death. So complete was this submission, that Henry, in 1541, received from the Irish parliament the title of king of Ireland, instead of lord.

To reward the chieftains for their submission, and to keep them faithful, O'Neil was created Earl of Tyrone, O'Brien Earl of Thomond, and De Burgo Earl of Clanricard.

At this period, when, after many unsuccessful attempts, it seemed probable that Ireland would subside into a state of comparative tranquillity and civilization, a new source of civil warfare, of hatred of the English, and of devastation arose. We allude to the attempts which were made to convert the Irish to the Protestant religion, and the sturdy consistency which the great majority of the Irish displayed in adhering to the old religion. The means that were adopted by Henry VIII. and his son Edward, to introduce the Reformation, were extremely injudicious; and as it was strenuously opposed by the primate, it made scarcely any progress, when the accession of Mary destroyed the little of it that had taken root. But though this queen, on account of her religion, was a favourite with the Irish, yet they did not display their attachment by remaining perfectly quiet during her reign; on the contrary, such a formidable insurrection broke out in the districts of Leix and Ofally, that, when it was quelled, it was judged necessary to vest them in the house, and to place them under the jurisdiction of sheriffs; the name of Leix was changed to that of Queen's County, and of Ofally to King's County. The same parliament which passed these enactments in 1557, passed an act explanatory of Poyning's law, by which it was declared that no bill, nor even the heads of a bill, should be framed by the lords or commons of Ireland, but only by the viceroy and his council, or by the king and his council; and that the bill thus framed was to be passed into a law by the Irish parliament, or rejected without alteration or debate.

During the latter part of the reign of Mary, the north of Ireland was agitated by the machinations of O'Neil, and the south by the turbulence of O'Brien. On the accession of Elizabeth, O'Neil having made his peace through the earl of Kildare, repaired to London, where he was graciously received by the queen. His submission, however, was short and insincere; for as soon as he had assembled his forces, he appeared openly in arms, while, at the same time, he had recourse to intrigue. But as neither availed him, and he saw himself surrounded by the royal troops and their Irish auxiliaries, while he was deserted by a large portion of his army, he surrendered himself to a body of Scotch who had landed in Ulster, by whom he was assassinated in 1567.

The disputes between the Geraldines and the Butlers still continued; and, in an attempt made by the Earl of Desmond to seize some lands of the latter, he was surrounded, taken prisoner, and sent to England; from which he was sent back to Dublin. His party, in the mean time, rose in rebellion. This induced him to attempt his escape, which he effected; but he deemed it prudent not to join the rebels at first. His intentions, however, being suspected, he was attacked as an enemy, and reduced to the most abject state of misery, so that at length he implored, as an act of mercy, that he might be sent a prisoner to London, but in vain. Under these circumstannes, hope revived in his breast at the intelligence of the arrival of a body of Spanish and Italian forces, with a large quantity of arms. This hope was not of long continuance, for the foreigners were defeated, and being deemed freebooters, were massacred by the command of the lord deputy. The Earl of Desmond was thus compelled to hide himself in the most unsuspected places; but even here he was not safe, for he was discovered by an Irishman, who cut off his head, and brought it to the Earl of Ormond.

Civil wars in all countries are carried on with the utmost violence and cruelty; and in the state in which Ireland was at this time, this civil war, or rebellion, as it is generally styled, was rendered horrible, especially in Munster, by every species of cruelty, the features and effects of which were heightened by famine.

Elizabeth at length directed that sagacity and policy to the affairs of Ireland, which she had too long withheld from them; and, in 1584, Sir John Perrot was appointed lord deputy: for the high and arduous duties of his situation he was amply qualified, both by experience and by talents and disposition. His plan was simple, but could it have been carried into effect, it would have been decisively and permanently advantageous. He first visited those parts of the country which had always been the scene of the most violent disturbances, and this journey having convinced him that the plan which he meditated was well calculated to produce the effects he wished, he resolved, without loss of time, to put it into execution. It consisted in the gradual introduction of the English law, administered with impartiality and steadiness, into all parts of Ireland. This ought to have been done before, but it had not; and Perrot, much to his chagrin and disappointment, soon found that the English government were not disposed to furnish him with the means of doing it now. Besides this source of disappointment, another awaited him, in the proceedings of the parliament, which strenuously set themselves against him, solely because he wished to act according to law, justice, and sound policy, towards the native Irish. Perrot, however, still persevered, and did as much good as he could with his limited means, and under the prejudice and opposition by which he was encountered. To these sources of disquiet others were added, for disturbances broke out in Connaught and Ulster; but such was the influence of his character, that, before his departure, the suspected Irish chieftains obeyed his summons, and gave hostages for their fidelity; and his successor, Fitzwilliam, found Ireland tranquil when he assumed the government.

That it should remain so was a matter of serious moment to Elizabeth, for the Spanish armada was at this time at sea, and the Irish, it might justly be apprehended, would rise up in arms, unless prudently managed, if the Spaniards were even reported to have succeeded in their object. These considerations, however, did not weigh with Fitzwilliam; on the contrary, by his conduct he exasperated even those Irish chieftains who were well disposed to the English.

The disaffected chieftains gladly seized the opportunity which this mal-administration presented, of forwarding their views. At the head of them, in the north, was Hugh O'Neil, than whom few persons were better qualified, at once to rouse and direct the Irish, and to offer a steady and dangerous opposition to the English. But though his designs had been long formed, yet he contrived, by his caution, and apparent devotion to the English cause, to elude their suspicions; and when they were raised, to remove them, more than once, before circumstances in a manner forced him to undisguised rebellion. Before this event took place, disturbances broke out in Connaught, headed by one O'Donnel, a Scotch adventurer, which distracted the attention, and divided the forces of the English. O'Neil carried his dissimulation so far as even to attack O'Donnel; and though he relied greatly on some Spanish forces which he knew were to be sent into Ireland, yet he also sent the letter announcing the promise of these forces from the Spanish king to the Lord Deputy and council. But while he was thus, to all appearance, acting the part of a loyal subject, he was exerting all his endeavours to render his rebellion, when he should deem it prudent, or be forced to engage in it, more formidable and general.

As his character and schemes were known, though the behaviour of the English government towards him was not so decided and firm as it ought to have been with this knowledge, it was deemed proper to send a new deputy. Thomas Lord Burgh was appointed to this situation. His actions displayed immediately his just sense of the state of Ireland, and of the real views of O'Neil; without loss of time, he attacked him him in his strong camp near Armagh, drove him from it, and afterwards defeated him a second time. Unfortunately De Burgh died in the midst of his victories, and O'Neil took advantage of this and other circumstances, and managed with so much adroitness, as to obtain from the queen a pardon under the great seal.

He sought, however, only a breathing time; and having, during this, recruited his forces, he again took up arms. His first engagement being successful, the royal army being routed, and the fort of Blackwater having surrendered, nearly the whole of Ireland, encouraged by these events, burst into open rebellion. Elizabeth was at last alarmed; but, unfortunately, her partiality for Essex induced her to send him over as lord lieutenant. But he was not equal to his situation; so that while the royal forces in different parts were defeated by the rebels, Essex himself was so completely deceived by O'Neil, as to grant him a truce for six weeks. Soon afterwards Essex left Ireland, and O'Neil renewed the war, having called in the powerful aid of religion to extend and support his cause.

Blunt, Lord Mountjoy, was next appointed to cope with O'Neil, who at first affected to despise him on account of his character for literature; but Blunt soon convinced him, that sagacity was more than a match for cunning; and by his rapid and successful movements so disconcerted O'Neil, and lowered him in the opinion of his confederates, that they began to exhibit symptoms of declining zeal and confidence.

The south of Ireland was, at the same time, the scene of nearly equally judicious and successful measures, adopted and pursued by Sir George Carew, who commanded the Queen's forces there. Sensible that he could not act with any prospect of success against the united Irish chieftains, and well acquainted with their jealousies and suspicions of one another, he turned these jealousies and suspicions to his own advantage; and having thus disunited the enemy, he carried on his military operations with vigour and success.

Hitherto the King of Spain had withheld the assistance which he had promised; but, at length, in September 1601, about 6000 men landed at Kinsale. Against these Blunt marched, and blocked them up in that town. As soon as the landing of the Spaniards was known to the rebel chiefs, O'Donnel moved to join them from Connaught and Leinster, and O'Neil from the north. Thus the fate of Ireland seemed to be brought to a point: on the one hand were the forces of the Spaniards, which had been augmented by 2000 men, and the armies of O'Donnel and O'Neil; on the other were the forces of the Queen, under the Deputy. O'Donnel, with the Spaniards that had last landed, and O'Neil with his troops, took up such a position as to cut off the Deputy's forces on the land side, while by sea their supplies were very irregular and insufficient. The consequence was, that the royal army was gradually reduced in numbers and spirit, and must have fallen before the continued blockade of its enemies; but they were divided in opinion, and O'Neil reluctantly gave way to the opinion of those who advised an attack. As soon as Blunt saw them advance, he also left his entrenchments; and while Carew, with part of the forces, continued the siege, he himself, with only 1200 infantry and 400 cavalry, resolved to meet the enemy, who were very far superior in numbers. On this occasion, the advantage of talent over mere personal bravery was evident. The Irish, first intimidated by the boldness of the measure adopted by Blunt, and afterwards perplexed by his judicious disposition of his forces, displayed symptoms of indecision. Of these Blunt immediately took advantage, and the enemy were defeated in a very short time, and with very little loss on the part of Blunt. The effects of this victory were most important: Kinsale surrendered; O'Neil was deserted by his allies and troops, and he himself submitted, almost at the very moment of the Queen's death. Thus Elizabeth lived just long enough to effect the subjugation of Ireland, a measure which had been attempted in vain by her predecessors.

In the reign of James I. there were some disturbances in Ireland, partly of a political and partly of a religious nature; but they were so uninteresting, and so unimportant in their consequences, that we shall pass them by, and advert only to such measures and transactions as relate to the internal policy of this country. Before Blunt left Ireland, he freed the Irish peasantry from the tyranny of their chiefs, and ordered them to be considered and treated as the immediate vassals of the crown. His successors seem to have been animated with the same spirit of conciliation, and to have imbibed his views; and, fortunately, James either approved, or at least did not oppose their measures: circuit judges were appointed; the law was administered with impartiality; the right to landed property was rendered more secure, and more conformable to justice; such lands as were held under the great lords had a fixed rent put upon them; and, in the distribution of lands, proper attention was paid to the support of the church. Free schools were endowed in the principal towns, and the university of Dublin received large grants of lands.

The English government next turned its attention to the colonization of the immense possessions which were forfeited; nearly 800,000 acres were in this predicament in the north of Ireland; and these it was resolved to settle with such people, and in such a manner, as might render the colonization beneficial both to the settlers themselves and to the Irish. As this desire was sincere, and as the plan was thoroughly digested by able and impartial men, the object was accomplished in a much greater degree than might have been anticipated.

In 1613, the first national parliament was held in Ireland. Their first proceedings were tumultuous; but afterwards they conducted themselves with more decorum, and their acts were wise and beneficial. O'Neil, who had again embarked in treasonable designs, but afterwards fled to the continent—the Earl of Tyrconnel, who had joined him—and O'Dogherty, who had been concerned in an insurrection, were attainted; amnesty and pardon were granted to all others. The measures of the king to abolish the distinctions between the English by birth, and the English by blood, and to place the native Irish under the protection of the law, were approved by the legislature; and the session was closed by a bill of subsidy.

Notwithstanding these judicious measures, and the apparent tranquillity of Ireland, there still existed serious causes of disaffection; but these had now assumed a religious character. The Reformation had made little progress—the great portion of the nobility, and nearly all the lower orders, were still attached to the Catholic religion; and as they were cut off from the possession of offices by their refusal to take the oath of supremacy, there were thus implanted in them two weighty reasons of discontent—difference of religion, and the disabilities which this occasioned. But, as they were sensible of their own numbers and power, they openly urged their claims and wishes, and opposed the measures of the Protestants. From this source had arisen the tumultuous proceedings of the parliament when it first opened; and the disposition displayed by the recusants (as they were called) to make demands in religious matters, caused its unexpected dissolution. The pope naturally approved and supported the measures of the recusants; and, in order that they might hold together, and act with decision, he appointed a regular hierarchy throughout the kingdom, all the members of which met with as much respect and obedience as they had received when the Catholic was the established religion.

Such was the state of Ireland when Charles I. ascended the throne. In 1633, that monarch appointed Wentworth lord-lieutenant. He entered upon his office with notions that were by no means calculated to render him popular, or to benefit Ireland; for he carried his ideas of the right of conquest to the utmost extreme; and acted on these ideas, both in his general administration of the country, and in his treatment of individuals. He seems, however, in some respects to have benefited Ireland; for though he discouraged the woollen manufacture, because it might injure that manufacture in England, yet he gave his countenance to the establishment of a linen manufacture in Ulster. In 1640, Wentworth left Ireland, to assist his royal master in the difficulties and troubles in which he was involved, having previously, as he thought, proved and secured the loyalty of the Irish parliament. As soon, however, as they found that Charles was involved in a war with Scotland, and that the English parliament were rising in their demands from him, they forgot their protestations and promises, and directed a remonstrance to be sent to the king regarding the grievances they had suffered from Wentworth. This remonstrance, instead of being presented to his majesty, was communicated to the English House of Commons, who naturally fomented and encouraged the discontents of the Irish. The king, under these circumstances, was obliged to yield, and to agree that most of the grievances complained of should be removed. This concession only stimulated to fresh demands; and, to render these demands more imperative, the recusants and puritans, who formed the majority of the parliament, united.

It is not to be supposed that the Irish chieftains were inactive during this state of things; on the contrary, they used their utmost endeavours to persuade the people, that the moment was arrived when they might shake off the English yoke. The most active and enterprising person on this occasion was Roger Moore: He was descended from a family once powerful, but now reduced, in the Queen's county; and though not of native Irish descent, yet he contrived to ingratiate himself so thoroughly with the native Irish, that he was the subject of their most popular songs. His address was insinuating—his manners, when he chose, and deemed it necessary or politic, highly polished—and his judgment cool and penetrating. With him were associated several men, greatly his inferiors in every respect, but whom he well knew how to employ as useful instruments for his purposes.

The levying of troops for the Spanish service had been very injudiciously permitted in Ireland: These troops were kept in the country by the contrivance of Moore and his associates, who also increased their numbers. Upon these Moore mainly depended for setting the rebellion in motion; and he trusted that his measures were so well taken, that, when once set in motion, it would spread rapidly over the whole kingdom. Their first object was the seizure of Dublin castle; and, for this purpose, on the 22d of October 1641, he and his associates assembled in the capital, with an intention the next day to attempt the seizure; but on the previous evening the plot was discovered to the lords justices. This part of the scheme of Moore was of course frustrated; but his associates in Ulster rose in such strength, and so simultaneously, that in the course of a very few days they were in possession of nearly the whole of this part of Ireland. The Protestants, alarmed, and completely taken by surprise, fled to their strong places. As soon, however, as they had digested their plans, and recovered from their alarm, they marched out against the insurgents, whom they defeated and checked in many parts. This served only to enrage them, and the hostilities they carried on soon began to assume all the horrors of civil war, such as it is always waged where religious bigotry sharpens the edge of political hatred, and where they both act on savage and barbarous dispositions. The most cruel and unheard of massacres were committed by the rebels; nor was the conduct of their opponents unstained by acts nearly as atrocious.

Charles was totally unable to subdue the insurrection, and the English parliament did not deem it politic immediately to quell it. Hitherto the Catholics of the pale had refused to join the insurgents; but, being left unprotected, and thus exposed to their ravages and contributions, they wavered in their allegiance, and were at length decided in their resolution to join them, in consequence of a victory they obtained over the royal forces near Drogheda. Had the administration of Ireland, at this period, been conducted by men sincere in their attachment to government, and of moderate capacity and activity, the rebellion might have been quelled, even after it had spread thus far, and taken such deep root; but neither the civil nor the military measures of the lords justices were of such a nature as the exigencies of the times required. The force which they possessed was weakened, and rendered of little effect, by petty and insulated attacks on the subordinate and distant forces of the rebels, instead of being brought to bear, in one body, on their most vulnerable points. The soldiers were thus harassed and dispirited, while Moore and his associates gained strength and spirits daily. Even Dublin was threatened by them; and it is probable that they might have taken it, if they had not delayed their march, and laid siege to Drogheda. Against this place they were unsuccessful, in consequence of the approach of Ormond, who would have prosecuted his success had he been allowed by the lords justices.

As soon as the Catholics of the pale received intelligence of the success of Ormond, they offered to desert the cause of the rebels, which they had reluctantly joined, and to which they had never been sincerely attached; but they were not received by the lords justices as sincere in their wishes. On the contrary, they were prosecuted with the utmost violence, it is supposed with a view to render the forfeiture of lands more extensive; and in this plan they were encouraged by the English House of Commons, who looked forward to the sale of the forfeited lands, as the means of enabling them to prosecute the war against the king. Thus driven to despair, the Catholics of the pale were forced to violent measures; and, having formed an army of 8000 foot, and some troops of horse, they attacked Ormond near Kilrush; but though superior, they were not able to make any impression on his better disciplined troops, and the contest ended in their precipitate retreat.

This defeat saved the city of Cork, which had been besieged by the insurgents of Munster; for, during the dismay which it occasioned, being attacked by the garrison, they also were routed. The consequences of these defeats of the rebels, however, were not nearly so advantageous as they might have been, if the royal armies had been properly supported. The rebels also, about this period, were still further excited against the English by the fanaticism of Hugh Peters, who accompanied Lord Forbes, a general appointed by the parliament.

The English House of Commons at last became sensible of the necessity of taking vigorous measures for the reduction of the rebels; and accordingly they concluded a treaty with the Scotch parliament, by which the latter agreed to send 10,000 men into Ulster; but these troops were more active in plundering the country, and exporting the cattle to Scotland, than in pursuing the rebels. The English forces, therefore, in this part of Ireland, were obliged to trust entirely to their own unassisted efforts, the first success of which seemed to open up the prospect of more permanent and decisive advantages, when the arrival of Owen O'Neil from Dunkirk, with 100 officers, and a large supply of arms and ammunition, directed their attention to the necessity of checking him. In this enterprise they were again disappointed, in not being assisted by the Scotch, though the Earl of Leven, their commander, was now at the head of 20,000 foot and 1000 cavalry; but, instead of acting, he contented himself with sending a message to O'Neil, and soon afterwards embarked for Scotland.

This inactivity on the part of their opponents, joined to the arrival of supplies from France, gave great confidence to the rebels, who now prepared to give consistency and colour to their proceedings, by the holding of a national convention. This accordingly met at Kilkenny, in October 1642. It consisted of the Catholic lords and clergy, besides deputies from the counties and towns in each province. By them were chosen 24 persons, who were styled the Supreme Council of the Confederate Catholics of Ireland. To this council the conduct of the war, and the choice and command of all officers, civil and military, were committed.

The convention professed themselves faithful to the king, but they denied the authority of his Irish government. The rights of the Catholic church were to be supported; and the law of England, so far as it did not contravene those rights, was, in conjunction with the statutes of Ireland, to form the guide of their public conduct. Generals were immediately appointed for the conduct of the war; but among these were not included Moore, or the other original leaders of the insurrection.

Opposed to this union of the Catholics, the loyal party, as they were styled, would have been weak, even if they had not been divided; but, in consequence of the contests between the king and his parliament, they were split into two parties. The lords justices, and those whom they influenced, adhered to the cause of the parliament; whereas Ormond, and the greatest part of the army, were royalists. These hoped that the insurgents might be induced to cooperate with them; and they were, indeed, so disposed.; but the lords justices had hiterto prevented their petition from reaching the king. Ormond at last interfered; their petition was laid before the king, and a commission was appointed to confer with the principal insurgents, and transmit their proposals. Charles was urged to this step, from the hope, that if he could gain them over, he might draw a large force from Ireland in support of his cause; while the parliament, on the other hand, were as anxious to prolong the disturbed state of that country. To effect this object any longer by intrigue, the lords justices now found would be impossible; they therefore agreed to permit Ormond (who, while the negociation with the insurgents was pending, deemed it proper still to act against them,) to attempt the reduction of Ross and Wexford, after having in vain endeavoured to place one of their own party at the head of his army. Ormond immediately laid siege to Ross, but was repulsed in an assault; and the supplies of provisions which the justices had promised not arriving, he was compelled to raise it. He was now in a perilous situation, and, had the enemy kept possession of a defile in which they were posted, his ruin would have been certain and complete; but they left it, and Ormond, attacking them with impetuosity, defeated them, and effected his escape. His victory would have been more complete, if he had not been abandoned by the English cavalry under Lord Lisle.

After much delay and many difficulties, the negociation with the insurgents was brought to a favourable issue. On the 15th of September a treaty was signed, by which the confederates stipulated for the payment of 30,000*l.* to the king, partly in money and partly in provisions. Immediately on the conclusion of this treaty, upwards of 2000 of Ormond's soldiers were sent to England to assist the king; but the confederates, though they had professed their attachment to him, sent him no assistance.

At this period Ireland was in a very unsettled and divided state; the confederates attended more to their own plans and interests than to those of the king, by whom Ormond had been appointed lord lieutenant. In the north, the partizans of the parliament were most numerous; and Munroe, who commanded there, received a commission under the seal of the parliament, by which he was constituted commander of all the forces in Ulster, both Scotch and English, and ordered to carry on the war against all those who refused to subscribe the solemn league and covenant. Immediately on the receipt of this commission, he surprised Belfast, and endeavoured, though without success, to take Lisburne also.

In the mean time, the Irish confederates resolved to take advantage of the misfortunes of the king. Accordingly, during a negociation at Oxford, they proposed terms, which, if complied with, would in fact have put an end to the English power in Ireland; but Charles, though now reduced to great distress, refused to accede to them. The negociation was protracted till the year 1645, when two treaties were entered into; one secret, under the management of the Earl of Glamorgan, and the other open, under the management of the Earl of Ormond. By the former, with which Ormond was not acquainted, the royal word was engaged by Glamorgan for the re-establishment of the

Catholic religion and the papal authority; while, by the latter, the civil and political demands of the confederates were settled. The general assembly, on their part, passed a resolution, that 10,000 men should be raised for the service of the king. But these conditions were nearly rendered void, by the arrival and interference of the Pope's Nuncio, who protested against the treaty of Glamorgan, because it did not go far enough in favour of the Catholics, and because it was to be kept secret: and he prevailed on that nobleman to sign additional articles, to the effect that Catholic bishops should sit in parliament; that only a Catholic should be appointed lord lieutenant; and that the supreme council should continue its authority till the whole treaty was complied with.

In the mean time, the English parliament supplied the Protestant forces in Ulster with money; and one of their partizans having prevailed on them to advance into Connaught, they took possession of Sligo. To retake this place the Archbishop of Tuam and Sir James Dillon marched by order of the confederates; but being defeated by the parliamentarians, in the archbishop's baggage, which was taken, was found a copy of Glamorgan's original treaty with the confederates, and also of his commission and of his oath. These papers being sent to the English parliament, were immediately published, and injured the cause of the king very much in the minds of all those who had hitherto supported him, in the belief that he was not disposed to restore the Catholic religion. The ministers of Charles, in order to wipe off this impression, arrested Glamorgan, who confessed that he had acted without particular instructions, and solely on his own judgment, in order to benefit the king. It is difficult to ascertain the truth respecting this transaction; the probability is, that Glamorgan acted rather on his idea of what the king would accede to, and what would be advantageous to him, than on any express orders or directions.

As, however, Glamorgan was arrested for his part in the treaty, the confederates were alarmed and indignant; but at length were persuaded to renew the negociation; and on the 28th of May 1646, it was brought to an amicable termination. On the part of the king, he bound himself to grant toleration to the Catholics, and the confederates on their part engaged to transport 6000 well appointed infantry, and if they were not sent at the time specified, the treaty was to be void. But the aid thus at last obtained came too late; the affairs of the king were irretrievably ruined. Finding that it would be useless to send the forces into England, it became a matter of deliberation in what manner, and in what part, they should be employed in Ireland; but Ormond refused to act till his treaty should be published, and that with Glamorgan cancelled. This was accordingly done; but it soon appeared that the peace which this treaty concluded was acceptable to neither of the parties who were most interested in it, and on whose good will to it, it depended mainly for its efficacy. The Covenanters in the north, and the Parliamentarians in the south of Ireland, were determined, if possible, to root out popery; and the most numerous party, as well as the most active and powerful of the Catholics, were as determined to use all their efforts to extirpate heresy. To these the pope's Nuncio attached himself; and Owen O'Neil was appointed by him the commander of what were called the Nuncio's soldiers: these consisted of a desperate banditti; and this circumstance, as well as the extravagant views of the Nuncio, alarmed the more considerate of the confederates, and they actually commanded an armed opposition against the troops of O'Neil, on account of the irregularities which they committed in Leinster.

As soon as O'Neil had collected about 5000 infantry, and 500 horse, he advanced towards Armagh, and was followed by Munroe, at the head of the Scotch forces. A battle took place between them, at a place called Benburb, a short distance from this town, which ended in the defeat of Munroe, with the loss of 3000 men, his artillery, and most of his baggage. O'Neil's forces now rapidly increased, and at the head of 10,000 men, he was preparing to reduce Ulster, when he was recalled by the Nuncio, in order to oppose the peace.

The Nuncio, supported by a victorious army, was now more violent than ever in his opposition to the peace, as well as more haughty in his declarations of the pope's authority. Ormond was now seriously alarmed and perplexed; his treaty was slighted by all parties: the Nuncio and O'Neil openly opposed it; the other forces of the confederates under Preston had disbanded themselves for want of pay, and part of them had gone over to the clergy: on the other hand, the troops of the Parliament were still continuing their hostile operations. Under these difficult circumstances, Ormond put himself at the head of 2000 troops, for the purpose of supporting the authority of the supreme council, and enforcing the treaty; but his force was inadequate, especially after the Nuncio had gained over Preston, and Ormond was obliged to seek safety in the capital.

The united troops of Preston and O'Neil lost no time in advancing against Dublin, which was immediately besieged. As Ormond could not expect to defend it long, he was obliged to submit either to the English parliament, or to the Irish generals. He preferred the former alternative; his overtures were accepted; and 2300 men were ordered to march to the immediate relief of the city. In the mean time disputes had arisen between O'Neil and Preston, which probably would have produced a separation, if not mutual hostilities, had not the intelligence of the advance of the parliamentarian forces arrived. In consequence, however, of some difference between their leader and Ormond, they refused to act, and were sent back to Ulster. Ormond was now obliged reluctantly to give his sanction to the attempt which had been previously made to separate Preston from O'Neil; but his suspicions with regard to the former being soon confirmed, he saw himself again reduced to the necessity of submitting to the English parliament. Accordingly, on the 29th of June 1647, a treaty with the parliament was signed. The king's garrisons were to be delivered up to the commissioners of parliament, and the commissioners on their part promised security to such of the recusants as did not engage in rebellion; liberty for all to leave Ireland who chose to accompany Ormond; and the repayment of a large sum which he had expended in the service of the king.

Immediately on the conclusion of the treaty, Jones, the parliamentarian governor of Dublin, marched against Preston; at first he was unsuccessful, but being reinforced, a desperate battle took place at Dunganhill, in which the army of Preston was routed with dreadful slaughter. O'Neil was immediately called to the defence of Leinster by the Nuncio and his party, who rather rejoiced than grieved at the defeat, as it thus rendered O'Neil of more consequence.

In Munster the forces of the parliament were commanded by Lord Inchiquin, and the Catholic army by Lord Taafe. The latter was as anxious to avoid a general battle as the former was to draw it on, and for this purpose, as well as to obtain subsistence to his troops, he reduced the castle of Cahir, and thus opened to himself the fertile plains of Tipperary. He next took Cashel by storm. Taafe was soon obliged to put himself in motion, and to hazard a battle. The two armies met at a place called

Knockoness, and the Catholics were defeated with great slaughter. The state of the confederates, at least of the more moderate part of them, seemed now desperate: their two principal armies under Preston and Taafe had been defeated, and it might be apprehended, that as soon as spring arrived, the army of the parliament would follow up their success to the complete destruction of their cause. Thus situated, a new attempt was made to treat with the King, or rather with the Queen and Prince of Wales, who were at this time in France, while the Nuncio, by his influence, obtained the sending at the same time a deputation to the pope. The Queen promised to send a person in a short time to Ireland; and the moderate confederates were privately assured that this should be Ormond.

This pleasing intelligence was soon followed by the defection of Inchiquin from the Parliament; but as the Nuncio still continued opposed to all moderate measures, the affairs of the confederates were more injured by him than they were benefited by any other circumstance. He even influenced O'Neil so far as to induce him to declare war against the supreme council, and to his army all who were inimical to the peace and to the English flocked. It became therefore necessary to proclaim O'Neil a traitor, which was accordingly done.

In 1648, Ormond arrived: his first object was, if possible, to unite the Protestant and Catholic royalists; and this object was rendered more attainable by two events; in the first place, the return of the Nuncio's commissioners from Rome without supplies, or even promises of assistance; and secondly, the intelligence that the English army had demanded the death of the King. Peace, therefore, was concluded on nearly the same terms as in 1646; all the penal statutes against the Catholics were to be repealed, and they were to be allowed the free exercise of their religion; but the point relative to the establishment of the Catholic religion was left unsettled.

The intelligence of the execution of Charles, which arrived soon afterwards, proved that this treaty could be of no service to the royal cause in England, by enabling Ormond to send Irish forces thither; but in other respects this event, by the indignation which it excited, was beneficial to the royal cause in Ireland. Of this indignation, Ormond resolved to take advantage without loss of time. The governor of Dublin was, however, firmly attached to the parliament, and Sir Charles Coote, who occupied Derry, returned no answer to Ormond's offers. On the other hand, the British forces in Ulster declared for the royalists, and blockaded Coote. Ormond soon found, however, that he could not take advantage of the favourable change of circumstances, without a supply of money to support his troops; and this he could not obtain; the confederate Catholics could not raise it, and Prince Rupert, who had come to Ireland for the express purpose of aiding Ormond, not only refused to supply him with money, but even embarrassed his plans.

Jones, the governor of Dublin, a man of penetration, intrigue, and activity, was not, in the mean time, idle; he even endeavoured, and not without success, to detach O'Neil, and carried his intrigues into the very heart of Preston's army. Ormond, though disappointed in many of his expectations, was convinced that if he was inactive, or discovered his disappointment, he would injure the royal cause; he therefore put his troops in motion, and being sensible of the effect which would be produced on all parties by gaining possession of the capital, he took advantage of Jones having marched to some distance from it, and laid siege to it. He had some expectation that on his approach, such of the inhabitants as were royalists would discover themselves, and raise a disturbance in the city; but this not being the case, he deemed it prudent to encamp at Finglass, two miles from it. While there, he dispatched Inchiquin to Drogheda, whither Jones had sent his cavalry for the purpose of intercepting the supplies of the besiegers. Inchiquin on this occasion being anxious to shew his sincerity and zeal in the cause to which he had come over, exerted all his talents and activity; he surprized the cavalry of Jones; took Drogheda; defeated some parliamentary troops which were conveying ammunition to O'Neil; reduced Dundalk, and then returned safely to Ormond.

Ormond now pressed the siege of Dublin with hopes of its speedy surrender; but these hopes were utterly dissipated by the arrival from England of a reinforcement to the garrison of 2000 infantry and 600 cavalry, and the intelligence that Cromwell was about to land in the south of Ireland. Much difference of opinion existed in a council of war summoned on this occasion. Inchiquin was sent into the south with part of the forces; but in what manner to carry on the siege with diminished forces, was a matter of serious consideration, and no small difficulty. At length it was resolved to seize the castle of Baggatrath, by which means the enemy's cavalry would be excluded from their only pastures, and means might be taken to stop up the port of Dublin.

For this purpose a detachment was sent off, but it was led astray by the treachery of the guide; and Ormond found himself under the necessity of hazarding an engagement. Before, however, he had commenced the attack, his army was itself suddenly attacked, and thrown into utter confusion, by Jones. Eighteen hundred prisoners were taken, and 600 men were slain, Ormond himself retiring to Kilkenny with the remains of his army.

As some counterbalance to this misfortune he received overtures from O'Neil, which being accepted, and that leader having joined him with 6000 foot and 500 cavalry, Ormond resolved to make another attempt against the capital. Scarcely, however, had he formed this plan, when he learned that Cromwell had landed in Dublin, with 8000 infantry, 4000 cavalry, a formidable train of artillery, and every thing else necessary to carry on the war with vigour, promptitude and effect. The first effort of Cromwell was the reduction of Drogheda; in it Ormond placed a chosen garrison of upwards of 2000 men, commanded by a Catholic, on whose bravery and skill he placed the utmost confidence. As it was the grand purpose of Cromwell to strike terror into his opponents by the boldness and rapidity of his operations, he issued orders to take the town by assault, and though the garrison resisted with the most determined bravery, and twice repulsed the assailants, yet they could not stand the third attack, at the head of which Cromwell placed himself. The town was taken by storm, and the garrison and Roman Catholic priests found in it, were put to the sword. Losing no time in reaping the advantages of success and of the dismay which it had created, he took Trim and Dundalk without opposition; and while he himself marched towards the south, the whole of the north, except the castle of Carrickfergus, submitted to his authority.

Cromwell having reduced Wexford, notwithstanding Ormond had thrown a garrison into it, pursued that general, who had retired to Ross, and afterwards having crossed the Barrow, compelled him to retreat further to Kilkenny. Indeed Ormond, unless reinforced, was utterly incapable of standing against Cromwell; and the only source from which he could look for reinforcements was by an agreement with O'Neil. This general was himself dangerously ill; but having come to an accommodation with Ormond, he sent his army, consisting of a very large body of troops, to join him. Ormond immediately resolved to give battle to

Cromwell, but the latter had proceeded to Waterford, which he was besieging. Into this place Ormond threw reinforcements, but a detachment from his army having failed in their attempt to reduce Carrick on the Suir, he did not deem it prudent to attack Cromwell.

Having received intelligence, however, from the inhabitants at Waterford, that they could no longer hold out, he resolved, at all hazards, to attempt their relief; and he succeeded in throwing in a second reinforcement, and in obliging Cromwell to raise the siege. Had he been supplied by the inhabitants with boats, and thus enabled to cross the river, he would have pursued Cromwell; but not only were these refused him, but his request that his soldiers should be permitted to lodge in huts under the walls was rejected; and it was even proposed to seize his person. This extraordinary display of ingratitude arose from the influence of some bigotted and ignorant priests in Waterford, aided and fostered by the Marquis of Antrim, who wished to supplant Ormond in the chief governorship.

Cromwell, on his retreat from Waterford, took up his winter quarters in Munster; the principal garrison in this province having declared in his favour, in consequence of the insults they received from the Catholics. Ormond, not supposing that his opponent would leave these quarters till the spring, had dispersed his troops in various places; but as soon as Cromwell learned this, he suddenly advanced, in the depth of winter, and laid seige to Kilkenny, which most probably he would not have reduced, had it not been for the treachery of the mayor and citizens. His next object was Clonmell. This place was garrisoned by 1200 troops under Hugh O'Neil; and such was their intrepidity, that in his first assault Cromwell lost 2000 men. This obliged him to commence a blockade; and O'Neil, after a siege of two months, being exhausted of his provisions and ammunition, and yet unwilling to surrender, contrived to withdraw his troops, with which he arrived safe at Waterford.

In consequence of the Scotch having embraced the cause of Charles II. Cromwell judged it expedient to return to England, having previously placed Ireton in the command of the army which was to act against Ormond and the Irish confederates. But there was now little to do; the greater part of Ireland was subdued: Cromwell had been very successful in the south, and, after his departure, Carlow, Waterford, and other places of importance, were surrendered. Limerick, too strong to be taken by assault, or even by a regular seige, till Ireton was reinforced, was blockaded. In the north, Coote had reduced Carrickfergus. To the junction of the forces of this general, and of Ireton, for the purpose of subduing the western counties, there was now no impediment, and for this purpose they both marched towards Athlone, while Ormond, with the few troops he could collect, directed his march to the Shannon, to prevent the enemy from passing that river.

The cause of the confederates, bad as it was rendered by the success of Cromwell, was made still worse by their own violence, opposition to Ormond, and want of plans and unanimity among themselves. Ormond and the royalists wished merely to support the king's cause; many of the confederates went rather farther than this; and the Catholic clergy made no scruple in avowing that they still indulged the idea of establishing their own religion, under the protection of a foreign prince. Even the inhabitants of Limerick, though sensible of the dangers with which they were threatened, refused to admit 1800 men, with which Ormond proposed to reinforce the garrison. An attempt was indeed made to arrange matters in such a manner that Ormond might act with effect in favour of the royal cause; but these attempts having been rendered of no avail by the intrigues of the violent Catholics, Ormond, unable to keep his army on the Shannon, destitute as it was of support or supplies from the inhabitants, and even apprehensive for his own safety, resolved to leave Ireland. But this resolution he changed when the Catholic clergy required him to repair to the King, declaring that now he would not quit the kingdom unless forced to it. This declaration produced formal articles against him, in which he was accused of being an enemy to the Catholic religion; and, as such, the people were enjoined not to obey his orders, but only those of an assembly of the clergy; a sentence of excommucation was at the same time passed against all who should adhere to him, or pay him subsidy or obedience. These violent measures of the clergy were rendered still more so, by a declaration made by the king, in order to please the Scotch, in which he expressed his abhorrence of popery, and pronounced the treaty with the Catholics of Ireland void. Ormond's sole hope was now placed in the Commissioners of Trust, who had the management of the civil affairs of the king; but when they deserted him, by declining to take decisive measures, and passing over the violence of the clergy, he determined to leave the kingdom. This he accordingly did, after having appointed Clanricard his deputy. As the confederates had now gained their object, by having a Catholic governor, and as the army was wholly Catholic, it was supposed that all causes of discontent and disunion would be removed; but so far from this being the case, the clergy, still anxious to raise their own power, secretly intrigued against Clanricard, and actually sought to place a foreign prince on the throne of Ireland. This prince was the Duke of Lorrain, with whom they opened a negociation, which, however, was very prudently broken off by the Duke, when he learned that the republicans were fast advancing in their plan to subjugate the whole country.

It was now determined by Ireton to lay siege to Limerick. In order to defend this important place effectually, Clanricard offered to throw himself into it; but this was refused by the magistrates, and Hugh O'Neil was admitted to take the command of the garrison. The measures he took for the defence of the place, were aided by the approach of winter and the sickness of the republican troops, and probably would have saved it, had not the troops and inhabitants been divided among themselves, and the prevalent party opened the gates to Ireton. This general intended, immediately on the surrender of Limerick, to have besieged Galway; but he was taken off by a pestilence which then raged, and was succeeded in the command by Ludlow. The death of Ireton at first inspirited the inhabitants of Galway; but the fate of this place was decided, like that of Limerick, by internal disputes, and it was surrendered without any opposition. Clanricard upon this fled from the south into the north of Ireland, where at first he met with some slight success, but at length being obliged to capitulate, he was permitted to transport himself and his troops to any foreign country which was not at war with England.

Soon afterwards, Fleetwood arrived in Ireland, as commander-in-chief of the forces; but in this capacity he had little or nothing to do, the whole country having been subdued, or intimidated into submission. Executions and forfeitures now commenced, and both were carried to an excessive degree.

In 1654, Cromwell, having become Protector, sent his son Henry into Ireland to examine into the state of affairs, and at the same time ordered that thirty members of the new parliament, which he called, should be chosen from this country. The conduct of his son was judicious and humane; abuses were reformed in the administration of justice, and in the general policy of the country, so that the Irish generally seemed desirous of supporting Cromwell, and were in fact, during the remainder of his life, more quiet and contented with his rule than the people of Britain.

On the death of Cromwell, when the restoration of Charles II. seemed probable, the royalists in Ireland began to resume their intrigues, in which they were so successful, that in a short time they made themselves masters of the castle of Dublin, Athlone, Limerick, Drogheda, and in fact nearly the whole kingdom, and Charles was proclaimed in all the great towns.

While the royalists were thus advancing their own interest, and that of the king, the old Irish Catholics, as usual, were indulging in proceedings and schemes the most violent and outrageous; these were represented to his majesty as in fact rebellious; and the consequence was, that Charles, on his arrival in London, issued a proclamation commanding a prosecution of all Irish rebels. The settlement of the lands was the next object of the king; and a declaration for this purpose was issued in May 1659. The great end in view, was the compensation of all the innocent and meritorious Irish; but, in doing this, it was necessary to preserve to the soldiers such lands as had been allotted to them. The persons ordered to be first restored were innocent Protestants or Catholics, to whom no lands had been assigned in Connaught; next the innocent who had taken decrees for such lands; then those who had been dispossessed by the two first classes were to receive their reprisals, as it was called; and, lastly, those Irish were to be restored who claimed the benefit of the peace of 1648, or who had served abroad under the king. Such lands as might remain after these grants, were to be given as a recompense to those who had supplied, previously to 1649, arms, provisions, &c. Three new lords justices were appointed. Charles's next step related to the church; the four archbishops, and 12 bishoprics, were filled with some of the most eminent clergy, which was a prelude to the regular and full re-establishment of Episcopacy.

It was in vain, however, that the king expected, by these measures, to satisfy all parties, or to restore unanimity and satisfaction to a country which had been so long the prey of discord and discontent. The settlement of the lands was displeasing to almost all classes; and the interests of the old Irish Catholics, the other Catholics, the Protestant royalists, and the Puritans, were so much at variance, that the discontents arising from the settlement were much extended and deepened.

In vain a parliament was summoned, to sanction by their vote the proceedings of the king; in the Commons, the majority was returned by those who were adverse to the Catholics, as they possessed the greatest parts of the land, and the whole interest in the corporations. The Catholics had no members, and little influence in it; and it was even proposed that a law should be passed to exclude them. But the Commons, not being able to carry this law, they endeavoured to raise alarms of conspiracies; but here also they were disappointed. There was also a difference of opinion between the two houses regarding the settlement; the Commons wished to pass it into a law without any alterations, whereas the Lords wished to make such alterations as justice seemed to demand. As the king would of course decide those differences of opinion, the various parties sent agents to London. It was now that the Catholics felt the consequences of their former violent and disloyal conduct; proofs of all their proceedings were laid before the king, who, from these, was convinced that they had tendered the sovereignty of Ireland to the Pope; and, if he declined it, to any other Catholic prince. Orders were immediately issued, that no further petition should be received from the Catholics of Ireland.

Ormond, on the contrary, was rewarded by being appointed lord-lieutenant, by a present of £30,000 from the Irish parliament, and by his son being called to the House of Peers. Another source of discontent now arose: the execution of the act of settlement, though it was intrusted to English commissioners, unconnected with Irish interests, was said to be performed in a partial and unjust manner; and the discontents thus originating were carried so far as to produce several conspiracies, one of which had for its object the seizure of Dublin castle; they were all however frustrated.

In 1665, a bill of explanation of the act of settlement was brought into parliament; but it was not without a great deal of difficulty and management, that, even with this bill, Ormond could obtain the passing the act of settlement; and that only on the assurance, that whatever was objectionable in it should be removed by the discretionary power which was vested in the governor and council.

Narrow and short sighted views on political economy, acting in unison with the opinion that Ireland, as a conquered country, ought in every respect to be sacrificed to England, gave rise to an act prohibiting the importation of Irish cattle into England. As some counterbalance to this unjust and impolitic measure, Ormond gave every encouragement to Irish manufactures, especially to the revival of that of linen, which had been established by Wentworth.

The conduct of Ormond, through the whole period of his command, and after he became lord-lieutenant, had been marked by wisdom, moderation, and justice; but though thus distinguished, and though his attachment to the royal cause was undoubted, he could not escape from the intrigues and machinations of that junto in England, known by the name of the cabal. He was obnoxious to them on those very accounts which made him the favourite of every real friend of his country; their schemes against him were deeply laid, and at last they succeeded in bringing him into disgrace with the king. The charges against him were examined before the privy council; but they were so evidently unfounded, that Charles restored him to the government of Ireland, in which he continued, in spite of the intrigues which were still carried on against him, the difficulty of keeping the Catholics quiet, and other circumstances, which would have puzzled, and probably been the ruin of a man possessed of less firmness, circumspection, and honesty, than Ormond, till James II. ascended the throne.

Two lords-justices were appointed to succeed Ormond, and it soon became evident that their situation would be surrounded by difficulty and danger. The Catholics, exulting in the known character and principles of James, were extremely violent in their language and measures, while the Protestants found themselves exposed to their rancour, in consequence of an order from the king, that the militia, who were all of this persuasion, should be disarmed, under the pretence that they might favour the rebellion of Monmouth. The apprehensions of the Protestants were but too well founded; they were haunted every where, and upon every occasion, by informers; the most absurd and impolitic accusations were brought against them, and their lives were thus rendered miserable from continued apprehension.

The designs of James to subvert the Protestant religion added to their alarms, while they whetted the bigotry and persecuting spirit of the Catholics. Their designs could no longer be doubted. Three Protestant judges were removed, and three Irish Catholics raised to the bench, who, as well as some Catholic lawyers, were admitted into the privy council. The revenues of all the sees that became vacant, were set apart for the maintenance of Catholic bishops; and all the priests of that religion were directed to appear publicly in the dress of their order. In further proof of James's views and principles, Tyrconnel was appointed lord lieutenant, a man who professed the most devoted attachment to the Catholic religion, but whose conduct was profligate in the extreme, as well as tyrannical and brutal. Tyrconnel lost no time in taking such measures as he thought would ruin the Protestants, and re-establish the Catholic religion in all its pristine glory and power. And his measures were not concealed, irresolute, or half executed; on the contrary, they were bold, open, and to the point, evidently conceived and executed with a thorough knowledge that they were such as the King not merely approved, but was determined to carry through. The charters were taken from several corporations, and new ones given, in which the members were to consist of two-thirds Catholics. Attempts were made to deprive Dublin of its charter, and to introduce Catholics as professors into the university; but these failed.

In the midst of these measures, and of the alarm and misery which they created in Ireland, news arrived of the deposition of James, and the arrival of William in England. The joy which this created in the Protestants was suddenly and completely damped, by information that a general massacre of the Protestants was planned, and about to be executed. The utmost consternation immediately prevailed. The flight of the Protestants was almost general; their only hope of safety seemed to be by leaving Ireland; and the coasts opposite to England were almost literally lined with the fugitives. In the north of Ireland alone, being more numerous, they resolved on defence, and for this purpose took refuge in Londonderry.

The citizens of this place participated in the general alarm; and when they heard that the Earl of Antrim's regiment, composed entirely of Catholics, was marching towards Londonderry, they naturally supposed that the crisis of their fate was at hand. Under this impression, they were filled with dismay, and utterly at a loss how to act, when the enthusiasm of a few youths determined them to oppose the entry of these troops; nor did they admit them, till they were convinced that their intentions were not what they apprehended, and on conditions which tney themselves proposed.

As soon as the alarm of the assassination had subsided, and it was ascertained that it was destitute of foundation, the Protestants began to form associations, especially in Ulster; but these were dissolved in a short time, being objected to, and in fact opposed, both by the Protestant and Catholic members of the council.

Almost at the same time that information was received that William meant immediately to send troops and supplies into Ireland, intelligence came that James had landed in Munster with an army. On the 24th of March 1689, he entered Dublin. His promises of protection to the Protestants were rendered very suspicious, by the solemn procession with which the Catholic clergy welcomed him into Dublin, and, in a very short time, were unequivocally proved to be insincere. As the Protestant strength lay chiefly in the north of Ireland, James resolved to direct his march thither. Londonderry was to be first reduced. In this city Lundy commanded, a man suspected of attachment to James, but to whom William, in the midst of his embarrassments, had been obliged to commit this important place. The suspicion that attached to him was too well founded. He refused to defend the town; and had it not been for the skill and intrepidity of George Walker, a clergyman, James would instantly have gained admittance into it. The inhabitants, encouraged by him, resolved to defend the town, and elected Walker, and a Major Baker, their governors. The garrison consisted of 7361 men; but there was not one well mounted cannon, no engineer, no person who possessed any considerable degree of military skill. The fortifications too, originally not strong, were by no means in a good state, the stores were few; and besides the garrison, there were 30,000 people, who could be of little or no use, to maintain. Under such circumstances, they determined to defend their town against James's army, consisting of 20,000 men, well equipped in every respect, prepared for the seige, and led by him in person. It is not to be supposed that Walker and his brave associates were qualified to defend the town according to the rules of military art. They depended solely on zeal, perseverance and courage. Their sallies were frequent, fierce, and destructive to the besiegers; and so confident were they in themselves, that they always kept the gates open, in order that they might sally forth whenever an opportunity occurred; and when James's army battered the walls, they told them that was useless, as they might enter by the gates if they were so disposed.

The prospect of reducing this place, so defended, appeared to James so distant, that after having continued his assaults for eleven days, he returned to Dublin, leaving his forces with orders to continue the siege. From force, there seemed now no chance of gaining the town. The besiegers, therefore, resolved to wait patiently till famine forced it to surrender. Of the approach of this, the inhabitants were not unapprehensive; but they trusted that supplies of forces and provisions would speedily arrive from England; and, in the mean time, the clergy in the town, both of the establishment, and belonging to the dissenters, by daily addressing the people in the cathedral, kept up, and even increased their determination never to yield.

But the period seemed now near at hand, when human nature, however reluctantly, must give way to fatigue, hunger, and disease, united; and the hopes of the inhabitants had almost deserted them, when thirty ships were descried in Loch Foyle, containing arms, ammunition, provisions, and troops. Animation now lighted up every eye, and filled every bosom; but this feeling was soon turned into despair, when the fleet, instead of approaching the town, sailed away. The commander, however, informed them, that he would attempt by another route to send them the necessary articles; but from this intelligence, in their present state of mind, they derived little confidence.

The army of James was commanded by a German of the name of Rosen, a man whose experience in war was great, but who was equally distinguished for his ferocity. Enraged to madness at the defence of the town, he ordered all the Protestants in the neighbourhood to be driven under its walls, where they must have perished, had not James, with more humanity, or perhaps only more policy, directed that they should be released.

The town had been first assailed on the 17th of April. On the 30th of July, three ships were seen in Loch Foyle, part of those which had before appeared there. On these vessels the eyes both of the besiegers and besieged were anxiously fixed. The attempt to approach the town was extremely difficult and hazardous; and the besiegers now did every thing in their power to increase the difficulty and danger. Where the lake narrowed, its shores were lined with batteries, and a boom formed as strong as it could be made, was stretched across this narrow part. This boom consequently must be broken, before the vessels could possibly approach. One of them came near it. All eyes were fixed on the event. Sailing with considerable velocity, she broke the boom. The besieged were almost intoxicated with joy, when the next moment their joy was changed into despair, on observing the vessel on shore, in consequence of the rebound given her in breaking the boom. The next moment, the recoil of her guns, which were fired on the besiegers as they attempted to take possession of her, again set her afloat. The garrison were now relieved from famine; and as on famine alone the besiegers had trusted for success, they immediately retired, having lost 8000 men. Of the 7360 of which the garrison consisted, 4300 survived; but a large proportion of these were incapable of service.

As soon as the Protestants of Enniskillen learnt the issue of the siege, they went in pursuit of the enemy, and not only harassed them, but by their rapid excursions, struck terrror even to the capital. At length three different armies were sent against them. Two of these they defeated, and the third, under the Duke of Berwick, they obliged to retreat.

In the mean time, James in Dublin had assembled a parliament, composed almost entirely of Catholics. The acts of this parliament were by no means calculated to repress the violence of James's adherents, from which indeed his cause suffered as much as from the opposition of the adherents of King William. Among the first acts of this parliament, were the repeal of the act of settlement, and the passing an act of attainder. The last was equally distinguished by its impolicy, injustice, and cruelty. But, indeed, the whole of the proceedings of James were marked by such blind folly as no man could have fallen into, whose intellect was not completely obscured by bigotry, and who had not given himself entirely up to the guidance of men of the most desperate character. It is not possible that he ever could have reflected on the possibility of such measures restoring him to the throne; or how, if restored, he could hope to reign, except these measures were continued, to keep down the hatred which they excited.

The Protestants, exposed to every species of outrage, had long looked for effectual succours from England. At length they arrived under Schomberg and Solmes. From Bangor, in the county of Down, where Schomberg landed, he advanced to Dundalk, taking possession of Belfast, Antrim, Carrickfergus, &c. on his route. His encampment at Dundalk was very injudiciously chosen in a low and damp spot, by which sickness attacked his troops. Against him, thus encamped, the army of James marched, commanded by him in person. The situation of Schomberg, though unhealthy, was strong; so that James, after making a shew of immediate and general attack, retired to Ardee. The people of England having indulged in great hopes from the operations of Schomberg's army, were loud in their expressions of disappointment and indignation, when they learnt that his plan seemed rather defensive than offensive; and William resolved, in order to pacify the people, to go himself into Ireland; and he accordingly landed at Carrickfergus on the 14th of June, 1690.

Having put himself at the head of his forces, the army of James retired before him to the southern side of the Boyne, near Drogheda, where it halted; James, who had joined it from Dublin, declaring his resolution to try the fate of a battle. The hostile armies were nearly equal, that of James consisting of 33,000 men, and that of William of 36,000 men. The army of the former was composed of French and Irish; that of William of Dutch, Danes, and other foreigners, among whom were some Huguenots, and English and Irish; the last were principally Enniskillen Protestants. The position of James's army was strong; but William, after having reconnoitred it, resolved to cross the Boyne and attack him. For this purpose, he formed his army into three divisions, with orders to pass the river in three different places. The right wing crossed early in the morning of the 1st of July without opposition, and, by their manœuvres, soon put to flight those of the enemy with whom they had to contend. The passage of the centre division was not effected so easily; and, after it was effected, the Huguenots were thrown into disorder. To retrieve which, Schomberg put himself at their head, and being taken prisoner, he was accidentally killed by the fire of his own troops. Nearly at the same time fell George Walker, the heroic defender of Londonderry. The object of the King himself, who headed the third division, was, after crossing the river, to take the enemy in flank; but the English cavalry under his immediate command could not withstand the impetuous attack of their opponents, and were forced to give way. In this dilemma, William rode up to the Enniskilleners, and asking them "What they would do for him?" they immediately advanced, charged the enemy in the most brave manner, and thus afforded time for the cavalry to rally. The infantry of James now gave way; and James himself, alarmed at his danger, put himself at the head of a regiment of cavalry, and gained the pass of Duleck, three miles to the south of the field of battle. The rest of his forces having also passed through this defile, formed again, and effected their retreat in good order. The loss of the vanquished is said to have been 1500, and that of the victors 500.

James fled with such rapidity, that he reached Dublin that night. He stopped there a very short time; and after having advised his partizans to submit to William, he continued his route, and embarked at Waterford for France. His army also retreated by Dublin; but they directed their march towards Athlone and Limerick, highly dissatisfied with James's conduct during the battle, and with his desertion of them after its unfortunate issue.

The King did not attempt to pursue the defeated army; but having received the submission of the garrison of Drogheda, he advanced slowly to the south, and encamped about two miles from Dublin. A proclamation was immediately issued, promising pardon and protection to the lower orders of men who had remained at home, or should return thither, and give up their arms; but expressly excluding from pardon the leaders of the rebellion. Commissioners were also appointed to seize all forfeitures rising from the rebellion.

As the enemy's forces had retreated to Athlone and Limerick, it became necessary to take measures for following and reducing them. Accordingly, after William had permitted his army to rest a short time, he detached ten regiments of infantry, and five of horse, towards Athlone, while he himself marched southward with a larger force. Athlone was first attacked; but William's troops being repulsed, their commander judged it prudent to give up the enterprize, and to march to join the King. The great object of the monarch was the reduction of Limerick. He began his approaches to this city, which was very strong, on the 9th of August. The garrison was commanded by Boileau, a Frenchman, who took every measure that skill and experience could suggest for the defence of the place. One of his first enterprizes was to intercept an escort, and succeeding in this, he gave fresh spirit to his troops, and an earnest to William of the difficulties he might expect to encounter. The King, however, was naturally of a temper not easily damped or dispirited. He proceeded in his plans, and, on the 18th of August, was enabled to open his batteries. On the 27th, having effected a breach, an assault was ordered; but after this attempt had been carried on for the space of three hours, William was obliged to retreat, with a loss of 500 killed and 1000 wounded; and soon afterwards he ordered the siege to be raised, and his army to retreat to Clonmell. Thence he himself proceeded to Waterford, and embarked for England. On his departure, the command of the forces was left to Count Solmes and Ginckle, and the care of the civil government to two lords justices.

The Earl of Marlborough, afterwards so famous, had, before William raised the siege of Limerick, sailed from Portsmouth with 5000 men; and, landing near Cork, he reduced this place and Kinsale. This event, so prejudicial to the cause of James, was almost immediately followed by the departure of Boileau and his French soldiers from Limerick, between whom and the Irish there had long been much jealousy.

The Irish were not, however, dispirited by these events. On the contrary, they prepared for an attack on the garrison at Mullingar, and, for this purpose, had collected forage for 5000 cavalry for five days at Athlone. Ginckle, on learning this, resolved to anticipate the attack, and, marching at the head of 3000 men from Mullingar, he attacked a considerable body of the Irish, who were encamped at Ballymore. The attack succeeded; the enemy fled; but, rallying at a place called Grenoge, they again gave battle, and were again defeated, and thrown into complete disorder. By this defeat, their plan of offensive operations against the English garrisons was frustrated.

The partizans of James would probably have given way to despair, had not their hopes been kept up by the promise of supplies from France; but only officers came, and among them Saint Ruth, who was empowered by James to take the command of all his troops in Ireland. This general, after having learnt the number of the forces which he was to command, and of those by which he would be opposed, deemed it prudent to act solely on the defensive; and he therefore strengthened his posts on the west side of the Shannon, while with his main army he took his station behind Athlone.

Against Saint Ruth, thus situated, Ginckle resolved to commence offensive operations. On the 18th of June, he came in sight of the town; a breach was soon made in the wall of what is called the English town, and that part was taken by storm; but it seemed impossible to reach the Irish town, the bridge being broken down, and the Shannon being here extremely deep, and at the same time very narrow. Ginckle, under these circumstances, twice attempted to repair the bridge, but the works were destroyed. His officers and troops, instead of being discouraged, were eager to ford the river, notwithstanding the obstacles and dangers to which they would be thus exposed; and the general giving way to their impetuosity, they rushed into the stream, gained the opposite shore, and in spite of the enemy's incessant fire, in half an hour were masters of the town. This disaster increased the mutual hatred of the Irish and French; and of it, and the hatred thus increased, Ginckle endeavoured to take advantage, by issuing a proclamation, offering pardon to those who would desert James. This offer, however, produced little effect; and it was evident that the cause must be entirely decided by force of arms.

Saint Ruth, immediately on the reduction of Athlone, retired with his army, which consisted of 25,000 men, to the heights of Kilcommeden. Here he took up a strong position, and awaited the approach of Ginckle, who was not slow in following him, notwithstanding his army consisted of only 18,000 men. This inferiority, however, was amply compensated by the spirit by which his soldiers were actuated. Indeed a most bloody contest was about to take place. The first effort of Ginckle was, to force a pass on the right of the enemy; and this having been effected, his whole left wing advanced through it, and attacked the right of the Irish. The contest was severely contended; and the Irish, even after they were obliged to give way, retired only to flank their assailants in their turn. Saint Ruth, as soon as he was informed of the attack on his right, drew great part of his cavalry from his left to support it. Advantage was immediately taken of this, and orders given to force the pass of Aghrim Castle on the left of the enemy by the cavalry, while the infantry made a movement to support this attack. The latter charging with impetuosity, the enemy designedly gave way, and the assailants, pursuing too far, were overpowered by a charge on the front and flank at the same time. The cavalry, however, had succeeded in their object, which induced Saint Ruth to make them the principal object of his attack. But, while he was giving orders to that effect, he was slain by a cannon ball. The disputes between the French and Irish now produced the most fatal results; for Saarfield, the Irish general, being totally unacquainted with Saint Ruth's plans, was unable to follow them up, and, before he could decide in what manner to act, the English were victorious. Their loss was only 700 killed and 1000 wounded, whereas the Irish lost 7000, besides 450 prisoners, and all their cannon, ammunition, &c.

Allowing his troops a few days repose, Ginckle marched against Galway, which soon surrendered, on condition that its garrison should be permitted to march to Limerick. The terms in other respects were liberal as well as politic; for, as soon as they were known, considerable numbers deserted the cause of James. Still, however, his partizans were numerous, and such as remained firm were animated by a most determined spirit of resistance.

No place of consequence now remained to James except Limerick, and thither Ginckle directed his march. Recollecting, however, the ill success of his master before this place, he resolved to proceed with the utmost caution. He took measures to prevent the garrison receiving supplies by sea, and to secure his own communication with Kerry, in case he should be obliged to take up his winter quarters there. As the garrison was equal in numbers to his own army, it would have been madness to have attempted to have taken the town by assault. Instead, therefore, of wasting his time in making breaches in the walls, he resolved to cut off their provisions, by cutting them off from the county of Clare, whence they were drawn. This enterprize was successfully performed, to the surprise and consternation of the Irish, who, when they saw the batteries dismounted, thought that the siege was about to be raised. The next object of the general was, to gain possession of Thomond Bridge and King's Island, which lie to the north of what is called the English Town. The Shannon was crossed, the works that protected the bridge were approached and stormed, and, after a desperate resistance, the English made a lodgment within ten yards of it. Ginckle was surprised at his own success; but a general engagement, which the enemy ought to have have hazarded on this occasion, was prevented by the disputes between the Irish and the French. This dissension, together with the success of the English, produced an offer to capitulate; and Ginckle here, as at Athlone, gave the most liberal terms. In a few days after Limerick was thus reduced, a French fleet appeared in the Shannon, with such supplies of troops, &c. as must have rendered it impossible, if they had got into the city, to have taken it.

The articles of Limerick, as they are called, that is, the terms on which this city, and all the other posts in possession of the adherents of James, were surrendered, were in substance as follows: "That the Catholics should enjoy such privileges in the exercise of their religion, as were consistent with law, or such as they had enjoyed in the reign of Charles II.: That their Majesties, as soon as their affairs would permit, should summon a parliament, and endeavour to procure from it such further security as might preserve them from being troubled on account of their religion: That all the Irish in the kingdom in the service of James should be pardoned, and exempted from all actions for debt, on account of plunder committed by them in the course of the war: That they should be reinstated in their property, and in their rights and titles, as soon as they took the oath of allegiance, enjoined by an act of the English parliament in the first year of King William's reign: That every lord and gentleman, who was included in this capitulation, should be allowed to carry arms for defence or amusement: That the garrisons should march away with all the honours of war: And that those who might choose to leave Ireland, should be permitted to carry off their effects to any country except Britain, ships being provided for that purpose by the British government. Fourteen thousand Irish availed themselves of this article, and left their native country."

As William was now completely master of Ireland, it was hoped and expected that he would immediately summon an Irish parliament, but this he did not do till 1692, when he wanted money. In the mean time the English parliament legislated for Ireland; the most important of their acts was one to substitute other oaths, instead of the oath of supremacy, which, in fact, excluded Catholics from both houses of parliament. In 1692, when the Irish parliament met, it became evident that the commons were disposed to stand up for the rights of their country much more firmly than William wished or expected; they even went so far, as to contend that Poyning's law did not extend to money bills, and rejected one that was sent over to them from England, expressly because it had not originated with them. This parliament was therefore dissolved, in the hopes that the next would be less sturdy in the maintenance of their privileges.

In 1695, a new parliament was assembled, which, among other things, explained and confirmed the act of settlement, and confirmed the articles of Limerick, but not without such modifications and alterations as were by no means consonant to their spirit, and therefore were not justifiable: this parliament also passed some penal statutes against the Catholics. The great majority of its members were by no means disposed to question the authority of the English parliament; but some of the members of the commons stood resolutely up, not merely for the independence of the Irish upon the English parliament, but even for the independence of the kingdom of Ireland upon the kingdom of England. These doctrines were maintained with great spirit, acuteness, and reason, in a work published by Mr. Molyneux, one of the members from the university of Dublin, which so incensed the English House of Commons, that it was burnt by the common hangman.

So jealous and sensitively alive did the English government appear to be to the rivalship of Ireland in manufactures, that whenever, by being rendered tranquil, she was in a state to carry them on, it immediately interfered to injure such kinds of manufacture, as could in the smallest degree compete with those of England. Against the woollen manufacture their decrees were most violent and frequent; and the linen manufacture, which the English government professed to encourage, was suffered to languish, till formidable rivals to it arose both in England and Scotland. The climate of Ireland, and the richness of her pastures, especially near the Shannon, pointed out the rearing and fattening of cattle, as her most proper and profitable species of agriculture; and yet embargoes were laid on the exportation of Irish provisions. In short, Ireland was treated not only as a conquered country, but as a country so formed by nature, that if left to itself, it must unavoidably get the start of England; and these two considerations, in the opinion of the English government, appeared to justify its conduct towards her.

William, in his conduct towards Ireland, does not deserve so much censure as the English parliament, which forced these measures upon him; they were jealous of almost every thing he did; sometimes because they thought the liberties of the people might be injured, but more frequently from regard to their own privileges. In order to reward some of his favourites, the king had made several grants of the forfeited estates in Ireland; this displeased the English parliament, which passed a bill to resume these grants, on the ground that they ought to have disposed of them, and that the money they produced ought to have gone to the public; and the king most reluctantly was obliged to give his assent to this bill, and thus annul his own measure.

The reign of Queen Anne, so far as it regards Ireland, was distinguished principally by the severe penal statutes which were passed in the Irish parliament against the Catholics. It never seems to have occurred, that excessive severity only tended to increase the bigotry and ignorance against which it was directed, and that mild measures, aided by endeavours to enlighten the Catholics, and adopted in the spirit of charity, without a constant reference to the state of Ireland as a conquered country, would much more effectually have promoted the object which the British government, and, under their influence, the Irish parliament, professed to have in view. But, besides the irritation which was thus produced among the Irish Catholics, the Irish nation in general were constantly reminded, in the most galling and unnecessary manner, of the dependence of their parliament upon that of England; and the violence of party—always great in Ireland, was augmented by the English government, to serve the paltry purposes of political intrigue.

In the year 1719, a circumstance occurred which pointed out the pertinacity with which the British parliament were resolved to crush every symptom of an independent spirit in the parliament of Ireland. It was necessary to take the judges' opinion, whether, by the laws of the land, an appeal could be made from the Court of Exchequer in Ireland to the King in Parliament in Great Britain. The answer was in the negative. This point afterwards came before the British House of Peers, who were highly indignant at the determination of the question, and at the conduct of the Irish Peers, in resolving to support the independence of their country; they even brought in a bill, which passed into a law, entitled an Act for the Better Securing the Dependency of Ireland on the Crown of Great Britain, in which the British Parliament was declared to have full power and authority to make laws and statutes of sufficient force and validity to bind the people of the kingdom of Ireland.

In 1724, Swift distinguished himself by the Drapier's letters, the object of which was to point out the consequences that would result from a patent granted to a man of the name of Wood, for supplying Ireland with a copper coinage. Such was the ferment occasioned by these letters, that the patent was revoked next year. It is now pretty well ascertained that Swift was not the patriot he was then considered, and that Wood's coinage (though the granting him a monopoly was improper and unjust) would by no means have been the source of profit to himself, or so prejudicial to the people, as was represented in the Drapier's letters. But Ireland, at this period, was admirably adapted to be the scene of every kind of political imposture and intrigue. She was miserably governed; her interests were never consulted, but always sacrificed either to the interests of England, or, what was worse, and more provoking, to the interests of such individuals as the British ministry wished to oblige. The viceroy only came over once in two years: The effective power was with the lords justices, and their time and thoughts were occupied in forwarding the plans of the British cabinet, and promoting their own private interests.

The privileges of the Catholics, already greatly curtailed, were still further encroached upon, by an act passed in 1727, by which they were totally deprived of the elective franchise. Such, however, was their attachment to their native soil, that, though a scarcity, reaching almost to a famine, drove thousands of Protestants to America, scarcely any Catholics emigrated.

The grand political parties at this time consisted of those who, on all occasions, endeavoured to promote the English interests, even at the expence of the interests of their own country, and those who called themselves patriots, and who professed to look only to the advantage of Ireland, and to regard that advantage as too often sacrificed to the views of the British parliament. In the Duke of Dorset's first administration, which began in 1731, there was a grand struggle between these two parties in the parliament: Those in the British interest were desirous of granting the supplies for the payment of the national debt to the crown for 21 years, instead of only from one session to another; but a motion to this effect was negatived in the House of Commons, by a majority of one.

At length, in 1745, when a rebellion raged in the heart of Britain, and when the British ministry, conscious of the harsh and unjust manner in which they had treated Ireland, were apprehensive that she also would encourage the Pretender, they sent over the celebrated Earl of Chesterfield, who so well discharged his duty, that he discountenanced all party distinctions; gave to the Catholics the full protection of the laws; and, by similar conduct in other respects, prevented the Irish from even indulging a wish to support the Pretender; so that the unexpected and singular spectacle was exhibited, of Ireland tranquil and loyal, at a time when Scotland, and even England, teemed with favourers of the exiled family; a decided proof, that confidence, liberality, justice, and kindness, possess more influence over the Irish nation than harshness, suspicion, and violence. To the disgrace of the British government, they permitted Ireland to enjoy the benefit of such a lord-lieutenant only till they were free from danger; for, immediately after the battle of Culloden, Lord Chesterfield was recalled.

Scarcely had he left Ireland, when intrigues and party spirit revived. At the head of the English interest was a prelate of the name of Stone, who was raised to the supremacy as a reward for his past, and a retaining fee for his future services. Perhaps, in few instances, has the church ever been disgraced by such a worthless and profligate character; his public conduct, as well as his private, was totally without principle, and proved, that with all principle he had thrown aside all shame. At the head of the patriots were Henry Boyle, Speaker of the House of Commons, and an apothecary of the name of Lucas. The latter was a man of undaunted spirit, and of great activity of mind, and both were employed in investigating and promulgating what he considered the rights of his country. His publications on this subject gave such alarm to Government, that the attorney-general was directed to prosecute him. In consequence of this he left his country; but afterwards returned, and was elected to parliament by the city of Dublin.

In 1749, the power of the Irish parliament was again brought under discussion, in consequence of the intended application of the surplus of the hereditary revenue of the crown towards the payment of the national debt. The question was, whether the right of disposing of this surplus was vested in the king or the Irish House of Commons; or, in other words, whether his majesty's previous consent was necessary. At this time the English party gained their point; but when the question was renewed in 1753, the patriots were victorious.

At length, in 1755, the British government seemed disposed to accede to the wishes of the Irish nation, and to think that the real interests of Ireland ought, at least in some degree, to be consulted. Stone was removed from the privy council by the king's command; Boyle was created Earl of Shannon; and several others of the patriots were placed in situations of emolument and influence. But it soon became evident that the patriots, as they styled themselves, had carried on the struggle with the crown, rather to support and extend their own influence, than from any regard to the wishes, or real benefit of the people. In fact, it had been too much the struggle of the aristocratic party against the crown; and while they were kept out of office, they took the side of the people, in order to strengthen themselves, which they were too much disposed to desert when they had brought the crown to their own terms.

In 1756, the real sentiments of the aristocracy were displayed: A bill was brought into parliament, to vacate the seats of such members of the House of Commons as should accept any pension or place of profit from the crown. This bill was thrown out by a majority of 26. As the passing of this bill would have *told* against the patriotic party when they came into power, it was obnoxious to them; but they gave their support to those measures which tended to support the privileges of parliament, or to benefit the country, without trenching on their own interests.

It is not to be supposed, that a country such as Ireland was at that time—with the great majority of its population ignorant, bigoted, and idle; with a government constantly inattentive to, if not absolutely sacrificing its interests; and with the spirit of enterprise and industry, wherever it started up in spite of these obstacles, crushed by the mean jealousy of Britain—could be rich: it was in fact poor; and the national poverty was greatly increased by the failure of some of the principal banks, and an extreme scarcity, and consequent high price of grain. In the midst of the discontent which arose from these causes, a report was spread that Ireland was to be united to England—to be deprived of its parliament—and to pay the same taxes as England. The mob of Dublin took the alarm, and broke out into the most riotous proceedings, which, however, were of very short continuance.

In 1759, Britain and Ireland were alarmed with the preparations for invasion making in the French ports; but no landing took place, except that of Thurot with 600 men at Carrickfergus, and he re-embarked in the course of a few days. The conduct of the Irish troops, as well as of the peasantry, on this occasion, proved that they were much more loyal and worthy of confidence than they were allowed to be by those who calumniated them, for they were eager to rush to the defence of their country; and such as were engaged behaved with surprising zeal and intrepidity.

We now come to the time of the first appearance of those associations of the peasantry, and others of a higher class, for purposes of outrage, or of effecting political objects, by which the history of Ireland is henceforth so much distinguished. In 1762, the Whiteboys first created alarm. They took this name, which succeeded that of Levellers, from the circumstance of their covering their ordinary dress by a short or white frock. They consisted of labourers in the woollen manufacture, who had been driven out of employment by its decline; and of labourers in husbandry, who had been reduced to the same state, in consequence of the general conversion of arable into pasture land. To add to their distress, at this time a spirit of enterprise and improvement had recently promoted the enclosure of commons, on which these people had previously enjoyed the right of commonage. The outrages of the Whiteboys were dreadful; and the alarm was greater than even they warranted, in consequence of a suspicion that they were instigated by, and connected with, the Catholics. The next year an insurrection arose in Ulster. In this only Protestants were concerned. The cause of this was the hardships under which, it was alleged, the poorer classes laboured with regard to keeping the roads in repair. The insurgents called themselves *Hearts of Oak*, from wearing oaken branches in their hats. They soon, however, carried their views beyond their original object; and, on their proceeding to interfere violently with respect to this, and the rent of land, they were put down by an armed force.

The first circumstance, after the accession of George III., connected with the history of Ireland, that deserves our notice and record, was the passing of the octennial bill in 1768. The Parliament of Ireland, unlike that of Britain, continued in existence as long as the monarch lived, being dissolved only by his death taking place. In 1761, an attempt was made by Lucas and others of the patriotic party, to limit the duration of the Irish parliament, and to place it on the same footing in this respect as the British parliament; this however did not succeed, and it is even doubtful whether the British government intended that the measure should be carried in 1768; for the British privy council returned the heads of a bill transmitted to them for limiting the duration of the Irish parliament to *seven* years, with an alteration which extended the duration to *eight* years; probably expecting that, by this interference, the Irish parliament would be induced to reject the bill altogether; but the Irish parliament, with great temper and good sense, passed the bill as returned to them.

At this period Lord Townshend was lord-lieutenant: His favourite and principal object was, to destroy the power of the Irish aristocracy, and to take out of their hands the influence and distribution of places and pensions, which had been hitherto allowed them, in consequence of the supposed necessity of courting their favour and votes. This was a difficult point; but the viceroy carried it, though not by the most justifiable means. From this time, the lord lieutenant, or in other words, the British government, was regarded and treated as the only source of honours or emoluments. During the administration of this nobleman, who was very popular among the Irish, not merely on account of his public measures, but also on account of his disposition and manners, open and convivial, and thus highly congenial to those of the people over whom he was placed, some disturbances broke out in Ulster, in consequence of a system introduced there of letting land on fines. As the great majority of the small farmers and peasantry were totally unable to pay these fines, and were consequently deprived of their farms, they became desperate, and committed such violent outrages on those who had taken their lands, that government was obliged to have recourse to military force. The insurrection was thus quelled; but the distressed inhabitants, deprived of the means of subsistence, were driven to America in great numbers.

We now approach one of the most interesting and important æras in the history of Ireland. From the conduct almost uniformly pursued by the British government towards this country, as we have detailed it, it must appear evident, that Ireland could never expect to obtain freely from Britain, those privileges and that treatment, which, had the government of Britain been wise, she would have been anxious to grant, not merely from a feeling of justice, but from a view to her own real interests. Neither this feeling, however, nor this enlightened and liberal view of her own interest existing, the conduct of Britain to Ireland had been, with scarcely a single exception, marked by mean and narrow jealousy; and, what was worse, by a determination, which ought not to have found a place in the mind of Britons, who prided themselves on their love of freedom, to treat Ireland in every respect as a conquered country.

To Ireland there appeared no chance of escaping from the degradation and thraldom in which she was thus involved, when the American war broke out. This immediately produced a remarkable change in the language and conduct of the British government as they related to Ireland; proposals were made in the British House of Commons in favour of Irish commerce; and some of the penal statutes against the Catholics were annulled. They were now enabled to acquire full property in land, and a son could no longer force a settlement from his father by conforming to Protestantism, provided the Catholics subscribed an oath of allegiance and a declaration, which were prescribed. Still, however, Irish commerce and trade languished, and the Patriots of Ireland aimed at much greater privileges with respect to it, and to their political state in general, than had yet been granted.

The means by which their views might be forwarded were at hand. The American war had drawn from Ireland nearly all her regular forces, and her coasts, thus unprotected, were exposed to invasion. In consequence of the town of Belfast not receiving a garrison adequate to their protection, the inhabitants, in 1779, entered into armed associations to defend themselves against the enemy. This gave rise to the system of volunteers, which soon spread over the whole country. The Irish now began to feel their strength, and even the House of Commons unanimously passed a resolution, on the first day of their session this year, that, in their address to the king, it should be represented to his majesty, that "it was not by temporary expedients, but by a free trade alone, that Ireland could now be saved from impending ruin;" and in order to give effect to this address, they voted their supplies only for six months. A motion was also made, that the granting of new taxes would at that time be inexpedient, which was carried by a large majority. Thanks were voted, unanimously, in the House of Commons, and, with only the dissentient voice of the Lord Chancellor, in the House of Lords, to the volunteers, for their exertions in defence of their country.

Lord North, who was at this time prime minister, now found himself obliged to give way; but hoping that the Irish would be content with the removal of commercial restrictions, he carried a bill through the British parliament, which in some measure effected that object. But the Irish looked to greater objects; and, unfortunately for his own views, Lord North, in order to induce the British manufacturers and merchants to agree to his commercial concessions, had represented them as a boon resumable at pleasure. The Irish thus learned, that what had been granted, had been granted either through fear, or as a matter of favour, and not as their right, and they became sensible that they could not be secure, unless they had an independent legislature of their own. Resolutions to this effect were published by the different volunteer corps, who, in order that they might act with more effect, formed a union among themselves, and they were not only animated by the same spirit, but, in all their resolutions and proceedings, directed to the same object.

This spirit animated all ranks and classes; it was no longer an association confined to one part of the kingdom, composed of ignorant and poor men, without talents or influence, and aiming at some local and temporary object. At the head of the Dublin volunteers was the Duke of Leinster; and, on the 9th of June 1780, with him in the chair, they resolved, "That the king, lords, and commons, of Ireland, only are competent to make laws binding the subjects of this realm; and that they would not obey or give operation to any laws, save only those enacted by the king, lords, and commons, of Ireland, whose rights and privileges, jointly and separately, they were determined to support with their lives and fortunes."

The House of Commons, which had hitherto gone along with the sense of the nation at large, seems now to have been replaced under ministerial influence, or at least to have been of opinion that the nation were proceeding too rapidly and too far; for a motion made by Mr. Grattan, that no power on earth, save the king, lords, and commons, of Ireland, had a right to make laws for Ireland, was withdrawn; and the Irish parliament, acting in the spirit which caused this motion to be withdrawn, passed into laws two bills which had been altered by the British cabinet. Hence the parliament became very unpopular.

In the year 1781, the force of the volunteers had been augmented to 50,000 men, regularly divided into regiments, and in high discipline; and in order to give full effect to the object they had in view, the Ulster volunteers resolved to send delegates to Dungannon, to deliberate on the state of public affairs. This measure, however, was by no means approved of by some of the most judicious and sincere friends of the volunteers. The meeting took place, and some very strong resolutions were passed, in which most of the grievances under which Ireland had so long laboured, were dwelt upon in a bold and indignant spirit; it was further resolved, "that four delegates should be nominated for each county in Ulster, to act as representatives of the volunteers in that province, and that of these, eleven should form a quorum; and that this committee should appoint nine of their members for a committee in Dublin, to communicate with other volunteer associations. The parliament, however, were still adverse to the measures which the volunteers had in view, and refused to interfere, in favour either of the commercial or the political amelioration of Ireland. With respect to the Catholics, however, they were more liberal, and scarcely a session passed, in which some of their disabilities were not removed.

The volunteers, having formed committees of correspondence and a national committee, had thus given to their system a single animating spirit, by which their power was wonderfully increased; and if the British government still refused to comply with their requests, a crisis must necessarily take place, which would probably end in warfare. At this period, full of alarm to the best friends of their country, that administration which had lost Britain her American colonies resigned; and they were succeeded, in March 1782, by a Whig administration, at the head of which was the Marquis of Rockingham. The Duke of Portland was immediately appointed Lord Lieutenant. Mr. Grattan moved an address to the king, in the House of Commons, which was unanimously carried in both houses, in which it was declared, that "the crown of Ireland was an imperial crown, inseparably annexed to the crown of Great Britain; but that the kingdom of Ireland was a distinct kingdom, with a parliament of her own, the sole legislature thereof; that in this right they conceived the very essence of their liberty to exist; that in behalf of all the people in Ireland, they claimed this as their birth right, and could not relinquish it but with their lives; that they had a high veneration for the British character; and that their determination was, in sharing the freedom of England, to share also her fate, and to stand or fall with the British nation." The Lord Lieutenant assured parliament that the British legislature had concurrred in a resolution to remove the causes of their discontents, and that his majesty was graciously disposed to give his royal assent to acts calculated to fulfil their wishes. As an earnest of the sincerity of this declaration, a law was passed, by which all interference of the British privy council to alter Irish bills was abolished, and the parliament of Ireland thus placed on the same footing as that of Britain. Acts were also passed for the limitation of the law against mutiny to two years; for the right of habeas corpus, and for the independence of the judges; and the act by which the Irish House of Peers had been deprived of their supreme judicial power in their own country, was repealed. These concessions, however, were not deemed sufficient by some patriots, particularly by Mr. Flood, who brought in a bill, declaring the sole and exclusive right of the Irish parliament to make laws in all cases whatsoever, both internal and external, for the kingdom of Ireland: only six members voted for this motion. Mr. Grattan opposed it; and the volunteers of Leinster, Ulster, and Connaught, were likewise inimical to it.

The volunteers having accomplished the objects which they originally had in view, did not disband themselves, but directed their views and exertions to a reform in parliament. In order to act with vigour and effect, they followed their former plan of a national convention, which they appointed to be held in Dublin on the 10th of November, 1783. On the 29th of the same month, a motion was made in the House of Commons by Mr. Flood, founded on the resolutions of this convention, which, after a long and warm debate, was rejected by a very large majority. This termination, instead of rousing the volunteers to perseverance, as it would have done, when they had their original object in view, seems to have disconcerted and alarmed them; for the convention adjourned to an indefinite period, after having passed a resolution to carry on, individually, their efforts for parliamentary reform; and having agreed to address the king, expressing their loyalty, and beseeching him not to ascribe their efforts to restore the constitution to its pure and pristine form, to any love of innovation, or want of attachment to his government or power. Soon after this the volunteer system declined, ministers hastening its decline by raising fencible regiments, into which they drew the officers of the volunteers by pecuniary inducements.

The cause of parliamentary reform, though no longer supported by the volunteers in their associate character, was not deserted by the people, or by its advocates in parliament; and their hopes were raised by the circumstance, that Mr. Pitt, who had been its most strenuous supporter, was now prime minister. It was soon found, however, that Mr. Pitt was no longer of the same opinion; and Mr. Flood's motion for leave to bring in a bill to reform the Irish House of Commons, was negatived, though not till after a long debate. The advocates for this measure, out of doors, were not cast down; the citizens of Dublin, legally convened by the sheriffs, voted a series of resolutions in favour of this measure, and also appointed a committee to prepare an address to the people at large, and a petition to the king. The people were invited to form a national congress, composed of five persons from every county and large town; and the meeting of this congress actually took place in Dublin, on the 25th of October, 1784, notwithstanding the endeavours of government to prevent it, which were carried, at least, as far as the law warranted.

At the first meeting nothing of importance was done; but at the second meeting, at which there were assembled above 200 members from 27 counties and most of the large towns, it was resolved to petition parliament, but to leave the specific form of redressing the grievance complained of to be determined by the wisdom of the legislature.

Though Mr. Pitt was inimical to parliamentary reform, both in Britain and Ireland, yet he was disposed to free the commerce of the latter country from some of the restraints under which it laboured, and to protect it from foreign competition. But his attempts to establish a more advantageous system of commerce between Britain and Ireland were in a great measure defeated by the jealousy of the British manufacturers and merchants. This obliged him to new model the propositions which he had originally sent to Ireland, and which were adopted by the legislature there with the most perfect and cordial approbation, to such a degree, that when they were again introduced into the Irish House of Commons, they passed in the affirmative, with only a majority of 19 in a house consisting of 235 members. This trifling majority induced the Irish government to withdraw them altogether. The system of tithes has always been a source of ill will, even where those who paid them were of the established religion; but it seemed very hard and unjust to the Catholics, that they should pay towards the support of a clergy whose services they did not need, nor wish for. Besides, the tithes pressed hard on the poor renters of a piece of ground, perhaps scarcely large enough to support a man and his family, even if he had received the whole produce. From this feeling with regard to the oppression of tithes arose, in 1786, a species of insurrection in the south of Ireland, carried on by persons who styled themselves Rightboys. They administered oaths, binding the people not to pay more as the tithe of an acre, than a sum they fixed—to permit no proctors—and not to allow the clergyman to take his tithes in kind. Not being sufficiently opposed in this outrage, they proceeded farther; to fix the rents of land—to raise the wages of labour—and to oppose the collection of the tax called hearth-money. This called forth the attention of the legislature, and in 1787 an act was passed to prevent tumultuous assemblies and illegal combinations.

From this time till the illness of his majesty, in 1789, nothing important in the affairs of Ireland occurred. On the occasion alluded to, ministers found themselves deserted by so many of their friends, that they were left in a minority in both houses; and it was resolved to request his Royal Highness the Prince of Wales to take upon him the government of Ireland, during his majesty's indisposition, under the title of Prince Regent, with all the legal prerogatives belonging to the crown thereof. The aukward situation into which the two countries would thus have been thrown, by the Regent's power being restricted in Britain, and unrestricted in Ireland, was prevented by the fortunate recovery of his majesty; and this circumstance restored to the Irish ministry their majorities in both houses.

The American revolution, as we have seen, produced a wonderful effect on the affairs of Ireland; the French revolution, which commenced about the time of the King's illness, was destined to affect the affairs of Ireland in a still greater degree, but unfortunately not in so favourable a manner. It was natural that those in Ireland, who had been so long and so ardently endeavouring to gain for their own country what they deemed its rights, and essential to its prosperity, should rejoice at the French revolution when it began, and that they should feel by it inspired to renew their attempts to obtain their favourite objects of parliamentary reform and Catholic emancipation. The mode in which they might hope to attain these objects seemed pointed out to them by the volunteers,—by union and associations they had prevailed, and thus also they might be equally successful. Accordingly, in June 1791, there appeared at Belfast the plan of an association, under the name of United Irishmen; and in November this association was actually instituted at Dublin; their declared object was, "the forwarding a brotherhood of affection, a communion of rights, and a union of power among Irishmen of every religious persuasion, and thereby obtaining a complete reform in the legislature, founded on the principles of civil, political, and religious liberty." Such were their avowed objects; but there is reason to believe, that, even at the first formation of this association, the leading members looked further; or, at least, that they had determined, if it should be necessary, to obtain their proposed objects by means inconsistent with public tranquillity, and with their duty as subjects. That they had such a necessity in contemplation is evident from the formation in Dublin of national guards, distinguished by a green uniform, and by buttons with a harp under a cap of liberty instead of a crown. The 9th of December, 1792, was appointed for the general muster of these guards, and all the volunteer companies were invited to attend; but the muster never took place, in consequence of the strong measures of precaution adopted by government.

Thus prevented from assembling, the leading men among the United Irishmen put forth a paper, signed by Archibald Hamilton Rowan as their secretary, in which they expressed their expectation that the volunteers would resume their arms for the maintenance of tranquillity against foreign and domestic enemies, and the Protestants generally to choose deputies to a national convention, with which, when formed, the Catholics might act. The Catholics, as might be supposed, were not indisposed to take advantage of this state of the country. Besides the grievances which were common to them and the Protestants, they had various grievances of their own, arising from their religion; and from the declaration of the United Irishmen, they were led to hope that the Protestants, so far from opposing their claims, would now co-operate with them in their endeavours to obtain them. Accordingly they also had their convention, which assembled on the 3d of December, 1792, in Dublin. After voting a petition to the king, and appointing a permanent committee for the management of Catholic affairs during the recess, they adjourned. That the real nature of the claims which they put forth might be understood, and the objections generally urged against their claims being complied with might be removed, they abjured the dangerous tenets which they were commonly supposed to entertain—that excommunicated princes might be murdered or deposed by their subjects; that the murder of heretics is lawful; that no faith is to be kept with them; that they could be absolved from their oaths of allegiance; that the pope had any jurisdiction within the realm; or that any human power could forgive sins, without sincere repentance. They also renounced all claims to the estates of their ancestors which had been forfeited; and disavowed all designs of subverting the religious establishment of Ireland.

The United Irishmen and the Catholics, both looking forward to a change in the laws, were naturally well disposed to each other; but from other quarters the claims of the Catholics were most violently opposed. The government seemed to think, that the safest conduct for them to pursue was to avoid both extremes; they were not disposed to grant all the Catholics wished, nor to withhold every thing. In conformity with this determination, in 1793, the legislature admitted the Catholics to the practice of the law—to intermarry with Protestants—and to an unrestrained education. The legislature, during this session of parliament, also passed a law to prevent the election, or other appointment, of conventions, or other unlawful assemblies, under pretence of preparing or presenting public petitions, or other addresses, to his majesty or parliament. This act was directly aimed at a proposed meeting of a national convention of the United Irish at Athlone, which was prevented. A report of a Secret Committee of the House of Lords threw much light on the views and proceedings of the United Irishmen, as well as on those of a description of insurgents called Defenders. The latter were Catholics in Armagh, Louth, Meath, and the adjacent counties, who, having first associated to defend themselves against the ill treatment inflicted on them by gangs of Presbyterians, called Peep-of-day Boys, became afterwards the assailants.

From this description of the state of Ireland at this period, it will be evident that there was much discontent and dissatisfaction among the great mass of the people; and this discontent was much augmented by an act of parliament for raising a militia, on the plan of that of England, which caused some serious disturbances, besides a good deal of misery, among those who could not serve themselves, and were not able to pay for substitutes.

We have already mentioned, that Archibald Hamilton Rowan was secretary to the United Irishmen at the time their manifesto was published; he was on that account arrested, and in 1794 brought to trial. It was suspected at the time of his trial, that the views of the United Irishmen went farther than they avowed, and that the utter subversion of the constitution, and the separation of Ireland from England, was in their contemplation, and the object of their meetings and schemes. This was afterwards proved on the trial of an English clergyman of the name of Jackson, for a treasonable correspondence with the agents of the French government; for Rowan, who had been condemned to a fine, and imprisonment for two years, contrived to escape out of prison, and fled out of the country, conscious that, on the trial of Jackson, evidence of his real designs would be brought to light. Jackson was condemned, but he took poison, and expired before he was removed from court. Two others, who were leading men among the violent democratic party, Napper Tandy and Theobald Wolfe Tone, the principal framer of the United Irishmen, also fled from their country. Indeed, there was now too much reason to believe, that the United Irishmen not only aimed at a separation from Britain, but aimed at this object by means of the co-operation of France,—a method at once most dangerous to that liberty which they professed themselves so anxious to secure, and utterly at variance with real patriotism or enlightened views.

There seemed two modes by which, at this time, Ireland could be restored to a state of comparative satisfaction and quiet, either by giving way to the more open views of the United Irishmen, by conceding parliamentary reform, or by separating the Catholics from them, by granting Catholic emancipation. The people of Ireland believed that the British ministry had chosen the latter method, when Earl Fitzwilliam arrived among them as viceroy; for he had been intimately connected with the Whig party, though he had differed from them respecting the French revolution, and he had succeeded to the estates, and it was believed inherited the virtues and principles of the Marquis of Rockingham. According to his own statement, the truth of which rests on his character, and on the circumstance that it was not proved to be false by ministers, no restrictions had been imposed upon him when he accepted the government of Ireland, but he was left completely at liberty to take such measures to restore tranquillity and loyalty to the country, as he deemed necessary and expedient. His first measure shewed that he was in earnest; for he began by displacing those people in power, who had opposed the system he meant to pursue. Soon afterwards, petitions were prescribed from the Catholics, praying for the repeal of all their remaining disqualifications, and leave was given, almost unanimously, to bring in a bill agreeably to these petitions. In the mean time, those who had been removed from office had not been idle, especially one of the Beresford family, who had been removed from a situation of considerable emolument. A rumour was spread that Lord Fitzwilliam would be immediately recalled. The Catholics took the alarm, and petitioned the King against his removal. To this no answer was given; and on the 25th of March Lord Fitzwilliam left Ireland. The bill introduced into the Commons for the relief of the Catholics was still before them; but, on the second reading, the same House of Commons who had before almost unanimously supported the bill, threw it out! The Catholics, however, were permitted to send their sons to study in the university of Dublin; and a college, endowed by government, was established for them at Maynooth.

The conduct of the British government was by no means calculated to pacify the Catholics. Disturbances prevailed through the country. A mob in Dublin, attacked and wounded the Lord Chancellor, Fitzgibbon,—a man who was peculiarly obnoxious:—and defenderism increased. The Catholics, however, were not nearly so dangerous as those who aimed at political changes. The United Irishmen now began to direct their views and plans with less scruple, though with more secrecy, to the most treasonable designs. Secret associations were formed, of which no person was admitted a member, till he had solemnly sworn that neither hopes, fears, rewards, or punishments, should ever induce him, directly or indirectly, to inform on, or give evidence against, any member or members of that or similar societies, for any act or expression of theirs done or made collectively or individually, in or out of the society, in pursuance of the spirit of the obligation by which they were distinguished and bound.

In public as well as in private transactions, extreme violence on one side is too apt to beget extreme violence on the other. The government deemed it absolutely necessary to deprive the subject of the protection of those wholesome and just laws, by which, in times of internal tranquillity and universal loyalty, his life and property as well as his liberty were protected. They deemed it also necessary to pass laws of great rigour and severity, the execution of which must be left, in many cases, entirely to the local magistrates, or to the commanders of the troops stationed where the disturbances took place. These magistrates and commanders, thus vested, too often even by the authority of government with a discretionary or arbitrary power, were apt, even where they were men who were conscientiously desirous to act right, and only to exercise severity where it was absolutely necessary for the preservation of the public peace, to pass beyond the limits of their power. This was too frequently the case. Men guilty, or suspected of being dangerous to the public peace, were seized by the magistrates, and sent to serve in the navy. In order to protect the magistrates from the consequences of this stretch of power, a bill of indemnity was passed; and likewise what was called the insurrection act, by which the chief governor in council was authorised to proclaim, on the requisition of seven of its magistrates assembled at the session of the peace, any county or district thereof in a state of disturbance, and thereby to invest the magistrates with a power, under the authority of the law, to send suspected persons into the navy. They were also authorised to search houses for arms, and, after previous notice, to treat as culprits all such as should be absent from their homes, without satisfactory excuse, after certain hours in the evening. In October, 1796, the Habeas Corpus act was again suspended.

In order still further to protect the country from the designs of the disaffected, and against a French invasion with which it was threatened, the government encouraged the formation of an armed yeomanry. In many respects, this species of force was much preferable to the troops of the line, on which hitherto the peace and defence of Ireland had mainly depended; for those troops, principally from Britain, had certainly served to irritate and inflame the Irish by their disorderly conduct; besides, the formation of yeomanry was judicious and beneficial, as it might have a tendency to break down the associations of Orangemen in the north of Ireland, who, under pretence of defending themselves from the Catholics, were guilty of the most dreadful outrages and violations of the laws.

It was not to be supposed that the French government was ignorant of the state of Ireland, or indisposed to take advantage of it in their war with Great Britain. Indeed it was matter of surprise that they had not attempted to land troops in a country so disturbed, and in which there was avowedly so numerous and active a part of the inhabitants desirous to throw off the British yoke, and for that purpose, to accept any foreign assistance that might present itself. An agreement was in fact made between the leading men in the Irish Union and the French Directory, for the landing of a French force in Ireland, on condition that the invading army should act as auxiliaries, receiving their pay and instruction from the Union. As soon as this arrangement was settled, preparations for the invasion of Ireland were made at Brest. The Irish Union, in order to be ready to second the efforts of their new allies, were uncommonly active and zealous in their preparations and plans; but, in the midst of these, they were thrown into a state of uncertainty, and induced to suspend their operations, in consequence of receiving, first, the intelligence that the invasion would take place immediately, that is, in the beginning of the winter of 1796; and almost immediately afterwards, a letter, which they had no reason not to regard as authentic, that the invasion would be deferred till the spring of 1797.

The invading fleet, however, anchored in Bantry Bay on the 24th of December, 1796; but as the general and a great part of his troops were on board ships that had not arrived, the admiral, after waiting for him a few days, returned to Brest, having previously ascertained, however, that the country was well defended, and that even the peasantry, towards whom the French had been taught to look for immediate and hearty co-operation, were apparently adverse to them.

A proclamation was issued on the 17th of May, 1797, declaring the civil power inadequate to quell the insurrection; and this proclamation was followed by orders for the military officers to act without waiting for any authority from the civil power. The military, who had previously been highly irritated by the resistance of the insurgents and who, it is too probable, had entered Ireland, with the belief that it might be treated in all respects as a conquered country, now gave way, in too many instances, to the most oppressive outrages. Under the pretence that arms were concealed, houses were sometimes burnt or plundered; and the military torture of the picket was employed to force a discovery. But it is painful to dwell on such outrages; suffice it to say, that they were such as might be expected from soldiers acting not only without the control of the civil power, but, as they believed, in furtherance of the views of government, against a people whom they regarded as proper objects of their tyranny and cruelty. The United Irish, perceiving that their only chance of success was by assuming the appearance of being reduced to obedience, and conducting their operations in a more secret manner, discontinued their meetings; and the state of the country generally improved so much, that in August 1797, the administration of justice was again committed to the civil power.

But the United Irish were only laying their schemes deeper, and were inactive and tranquil only that they might burst out with more violence and effect. Hitherto they had been chiefly confined to the northern provinces; but now the associations began to extend to the western and southern parts of Ireland, and the whole organization to assume a military form. According to their new plan, the lowest societies consisted of 12 persons, who lived near one another, and among whom there was frequent and confidential intercourse. Five of these societies elected each a secretary, and these secretaries formed a baronial committee, which had the superintendance of the first society. Ten of these lower baronial committees elected each a delegate, and the ten delegates composed an upper baronial committee, which directed the business of the ten lower committees. In like manner was the organization of county, district, and provincial committees effected. The supreme command was lodged in an executive directory, which was composed of five persons, unknown to all except the secretaries of the four provincial committees. From this directory the orders were conveyed in the most secret but efficient and prompt manner; and they were instantly and fully obeyed. Such was the civil organization of the Irish Union. The military resembled it, and, in fact, was grafted upon it. The secretary of each of the lowest societies was its non-commissioned officer; and the delegates of the lower and upper committees were respectively captains and colonels. There was also a military committee appointed by the directory, to contrive plans for the direction of the national force towards the grand object they had in view. In May, 1797, the number of men enrolled as members of the Irish Union in Ulster alone, was nearly 100,000. In the other parts of the kingdom, except Dublin and the counties of Wexford, Kildare, East Meath, West Meath, and King's County, their numbers were comparatively few; but they were using their utmost endeavours to extend the Union all over Ireland.

As the attempt to reduce Ireland to order and tranquillity by means of force had now been carried on for a considerable time, without producing the effect expected and intended, it was hoped that the British ministry would have adopted different measures, more consonant to the spirit of the constitution, as well as more satisfactory and pleasing to the friends of humanity. Under this idea, Lord Moira and Mr. Fox moved in parliament, that a humble address should be presented to his Majesty, praying him to interpose his paternal interference for the allaying of the alarming discontents then subsisting in Ireland; but these motions [illegible]ved, as well as one which his lordship afterwards made in the Irish House of Lords, where he [illegible] of the most absurd as well as dis[illegible]rcised in any country. Indeed, it was only through the debates in parliament that the real state of Ireland at this period could be learnt; for the newspapers, which were in favour of the insurgents, as well as those of government, grossly misrepresented it. The former were most licentious and mischievous in their representations, and also in their endeavours to spread the flame of sedition and rebellion; and, in more than one instance, called down the vengeance of government. As soon as the members of the Irish Union found that they could not propagate their views by means of newspapers, they had recourse to hand-bills, which were privately printed and circulated by their agents. In these, abstinence from spirituous liquors was recommended, in order that the revenue might be impaired; and this recommendation, which it might have been thought no motive would have induced the lower classes of the Irish to follow, was obeyed so generally and faithfully, that their habits were observed to be decidedly more sober than usual. The members were also cautioned against purchasing the quit-rents of the crown, as the bargains would not be valid in case of a revolution. A caution was also given against the acceptance of bank notes. All these circumstances evidently proved that the Irish Union were still in hopes of accomplishing their object by a revolution; but, as they could not hope for this by their own unaided efforts, they again had recourse to France. Assistance was readily promised them; and preparations for the invasion of Ireland were made at Brest and in the Texel; but the expedition from the latter place was rendered abortive, by the defeat of the Dutch fleet at the battle of Camperdown. Still the Irish Union looked towards assistance from the Brest expedition; but the French government appearing to have forgotten their promise, Arthur O'Connor, who was a member of the Irish directory, was commissioned to proceed to France; but, on his passage through England for that purpose, in February, 1798, he was arrested, along with an Irish priest of the name of Coigly, and Binns, a member of the corresponding society of London. They were tried; O'Connor and Binns were acquitted, but detained on another charge of treason; Coigly was condemned and executed.

The Irish Union, thus disappointed in their hopes of assistance from France, resolved to trust solely to their own power. By this time, the number of men sworn into the conspiracy amounted nearly to half a million, and plans were formed for the simultaneous rising of this body. Their object, however, was discovered by a man of the name of Reynolds, who was a delegate for the province of Leinster; and from his information, the members who formed the committee of this province were arrested. Emmett, Macnevin, and Bond, members of the directory, were also arrested. Government, at the same time, by the seizure of papers, were made thoroughly acquainted with all the plans of the Union, and thus were enabled to frustrate them. The Union, thus deprived of their directory, proceeded to elect new members, among whom were two brothers of the name of Sheares; but neither these nor the other members were equal in talents to the former members; and yet greater talents were now requisite, not merely on account of the discoveries made by government, but also because the lower members of the Union, wearied with waiting, and anxious not so much to accomplish the political objects of the Union, as to gratify their own private revenge, could not be managed, except by men of the greatest talents and influence.

On the 30th of March, 1798, government issued a proclamation, which proved that they meant to adopt the most vigorous measures which were in their power, for the immediate suppression of the disaffection and disorders in Ireland. In this it was stated, that "a traitorous conspiracy, existing within the kingdom, had been considerably extended, and had manifested itself in acts of open rebellion; and that in consequence thereof, the most direct and positive orders had been issued to the officers commanding his majesty's forces, to employ them with the utmost vigour and decision, for the immediate suppression of this conspiracy, and for the disarming of the rebels, and all disaffected persons, by the most summary and effectual measures." At the same time General Abercrombie, who then commanded the forces in Ireland, was directed by the lord lieutenant to proceed with his army into the disturbed counties, vested with full powers to act as he should think proper. His first object was to restore the discipline of the army, which was in such a state, that it could not be safely trusted with the execution of the orders he meant to issue. Afterwards, on the 3d of April, he published a manifesto, calling upon the inhabitants of Kildare, where his head-quarters were fixed, to surrender their arms within 10 days, and, in case of non-compliance, threatening that large bodies of troops should live among them at free quarters, promising rewards to those who would give information of concealed arms or ammunition, and denouncing other severities, in case the inhabitants did not return to a state of tranquillity.

At the expiration of the ten days, the troops were quartered on those who were known or suspected to be disaffected; and their behaviour was such as in most instances might be expected from men of their habits and feelings, hitherto little accustomed to strict discipline.

The insurgents did not seem intimidated by these proceedings against them; and as they were ignorant that government were acquainted with their plans, they still persevered in the determination to rise in a body on a fixed day. Before that day arrived, however, government caused Lord Edward Fitzgerald, who had contrived the plan of attack, and who was distinguished for his boldness, talents, and influence, to be arrested. He made a desperate resistance, and died soon afterwards of a wound which he received before he was taken. The two brothers Sheares, and other conspirators, were arrested the same month; and, on the 21st of May, the plan of insurrection was announced by Lord Castlereagh, secretary to the Lord Lieutenant, to the Lord Mayor of Dublin. The night of the 23d was the time fixed for it. An attack on the troops stationed near Dublin, and on the artillery, was to have been first executed. The castle was, about the same time, to have been surprised; after which, the parties engaged in these enterprizes were to have united. The stoppage of all the mail coaches on the great roads, was to have been the signal for the rising of the people in the various parts of the country. The scheme was certainly well arranged, and, had it not been discovered, might have been attended with the most disastrous consequences.

Even though thus discovered, the insurrection broke out in a manner that caused great alarm, and, for some time, exposed parts of Ireland to all the horrors of a civil war. On the 24th of May, the insurgents, though they were nearly without leaders, and with scarcely any arms except pikes, commenced their operations by an attack on Naas, Carlow, and other places, from which they were repulsed with loss. They had previously destroyed the mail-coaches in their road to Dublin, to give notice to their confederates that they were about to commence their operations, and to retard the communication of them to government. As soon as the first acts of rebellion took place, General Lake, who had succeeded General Abercrombie in the command of the forces, issued a proclamation, in which he expressed his determination to use, in the most summary and vigorous manner, the powers with which he had been entrusted to suppress the rebellion; and commanded all persons of every rank, except officers and magistrates, to remain in ther houses from nine o'clock at night till five in the morning. Proclamations were also issued by the Lord Mayor of Dublin and the Lord Lieutenant. In the first, all persons in Dublin were ordered to give in a list of their arms, or to surrender them if they had not a licence to possess them; and every house-keeper to fix on the out-side of his door a list of the names of all persons resident in his house. In the second proclamation it was stated, that orders had been sent to all his majesty's general officers in Ireland, to punish, according to martial law, all persons assisting in the rebellion.

The progress of the rebels towards the south-west was checked by their repulse at Carlow; but the city of Dublin was still partially blockaded by them. To complete the plan for its relief, Sir James Duff made a rapid march with 600 men from Limerick, and arriving at Kildare, opened the communication between the capital and the country.

On the 26th of May, the insurrection broke out in the county of Wexford, where it was not apprehended that the insurgents were in great force. They were headed by a priest of the name of Murphy, a ferocious and ignorant fanatic. On the 27th, two bodies of them made their appearance at Oulart and Kilthomas. At the latter place they were defeated by 200 or 300 yeomen; but at the former place, where Murphy himself commanded, they were victorious. Murphy immediately proceeded to Enniscorthy, of which, by the assistance of the Catholic inhabitants, he gained possession. The inhabitants of the city of Wexford were now in great alarm, as they could plainly distinguish the flames of the burning houses at Enniscorthy. As they were little prepared for defence, they resolved to negociate with the insurgents, or rather to endeavour to persuade them to return peaceably to their homes. For this purpose, two gentlemen, who had been arrested on private information, were sent to them; but they kept one of these to be their leader, and sent the other back to Wexford. Against this place they now determined to proceed. Its small garrison took a position outside, but afterwards returned into the town, which was almost immediately evacuated, and taken possession of by the rebels. Their force was about 15,000 men; and by the capture of Wexford, the southern parts of the county, as well as the eastern and western, were at their mercy. They now divided into two bodies; one of which directed its march to Gorey, in the northern part of the county, in hopes of thus forcing a passage to the capital; and the other to New Ross, by reducing which they would be enabled to enter the counties of Kilkenny and Waterford. The inhabitants of Gorey were apprised of their danger, but they trusted it would be averted by the arrival of troops under General Loftus and Colonel Walpole, which immediately marched by different routes to attack the insurgents, who were posted on a hill seven miles from Gorey, under the command of a priest of the name of Roche. This man seems to have been possessed of great military talents, for he immediately resolved to quit his position with his whole force, upwards of 10,000 men, and attacked Walpole while separated from Loftus's troops. He came up with him at Clough, and, attacking him quite unexpected, the British were defeated, with the loss of their artillery. Loftus, in the mean time, following the insurgents to Gorey, ignorant of the defeat of Walpole's corps, found them posted so strongly that he durst not attack them, but retreated into the county of Carlow.

The body of the rebels who had marched towards Ross were not so fortunate: They had chosen for their leader a person of the name of Harvey, whom they had liberated from Wexford jail. He formed a plan of attacking three separate parts of the town of Ross at the same time: The attack was accordingly made in a furious but irregular manner. At first the rebels gained some advantages, but they were soon thrown into confusion; and General Johnson, who commanded a strong party of the regular army in the town, took advantage of this circumstance, and, after a desperate resistance from some divisions of the rebels, while others were totally without discipline or management, he succeeded in completely defeating them, and in saving the place. Enraged at this defeat, the rebels massacred, in cold blood, more than 100 of their Protestant prisoners at Wexford.

The insurgents who had defeated Walpole's corps remained inactive for some time afterwards. At length, on the 9th of June, they advanced to the north to join another body of insurgents, and, when united, to attack Arklow. The garrison in this place, not conceiving themselves strong enough to defend it against the rebels, left it, but afterwards returned, in consequence of their not attempting to seize it. The rebels, however, changed their plans, and advanced against it; but on the very day of attack, there arrived the Durham fencible regiment. The royal force now consisted of 1600 men, and being arranged in lines, with artillery in front, they were enabled to cover three sides of the place, a river protecting the other side. The force of the insurgents amounted to more than 20,000, but only about 4000 or 5000 of these had guns. They advanced with great impetuosity to the cannons' mouths, but they were in every assault driven back with immense slaughter. The battle lasted four hours; and though, during the whole of that time, the Durham fencibles bore the brunt of it, yet they stood firm and undaunted. The pikemen of the insurgents had not, however, yet come into action, and General Needham, apprehensive that the fencibles, wearied out with repeated attacks, would not be able to withstand these formidable assailants, sent directions to Colonel Skerret, who commanded the fencibles, to retreat. This, however, he refused to do; and though it was now dark, and the insurgents might have profited by this circumstance, they discontinued the attack, and retreated.

The insurgents, of whom we have been hitherto speaking, consisted almost exclusively of Catholics. They hoped to be assisted in their plans by the Protestants of the north of Ireland; but in this they were disappointed. There were, indeed, insurrections in Antrim and Down; but the Protestants who engaged in them, after a few skirmishes with the royal troops, gave up the enterprize, chiefly in consequence of being assured that the rest of the Protestants in the north, though in general well disposed, would not co-operate with them, having learned that the insurrection in Wexford was totally of a religious character, and that the Catholics engaged in it had repeatedly behaved with great cruelty to the Protestants.

The insurgents in Wexford were thus left to themselves, and measures were taken by government to crush them effectually and speedily. On the 20th of June, their whole force was assembled on Vinegar-hill, near Enniscorthy. General Lake immediately formed his plan, which was, to surround this post; and for this purpose, all the divisions of the royal army were put in motion.

In the mean time, the insurgents were guilty of the most atrocious acts of cruelty, not merely against those who had opposed their plans, but even against those who were known to be favourable to them, in case they were Protestants. These were dragged to Vinegar-hill, where, without trial, they were either shot or transfixed with pikes, or, in some cases, put to death in a still more barbarous manner. At Killan, the Protestants of both sexes were collected, with an intention of burning them alive in their parish church, when fortunately their design was prevented by the arrival of a body of yeomen.

General Lake had collected nearly 13,000 troops, with a train of artillery proportionate to that number, for the attack on Vinegar-hill. This attack took place on the 21st of June. The town of Enniscorthy was the first object of attack, and the insurgents were driven from their post. They fled through a space of ground which was to have been occupied by the troops of General Needham. These had not come up, whether from missing the road, or some other accidental cause, or, as was supposed, because General Lake wished to leave the insurgents some outlet, is not ascertained. Wexford was taken by the royal troops the same day as Enniscorthy: Previously, however, a battle had taken place at Horetown, between the troops of General Moore and the insurgents under Roche. The combat was long doubtful, but at length terminated in the defeat of the rebels. General Moore immediately encamped near Wexford, in order to secure the Protestants in that town from massacre. Before his arrival, however, the rebels in it had committed great outrages. These were principally directed and encouraged by a man of the name of Dixon. While the rebel force continued in Wexford, this man had not been able to carry his designs into execution; but soon after they marched out against General Moore, Dixon, at the head of a mob, which he had previously inflamed with whisky, murdered the Protestants in a manner to which, for wanton cruelty, not even the atrocities of the French revolution can produce a parallel. In the mean time, the battle at Vinegar-hill, though strenuously contended by the insurgents, ended in their complete defeat. They were completely broken, and fled; and their loss in the battle and pursuit was so considerable, that the whole party was completely disheartened.

Before General Moore arrived at this town, many of the inhabitants, being freed from the presence of the insurgents, who had joined their companions on Vinegar-hill, were desirous of submitting, and giving up the place. Lord Kingsborough, colonel of the North Cork militia, was at this time a prisoner in it; and he agreed to receive the surrender, pledging his honour for the safety of all, except those who had been concerned in the murders. On this pledge, which was made known to the British general, the insurgents who had fled into the town after their defeat at Vinegar-hill, evacuated it, separating into two bodies, in the full confidence of the ratification of the terms; but General Lake ordered all the chiefs of the rebels to be seized and put to death.

The movements and proceedings of the insurgents, after the battle of Vinegar-hill, were desultory, without union or plan. One body of them marched to Arklow, and, finding no royal troops there, massacred many of the inhabitants. Another body, under Murphy, who had originally raised the insurrection in Wexford, directed their march towards the county of Carlow, with the design of stirring up the inhabitants there and in Kilkenny; but in this they were disappointed, partly by the measures of the royal forces, and partly by the indisposition of the inhabitants. They now determined to return to Wexford, and on the 26th of June arrived at Kilcommy. Here they again changed their route, and moved towards the Wicklow mountains; but they soon found that they had no other chance of safety but by dispersing into small bodies, being no longer capable of withstanding the forces that were sent against them. After various movements and skirmishes, therefore, they finally dispersed.

Government, in the mean time, had been proceeding in the trials of those leaders of the union whom they had apprehended. Among these were the two brothers Sheares; M'Carra, the secretary to the provincial committee of Leinster; and Byron, delegate from Wicklow.

Soon after these events, Lord Camden, who had been viceroy during the rebellion, was recalled, and Earl Cornwallis was appointed his successor. This appointment gave great and general satisfaction: The character of few noblemen, for political honour and humanity, was higher than that of Lord Cornwallis, and his appointment seemed a pledge on the part of government, that they meant to pursue a different system in Ireland. He carried with him a general pardon for all who would submit, with very few exceptions; but his arrival could not immediately put a stop to the system which had been hitherto pursued. On the 3d of July, the pardon which Lord Cornwallis brought with him was published in the Dublin Gazette. His majesty's generals were thereby authorised to give protection to such insurgents as, being simply guilty of rebellion, should surrender their arms, abjure all unlawful engagements, and take the oath of allegiance. In order that this measure might receive the fullest authority and sanction, an act of amnesty was passed in favour of all who had been engaged in the rebellion, except the leaders—those who had been guilty of murder—and those who should not comply with the conditions above specified. From this amnesty were excluded Napper Tandy, and about thirty others who had fled to the continent. Afterwards the chief leaders of the rebellion were allowed to make their terms with government. Seventy-three of them bound themselves to give all the information in their power respecting the transactions of the United Irishmen, so far as it could be done without naming any individual; to emigrate into some country agreed upon, from which they were not to pass into any other country at war with Britain, or to return to Ireland.

It is probable that the disturbances in Ireland would have been quelled much sooner than they actually were, had not the French invaded that country. The policy of the French with respect to Ireland is not easily understood. It seems as if they either should not have invaded it at all, or their invasions should have been better timed, and in much greater force. There is little doubt that, at more than one period, Ireland might have been wrested from Britain, if the French had landed with 15,000 or 20,000 men, and a large supply of arms. The Irish insurgents fought well; they wanted principally officers and arms; so that, if the French had supplied these, the fate of the country would probably have been decided. But to return from this digression. The Irish insurgents had been long anxiously expecting assistance from France; at last, when it was too late, a force of about 900 regular troops, commanded by General Humbert, landed at Killala, on the 22d of August, and, being joined by some of the Catholic inhabitants, immediately marched to Castlebar. As soon as Lord Cornwallis learned their arrival, a force was collected and marched against them. General Hutchinson arrived at Castlebar on the 25th, and was immediately joined by General Lake, the chief commander on the west. The British troops were drawn up in an advantageous position between Castlebar and the French, who were advancing towards it. At seven o'clock in the morning of the 27th, Humbert arrived with about 800 of his own troops, and 1000 Irish peasantry. His only artillery consisted of two small guns. The army opposed to him amounted to nearly 3000. Scarcely was the engagement begun, when the royal army were seized with a panic and fled, leaving their artillery, which consisted of six pieces of cannon, and their ammunition, behind them. Their officers in vain attempted to rally them: They fled, without stopping, thirty-eight miles, to Tuam, which they reached that night; and, at one o'clock of the 28th, some of them reached even Athlone, having marched eighty miles in 27 hours. Here they were stopped by the arrival of the viceroy.

From Castlebar, the French, after gaining this most unexpected victory, proceeded to the eastward, into the heart of the country, with what design it is impossible to conjecture, unless from the expectation of being reinforced by the peasantry on their march. General Lake and his column followed to watch their movements, while Lord Cornwallis, with the chief army, moved towards Carrick, on the Shannon. At length, on September the 8th, General Lake having come up with their rear, at a place called Ballinamuck, a short action took place, which fortunately terminated in the surrender of the French, and the capture or dispersion of the rebels. The troops of Humbert amounted to 748 privates, and 96 officers.

The French certainly had been disappointed in not receiving assistance from the Irish; but it is probable that, on the intelligence of their landing, and especially of their success at Castlebar, insurrections would have taken place in many of the adjoining counties, had not the march of Lord Cornwallis intimidated those who might be so disposed. Even as it was, there was an insurrection near Granard, the object of which seems to have been to take possession of Cavan, where there were large stores of arms and ammunition. Previous to this enterprize, however, it was necessary for them to take Granard; and in this they were disappointed by the arrival of some yeomanry from Cavan, by whom they were defeated. They afterwards sustained another defeat, which put an end to the insurrection. The Catholic peasantry of the county of Mayo, who had first risen to assist the French, still continued in arms, notwithstanding the surrender of Humbert. They even attacked Castlebar, but were repulsed. They were afterwards obliged to take refuge in Killala, from which, being stormed by the royal forces, they were driven with great slaughter.

The French government at last seemed as if they meant to send assistance to Humbert; and, as a prelude to this assistance, a brig arrived near the north-west coast of Donegal, where it landed its new supplies. Among these was Napper Nandy, who had been constituted general of brigade in the French service. As soon, however, as he learned the fate of the army of Humbert, he reimbarked. He was afterwards arrested at Hamburgh by the British government, tried in Ireland, pleaded guilty, but was pardoned. Another attempt of the French to revive a cause now desperate was equally unsuccessful. A squadron, consisting of one ship of the line, and eight frigates, with troops and ammunition on board, destined for Ireland, was fallen in with off the western coast of that island by the squadron of Sir John Borlase Warren, on the 12th of October, who captured the ship of the line and three frigates. Afterwards the rest, except two frigates, were taken. Another squadron of three frigates, with 2000 troops on board, anchored in the bay of Killala on the 27th of the same month; but, on the appearance of some British ships, they set sail and escaped.

The plan of a union between Great Britain and Ireland appears to have been first proposed by the Irish peers, in their address to Queen Anne in the years 1703 and 1707, but at this time the British cabinet was averse to it. Afterwards, when the Irish volunteers forced the British government to render the Irish parliament independent of that of Britain, an union was sought for by the British, but it was no longer an object of desire among any classes of the Irish. The almost uninterrupted insurrections by which Ireland was disturbed after the commencement of the French revolution, seem to have suggested to the British cabinet the idea of seriously bringing about a union. As it was well known that such a measure, if it came unexpectedly upon the Irish unprepared for it, and strongly prejudiced against it, would not be carried without creating serious discontent, it was resolved to bring the question before the public in pamphlets, before it was agitated in parliament. Accordingly Mr. Cooke, the under secretary for the civil department, in 1798, published *Arguments for and against a Union between Great Britain and Ireland considered.* The country was immediately most feelingly alive to the discussion of this most important question, and became divided into two parties, Unionists and Anti-unionists. On each side were found those who, on all other previous questions, had ranged themselves on opposite sides; but the majority of the people were certainly against a union. On the 22d of January 1799, the measure was recommended by the viceroy to parliament. In the House of Lords a favourable address was voted by a large majority. In the Commons, after a debate which lasted 22 hours, there was a majority of only one in favour of the measure. When it was again brought forward the next day, those who opposed the union had a majority of five. Before the conclusion of the session, however, those who were favourable to it had attained a majority; but the detail of the measure was postponed till the next year. In the British parliament the question had also been introduced during the session of 1799, and, after considerable discussion, but with less opposition than in the Irish parliament, a series of resolutions recommending a union had been voted.

When the Irish parliament assembled again on the 15th of January, 1800, a motion was made, hostile to the measure, which, after a long and animated debate, was negatived by a majority of 42. On the 5th of February, Lord Castlereagh communicated a message from the Lord Lieutenant, in favour of a union, and developed the plan on which it was to be effected. On a division of the House for taking this message into consideration, there appeared 158 in favour of it, and 115 against it. The House of Peers were more decidedly in favour of a union. In it the lord chancellor Fitzgibbon, now Earl of Clare, was one of its most strenuous supporters, while the speaker of the House of Commons as strenuously opposed it. It was also opposed by Sir Lawrence Parsons, the Duke of Leinster, Lords Charlemont and Moira, and Mr. Grattan. In order to counteract the effects of such a formidable opposition, government had recourse to those means, which the distribution of places of honour or emolument must always put in their power, and which too frequently have overcome the consciences of those who have been the most loud in their professions of purity, independence, and patriotism. By the active and judicious employment of these means, the majority in the House of Commons had been greatly reduced, and the prospect of carrying the measure was rendered every day more favourable. Besides, many of those, both in and out of parliament, who, during the first impulse of their feelings, had reprobated the union, without considering the arguments that might be urged in favour of it, having become cool, and divested themselves of prejudice, resolved to support it. The arguments for and against this measure are thus summed up by Mr. Gordon, in his History of Ireland.

"The opponents of the measure insisted, that the representatives of a nation were not vested with a power of abolishing its independence by the transfer of its sovereignty, or right of legislation, to any foreign country; that such a transfer, without the general consent of the people, ought to be resisted, as a dissolution of the existing government, and introductive of anarchy: that a local parliament, best acquainted with the habits, prejudices, and dispositions of their fellow subjects, ever present on the spot to administer immediate relief to their wants, or guard against their excesses, was preferable to a foreign legislature, unacquainted with the state of the people, and too distant to receive information, or apply the proper remedies in due time: that the Irish members in the Imperial Parliament would become, as the Scotch in that of Great Britain had become already, the tools of administration, to the increase of the undue influence of the crown: that the evil of absentees would be nearly doubled, to the intolerable augmentation of the exhausting drain of money, and the abandonment of the tenantry to the tyranny of agents, who would abuse their delegated power to the gratification of their pride and avarice: that, by the absence of the bishops from their dioceses, in consequence of their attendance upon the Imperial Parliament, the inferior clergy would be neglected, to the growth of irreligion, and the discouragement of literature: that the national importance of the Irish would be annihilated by the degradation of their country from the rank of a kingdom: and that whatever concessions should, in return for her sacrifices, be made to Ireland in the compact of union, might at any time afterwards be cancelled by the Imperial Parliament, from its vast majority of English members."

"The advocates of the incorporating system contended, that in every government is inherent a despotic power for the maintenance of order, the enacting of laws, and for the making of alterations occasionally in its own constitution, for its adaptation to successive changes of circumstances, which in the course of human affairs inevitably take place: that this power is lodged, according to the British system, conjointly in the king, the lords, and the representatives of the people: that the modification now proposed was, no surrendry of independence, but an intimate conjunction with the sister island, on honourable terms,—no subversion, but a change of the constitution: that, to deny the competence of parliament for the effecting of this change, would be to deny the validity of the act by which England and Scotland had been incorporated, and consequently to deny the right of his present Majesty to the crown of the united kingdom, which was founded on the 2d article of that act: that otherwise than through their representatives in parliament, the consent of the people could only be collected from the opinions of the well-informed, the reflecting and disinterested part of the nation: that, to these, the measure proposed was an object of desire: that, whatever might be the advantages to Ireland from her local parliament, the disadvantages were far greater: that the feeble bond, by which the two kingdoms were connected, was in danger of being broken by a disagreement of the two legislatures, of which an alarming instance in the appointment of a regent had lately occurred: that by the distinctness of her legislature, Ireland was excluded from commercial advantages, as had appeared in the case of the commercial propositions, which had been rejected from political jealousy arising from this distinctness: that this boasted national parliament was founded on no national basis, but on the pretensions of a few to a monopoly of the government and resources of the whole,—a puny and rapacious oligarchy, who considered the nation as their political inheritance, and were ready to sacrifice the public peace and happiness to their insatiate love of patronage and power: that for the demolition of this oligarchical tyranny, and the curbing of violent factions, by which the nation was distracted and oppressed, recourse should be had to a legislature superior to local prejudices, and remote from the baneful influence of party: that the Irish members in the imperial parliament could not be tools of the minister in a higher degree, nor with more expence to the nation, than the local parliament had already been, in which were 116 placemen and pensioners: that the augmentation of the evil arising from the absentees would be more than counterbalanced by new advantages, particularly those of commerce: that the persons who now made the increase of absentees an argument against the union had not long before opposed the design of a remedy for this evil, the proposal of a tax on absentees, which administration had offered to support: that the necessary absence of bishops from the clergy under their care, by their attendance in the Imperial Parliament, would occur so seldom, as not in the slightest degree to prevent them from performing their duty in rewarding merit, if such should be their inclination: that the political amalgamation of the Irish with the people of Great Britain could not be a declension from national dignity: and that the infraction of the compact with Ireland could not with more reason be apprehended from the Imperial Parliament, than the disfranchisement of Scotland, of Wales, or of Yorkshire."

On the 21st of May, on a motion that leave be given to bring in a bill for the union into the House of Commons, there were 160 for it, and 100 against it. On the second reading of the bill, on the 26th of the same month, Mr. Grattan moved to defer the business till the 1st of August; but only 87 voted in support of this motion, and 124 against it. On the 5th of June, the bill passed the committee. In the House of Lords, where there was less opposition, it was read a third time on the 13th of June. The subject being again introduced into the British Parliament, it was discussed in both Houses; and on the 2d of July received the royal assent.

The articles of union were partly commercial, or relating to revenue, and partly political. The regulations of commerce did not materially differ from the propositions of 1785. The proportion of revenue to be raised in the two kingdoms was fixed by a comparison of their aggregate exports and imports, and their consumption of certain kinds of merchandize. By this rule, Ireland was to raise two parts of the revenue, for every fifteen raised by Great Britain during the first twenty years after the union. At the termination of this period, the proportion was to be regulated by parliament. One hundred commoners from Ireland were to sit in the imperial parliament, two for each county, two for each of the cities of Dublin and Cork, one for the university, and one for each of the 31 most considerable towns. The proprietors of the disfranchised boroughs were to receive a pecuniary compensation. Four lords spiritual, by rotation of sessions, and 28 lord temporal, elected for life by the Peers of Ireland, were to sit in the House of Lords. The first of January, 1801, was fixed as the commencement of the union.

From the period of the union, the history of Ireland naturally falls into that of Britain; but we shall here cursorily notice such transactions or proceedings in the Imperial Parliament, as more directly relate to this country.

In the first session of the Imperial Parliament, a bill was passed for indemnifying all persons concerned in the securing, imprisoning, and detaining individuals, under the suspension of the habeas corpus act, or in the performance of any acts done for the preservation of the public peace, and suppression of rebellions and insurrections in Ireland, since March, 1799.

Ireland appeared to be gradually subsiding into a state of comparative tranquillity, when, in the summer of 1803, it was suddenly agitated by a considerable though short lived alarm. The constitution was attempted to be subverted by the violence of a few men, the rashness of whose attempt was scarcely ever paralleled. The leaders were Robert Emmett and Thomas Russel, both of whom had experienced the clemency of government in 1798; the former was brother to the Emmett who was one of the directory at that period. The centre of the plot was Dublin, where these men had collected a few arms, and hoped, by the assistance of a mob, to seize the castle, which was protected by upwards of 2000 soldiers. The 23d of July was the day fixed upon for the insurrection. On the morning of that day a crowd of country people from the county of Kildare entered the capital; a signal was given by the firing of rockets, and the doors of the depot of arms were opened. The number of the insurgents is supposed to have been about 500. The time of their principal operations was late in the evening; and while the mob were the most furious, they met Lord Kilwarden, the lord chief justice of the King's Bench, his daughter Miss Wolfe, and his nephew Mr. Wolfe. The two gentlemen were dragged from their carriage and murdered. Miss Wolfe effected her escape, and fled to the castle, where she gave the alarm. Their only martial effort was an attack on an outpost, defended by a few soldiers, whom they overpowered and put to death. But being themselves attacked by about 120 soldiers, they were dispersed in a short time, and the whole insurrection was extinguished. Emmett, Russel, and some others of the leaders, were tried, condemned, and executed. A royal message was sent down to parliament, announcing the insurrection and its end, in which it was recommended that measures should be taken for the suppression of the rebellious spirit from which the insurrection had originated; and a bill for trying the rebels in Ireland by martial law, and another for suspending the habeas corpus act, were passed. Emmett, Russel, &c. were however tried, not by a court martial, but a special commission.

As the spirit of insurrection still lurked in various parts of the country, and broke forth in various acts of outrage, in 1807, Sir Arthur Wellesley, who was then secretary to the lord lieutenant, moved, in the House of Commons, for leave to bring in a bill, the provisions of which were the same with those of the insurrection act of 1796 so far as they gave power to the Lord Lieutenant to proclaim disturbed counties, and authority to the magistrates to arrest persons found out of their dwelling-houses between sunset and sunrise; but it was enacted, that persons so arrested should be tried at the quarter sessions by the magistrates and assistant barristers, with the addition of a king's counsel sent for the purpose. Another bill was passed to prevent improper persons from keeping arms. These bills were opposed strongly, but their necessity was admitted by Mr. Grattan.

It had been generally understood, that, in the event of the union between Great Britain and Ireland taking place, the Catholics might look forward to the removal of all the disabilities under which they still laboured; their emancipation, however, not taking place, they resolved to endeavour to bring it about by every peaceable and legal method. That they might act with more effect, as well as with less trouble to themselves, a committee was formed; the deliberations of that of 1809 were always confined to their petition, and the members had declared their resolution not to transgress the convention act, by any thing like delegation; the government of course did not interfere with them. But it was alleged that the committee of 1810 acted upon very different principles: it called an aggregate meeting of the Catholics, which came to the resolution, that the committee should have the power to manage, not merely the Catholic petition, but the Catholic affairs generally. A committee of grievances was afterwards appointed, which met weekly, and imitated all the forms of the House of Commons. Government took the alarm, and even some of the most respectable Catholics thought that the committee, by proposing a delegation of ten members from each county, had exceeded its powers. A circular letter from Mr. Wellesley Pole, secretary to the Lord Lieutenant, was addressed to the sheriffs, and the chief magistrates of all the counties in Ireland; they were required, in pursuance of the convention act, to cause to be arrested, and committed to prison, unless bail should be given, all persons within their respective jurisdictions, who might be guilty of having been in any way concerned in issuing notices for such election or appointment, or of having attended meetings for such purpose. Before this letter was written, the opinions of the Lord Chancellor and the Attorney and Solicitor General had been taken; and the letter itself had been drawn up by the Attorney General in such a manner as he hoped would bring closely before the eyes of the Catholic committee the tendency of their proceedings to violate the convention act. This letter was dated the 13th of February, 1811, and, on the 23d, two magistrates of Dublin were directed by the Lord Lieutenant in council to repair to a house where the Catholic committee assembled. This they accordingly did; and Lord Ffrench, who was in the chair, demanded by what authority they entered the room? the answer was, that, by order of government, they were come to disperse the meeting, as, being a meeting of the Catholic committee, it was illegal. After some conversation, the particulars of which are differently related, one of the magistrates went to consult Mr. Wellesley Pole; and, on his return, he said, that as Lord Ffrench had given them an assurance that it was merely a meeting of Catholic gentlemen for the purpose of signing a petition to parliament, and not a meeting of the Catholic committee, government had given directions that it should not be interrupted.

The letter of Mr. Pole was made the subject of some conversation in parliament; and afterwards motions were made in both Houses for the production of copies of all the dispatches to and from the Lord Lieutenant, relative to this business, which were negatived.

On the 20th of May, the petition which the Catholic committee had drawn up was presented to the House of Commons by Mr. Grattan: on the 31st he moved that it should be read, and also the votes of the House, conveying thanks to the armies under Lord Wellington and General Graham; from these he took occasion to point out, with great eloquence and force of argument, the claims of the Irish Catholics—of those men who had contributed so essentially to achieve those victories, by which the glory Britain had been so highly exalted, and the safety and independence of Europe so essentially benefited. On a division, there appeared for the motion 83, and against it 146. The Catholic petition was also introduced into the House of Lords by Lord Donoughmore, who moved that it should be referred to a committee. This motion was negatived by 121 to 62.

The Catholics of Ireland were not cast down by the result of the motions respecting their petitions; nor were they intimidated by Mr. Wellesley Pole's letter, and the measures of government thereupon. On the contrary, they resolved to persevere with increased zeal and assiduity in nominating delegates. On the 9th of July, an aggregate meeting was held at Dublin, for the appointment of delegates to the general committee of Catholics, when five persons were apprehended by a warrant of the Lord Chief Justice, for a breach of the convention act. One of them, Dr. Sheridan, was brought to trial; but the jury brought in a verdict of not guilty, upon which the Attorney General declined prosecuting the others. The verdict gave great encouragement to the Catholics, as well as great satisfaction to many Protestants, not only because they were friendly to the claims of their Catholic brethren, but because an attempt had been made and defeated, of perverting the law to the violation of the liberty of the subject. On the 19th of October, nearly 300 gentlemen, who formed the new committee of delegates, held a meeting, at which a petition to parliament was read and approved. The police magistrates did not arrive till the meeting was broken up; but on the second meeting of this committee, on the 23d of December, it was dispersed by a magistrate. On the 26th of the same month, the aggregate meeting was held, when the proceedings of the Irish government were severely censured; and it was resolved not to submit to them in silence. The only other circumstance relating to the history of Ireland that took place this year, deserving of record, was an act passed, to enable the crown to interchange the militias of Great Britain and Ireland. In this act was a clause, to confer on the Irish Catholics serving in England all the civil, military, and religious exemptions which they enjoyed in Ireland.

Early in the session of 1812, the claims of the Irish Catholics were again brought under the discussion of both Houses of Parliament. On a subject so frequently examined, little or no novelty could be brought forward. It may be mentioned, however, that the Marquis of Wellesley and Mr. Canning, though they professed themselves decidedly convinced that the claims of the Catholics were supported by justice and policy, yet were averse to conceding them while they were demanded in such a menacing attitude. The motions were lost in both Houses; but in the House of Commons the majority seemed on the decline.

From this circumstance the Catholics took heart. The tables of both Houses of Parliament were loaded with petitions both for and against their claims. On the 25th of February, 1813, Mr. Grattan moved for a committee of the whole House of Commons, to take into consideration the state of the laws that affected his Majesty's Roman Catholic subjects in Great Britain and Ireland. On a division, the motion was carried by a majority of 40. A committee was then formed, when Mr. Grattan moved, that the Catholic disabilities should be removed, and that the establishments in church and state ought to be effectually secured. The first motion was carried by a majority of 67. On the 30th of April, Mr. Grattan introduced a bill, which enacted, that it should be lawful for persons professing the Roman Catholic religion to sit and vote in either House of Parliament, provided they took a prescribed declaration or oath, instead of the oaths of allegiance, abjuration, and supremacy, and the declarations against transubstantiation and the invocation of saints. In this oath, they were to renounce their belief in the temporal jurisdiction or authority of the pope in Great Britain or Ireland—his infallibility or right to forgive sins without repentance—and whatever, besides, was subversive of morality, or dangerous to the church establishment. On taking this oath, Catholics might vote for members of parliament, or be appointed to any civil or military office, except those of lord high chancellor, keeper of the great seal, or lord-lieutenant of Ireland. The Roman Catholic clergy were to take an oath against the appointment of bishops, except such as were of unimpeachable loyalty; and against any correspondence with the pope, except on ecclesiastical matters. The bill was read and committed, and it was generally thought that it would pass, at least, the House of Commons. On the 24th of May, however, when the House was sitting in a committee on it, Mr. Abbott, the speaker, after a strong speech against it, moved, that the words, "to sit and vote in either House of Parliament," be left out. This motion, after a long debate, was carried by a majority of four, upon which the bill was withdrawn.

Though occasional and local disturbances existed in Ireland, they were not deemed of such a nature as to call for any new enactments of the legislature, till the year 1814, when a set of banditti, called Carders, committed outrages in some parts of the country. They were so called, because they tortured those who had incurred their hatred by the application of wool-cards to the skin and flesh of their victims. In consequence of their outrages, an act, to be in force for three years, was passed, similar to the insurrection act of 1807. The proceedings of the Orange societies, which at this time were very numerous, and by no means actuated by a liberal or conciliating spirit, were strongly reprobated in parliament during the discussions on this act.

In 1816, Ireland suffered, in common with Great Britain, and nearly the whole of Europe, from the effects of a season almost unprecedented for coldness and rains, and for a most scanty produce of grain; but though there was a nearer approach to famine in Ireland than in any part of Britain, and though this calamity pressed most heavily upon the inhabitants, from their not possessing those resources, either of trade or poor-rates, which are open to the lower classes in England, yet Ireland was quiet and loyal, while England was agitated by the most outrageous attempts against the public peace. See Leland's *History of Ireland*; Gordon's *History of Ireland*; Gordon's *History of the Rebellion in Ireland*; *Annual Register*; Aikin's *Annals of George III.*

PART II. STATISTICS OF IRELAND.

CHAP. I.

Geography and Hydrography of Ireland—Extent—Progressive Geography—Divisions—Face of the Country—Mountains—Rivers—Loughs—Sea Coast—Effects of the Wind on the Coasts—Sea Banks—Tides.

Ireland, called by the inhabitants Erin, and by the Welsh Yverdon, lies in the Atlantic Ocean, between 6° and 10° 40′ West Longitude, and 51° 15′ and 55° 13′ North Latitude. It is separated from Great Britain on the east by the Irish Channel, which is also called St. George's Channel; the latter appellation, however, is more commonly and particularly given to the southern entrance; and the northern entrance is, strictly speaking, distinguished by the appellation of the North Channel. The Atlantic Ocean bounds it on all the other sides. The nearest land to it on the west is America; on the south, Gallicia in Spain; and on the north, the Hebrides. The Irish Channel varies very much in breadth; generally speaking, it is narrowest at the two extremities, and broadest in the middle; the least breadth is between the Mull of Kintyre, in Argyle-shire, and Torhead, in the county of Antrim; the distance between these two places is about 16 miles.

Ireland is of an oblong shape, which, however, is bent from a straight line by the province of Munster; for this province, instead of stretching itself first from the north to the south, and then from the south to the west, like the rest of the island, runs, in a sloping direction, from north-east to south-west, and its western shores stretch farther into the sea than any other part of Ireland. Although Ireland is more compact in its form than Great Britain, yet it is still irregular, narrowing from the middle, with various inequalities to the north-east and south-west; "contracting suddenly in the former direction, and then somewhat dilating, so as to make in that quarter a rounded peninsula; in some degree gibbous on the south-east, and of a serrated form on the south-west."

From this account of its figure, it will be evident that its greatest length must be from the north-east to the south-west; a line drawn between the two most distant points in these quarters, viz. Fairhead in the county of Antrim, and Mizenhead in the county of Cork, will measure 241 Irish, or rather more than 306 English statute miles. From Emlah-rash, in the county of Mayo, to Carnsore-point, in the county of Wexford, is the greatest breadth of Ireland, being 163 Irish, or 207 English miles. The greatest length that can be drawn along a meridian, however, is not more than 185 Irish, or 235½ English miles; and the greatest breadth that can be measured nearly on a parallel of latitude is not more than 137 Irish, or 174 English miles. In consequence of the numerous and deep indentations of the sea on the west coast, there is not a spot in the kingdom 50 miles distant from the sea.

Geographers differ with regard to the superficial contents of Ireland. Dr. Beaufort, from a computation made by carefully measuring the area of each county on the best maps, is of opinion that it contains considerably more than 18,750 square miles, or several thousand acres above 12 millions, Irish measure, which is equal to 30,370 English miles, or 19,436,000 English acres. Mr. Wakefield is of opinion that, including the inland lakes, the superficial contents amount to 32,201 English square miles, of 69° 15′ to a degree; or 12 722 615 Irish acres, or 20,437 974 English acres. Mr. Pinkerton, and some other geographers, reduce its contents below those assigned to it by Dr. Beaufort and Mr. Wakefield, and assign it only 27,457 square miles. According to others, its contents amount to 11,067,712 Irish, or 17,927,864 English statute acres.

The progressive geography of Ireland presents little that is interesting. The map of Ptolemy is the most ancient geographical document of this island which we possess; and, considering the period in which he lived, and compared with the maps and descriptions he has given us of countries at that time better known, it is distinguished for its correctness in the delineation of its general shape, and of its rivers, promontories, &c. The principal tribes mentioned by Ptolemy are, the Darni, on the north-east, and the Venicni and Robogdii, on the north-west; to the south of these he places the Nagnati, Auteri, and Gangani, on the west, the Erdini in the centre, and the Voluntii, Eblani, and Cauci, on the east; and still further south, were the tribes of the Menapii, Brigantes, Bodii, Ivelni, Velabri, and Luceni. This geographer also mentions ten towns, of which the principal is Eblana, now Dublin. The geography of Ireland during the middle ages is more obscure than it was in the time of Ptolemy; at that period the Dalriadi occupied the north-east; the Crutheni occupied the north-west; and a numerous tribe called the Nelli seem to have occupied a large portion of the centre of the northern part of the island. Notwithstanding Ireland was first reduced under the subjection of the English in the reign of Henry II., it was little known till the time of Queen Elizabeth, when Stanihurst and Spencer published descriptions of it; and even at this day the geography of its western counties is by no means perfect.

Ireland at present is divided into four provinces, Ulster, Leinster, Connaught, and Munster. Ulster, the most northerly province, is bounded on the north by that part of the Atlantic called the Deucaledonian Sea; on the west by the main body of the Atlantic Ocean; on the east by St. George's Channel and the Irish Sea; and on the south and south-west by the provinces of Leinster and Connaught. Its area comprises 8375 English square miles, and it contains nine counties: viz.

	Baronies.	Parishes.	Acres, Irish.
Armagh, containing	5	20	181,450
Down, ...	8	60	348 550
Antrim, ...	8	77	387 200
Londonderry, ...	4	31	318 500
Donegal, ...	4	42	679.550
Tyrone, ...	4	35	463.700
Fermanagh, ...	8	18	283.450
Cavan, ...	7	30	301.000
Monaghan, ...	5	19	179,600

besides Lough Neagh, which is supposed to cover an area of 58,200 acres.

The following are the principal towns in the province of Ulster:

In the county of Armagh, the city of Armagh, Lurgan, Portodown, Hamilton-Bann, Tanderagee, and Jonesborough; in county Down, Donaghadee, Portaferry, Strangford, Down Patrick, the county town and city, Dromore, a city, Port St. Ann, Newry, Bann Bridge, Gilford, Ballynahinch, and Bangor; in the county of Antrim, Belfast, Carrickfergus, Larne, Bally Castle, Randalstown, and Antrim, the county town; in Londonderry, Colerain, Killree, Castle Dawson, Newtoun, and Londonderry, the county town; in Donegal, the city of Raphoe, Letterkenny, Ballyshannon, and Donegal, the county town; in Tyrone, Strabane, Omagh, where the assizes are held, the city of Clogher, Dungannon, Cook's town, Stewart's town, &c.; in Fermanagh, Enniskillen, the county town, there is no other place of any size or consequence in Fermanagh; in Cavan, Cavan, the county town, Killeshandra, and Virginia; in Monaghan, Castle-Blaney, Carrickmacross, Clones, and Monaghan, the county town.

Leinster, which is the most eastern province of Ireland, is bounded on the north by Ulster, on the east and south by St. George's, or the Irish Channel, and on the west by the province of Munster; it contains 7360 Englight squares miles; and comprises the following 12 counties:

	Baronies.	Parishes.	Acres.
Louth, ...	4	61	110.750
Meath, ...	12	147	327 900
Dublin, ...	6	107	142.050
Wicklow, ...	6	58	311.600
Wexford, ...	8	142	342,900
Kilkenny, ...	9	127	300.350
Carlow, ...	5	50	137 050
Queen's County, . .	8	50	235 300
King's County, . .	11	52	282,200
Westmeath, . . .	12	62	231,550
Longford, ...	6	23	134,150

In the province of Leinster the principal places are, in the county of Louth, Drogheda, Carlingford, Dundalk, Ardee, and Louth, the county town; in East Meath, Trim, the county town, Navan, Kells, Athboy; in Dublin, Dublin, a city, the county town, and the capital of Ireland; besides it there is no place of importance in this county; in Wicklow, Bray, Arklow, and Wicklow, the county town; in Wexford, Wexford, the county town, New Ross, and Enniscorthy; in Kilkenny, Kilkenny the county town, Callan, Innistioge, Thomas Town, &c.; in Carlow, Carlow, the county town, and Tullow; in Queen's County, Maryborough, the county town, Portarlington, and Mountmilick; in King's County, Philipstown, the county town, Tullamore, Balliboy, Banogher, and Bier; in West Meath, Mullingar, the county town, Athlone, and Fore; and in Longford, Granard, Longford, the county town, Edgeworthstown, Ardagh a city, Colehill, and Lanesborough.

Connaught, the most western province of Ireland, is washed on the south and east by the Shannon, and on the west by the Atlantic, and it is bounded on the north by the province of Ulster; its area comprises 7191 English square miles; and it comprehends the following five counties: viz.

	Baronies.	Parishes.	Acres.
Galway, ...	16	116	989.950
Mayo, ...	9	68	790.600
Sligo, ...	6	39	247.150
Leitrim, ...	5	17	255.950
Roscommon, . . .	6	56	346 650

In the province of Connaught the principal towns are the following; in the county of Galway, Galway the county town, Tuam a city, Loughree, Aghrim, Clonfert a city; in Mayo, Castlebar the county town, Mayo; in Sligo, Ballymoat, and Sligo the county town; in Leitrim, Carrick-on-Shannon the county town, Leitrim; in Roscommon, Tulsk, Abbeyboyle, Ballynasloe, and Roscommon the county town.

Munster, the most southern province in Ireland, is bounded on the north by Leinster and Connaught, and on the east, west, and south, by the ocean; it was formerly subdivided into Desmond, or South Munster, Ormond, or East Munster, and Thomond, or North Munster; its area occupies 9276 English square miles; and it is divided into the following six counties, viz.:

	Baronies.	Parishes.	Acres.
Cork, ...	16	269	1,048,800
Kerry, ...	8	83	647,650
Clare, ...	9	79	476.200
Limeric, ...	9	125	386,750
Tipperary, ...	10	186	554,950
Waterford, ...	7	74	262,800

In the province of Munster the following are the principal places; in the county of Cork, Cork the county town, and a city, the second place in size and population in the kingdom, Bandon, Baltimore, Youghall, and Rathcormuck; in Kerry, Listorwell, Ardfert, the county town and a city, Tralee and Dingle; in Clare, Killaloe a city, Ennis, or Clare, the county town, and Kilfinora; in Limeric, Limeric the county town and a city, Castle Connel, Charlesville, Killmallock; in Tipperary, Cashel the county town and a city, Tipperary, Nenagh; and in the county of Waterford, Lismore, Dungarvon, and Waterford, the county town and a city.

Few of the places above enumerated are of considerable size; so that, if we except Dublin, Cork, Belfast, Limeric, Galway, Sligo, Londonderry, Dundalk, Newry, Waterford, Wexford, Kinsale, Kilkenny, and a few others, the rest can only be considered, in respect to size and population, as villages. It may be remarked, with regard to the towns of Ireland, that, with scarcely a single exception, all the places of even tolerable size and population have a near and easy communication with the sea. The chief towns in the interior are rather venerable for their ecclesiastical antiquity than important in themselves; Kilkenny is an exception.

Recapitulation.

	Baronies.	Parishes.	Acres.
Ulster	53	332	3,201,200
Leinster	97	992	2.792,550
Connaught	42	296	2,630,300
Munster	59	816	3,377,150

From these Tables it will be seen that the largest of the provinces is Munster, and the smallest Connaught; and that the largest county is Cork, and the smallest Louth: it may also be remarked, that Leinster contains a far greater number of parishes in proportion to its area than any of the other provinces, which circumstance arises from its having been first colonized and civilized by the English, and to the consequent encrease of its population: a similar effect was remarked under the statistics of England, with respect to Norfolk and some other counties in that kingdom. The parishes are subdivided into townlands, and ploughlands, gneeves, cartons, &c.

The greatest elevation of the soil, or platform of Ireland, is in the Bog of Allan. This elevation does not exceed 270 feet, yet it is sufficient to give descent to the greatest rivers in the island. The ridge, or back-bone of Ireland, runs through this bog, dividing the waters of the Shannon from those which flow, in an easterly direction, to the Irish Channel, and southward to the shores of Munster. This elevated ground is connected with the principal mountains of Ireland, winding on the north to those of Tyrone, and on the south to those of Sleeve-Bloom and the Galtees, and afterwards turning to the west, to the peninsula of Corcaguinny.

Ireland is by no means a mountainous country; for though there are many hills of considerable elevation, yet neither their height, their continuity, or their number, can give it that character, compared with those countries which are generally deemed mountainous. Many parts are level, some quite flat, and many uneven, with hills of no great magnitude; on the other hand, there are not any such low fenny flats as in Britain. According to Dr. Beaufort, in his *Memoir of a Map of Ireland*, the most extensive levels are about the middle of the island, where a vast plain stretches quite across from sea to sea, from the coast of Dublin to the bay of Galway, including in its extent the Bog of Allan. In general, the maritime parts, particularly the western, are more mountainous than the interior, yet the mountains are so disturbed that we find few places "in which, (to use this author's expression,) the prospect is not somewhere terminated by this species of majestic scenery, forming a back ground, seldom more remote than 20 miles." The Irish mountains in general form short lines or detached groupes, as they are in unconnected masses of different magnitudes; in general they are of easy ascent, and admit of culture a considerable way up their sides; some of them, however, are precipitous, terminating in cones or spires. On the west and south of the Lake of Killarney, there is a chain of considerable height; one of which, Mangerton, is, according to Kirwan, 2693 feet above the level of the sea. On the north-west of

Bantry Bay, there is a small chain which stretches to the east. To the north of this is the chain of mountains called Sleeveboghér and Nagles, followed by the Galtee mountains; on the east of the province of Munster, the mountains of Knockandown bend in a southerly direction to the bay of Dungarvon. In the interior of the province of Leinster, the Sleeve-bloom mountains divide the King's and Queen's counties, and form a great chain; in this province also lie the Wicklow mountains, which are about 30 English miles in length, and 12 in breadth. In the south-east corner of the province of Ulster are the mountains of Mourne; one of them called Sleeve Donaw, in the county of Down, is said by Kirwan to have an elevation of 2809 feet above the level of the sea. The centre of this county is formed of the mountains of Sleevecroob. The extreme western peninsula of Connaught, is one of the most mountainous regions of Ireland. In the county of Mayo, there is a solitary hill, called Mount Nephin, that, according to Kirwan, is 2630 feet above the level of the sea. Croagh Patrick, in the same county, on the south-east of Clew-bay, rises to the height of 2660 feet.

With the exception of the Shannon, Ireland possesses no very considerable river. The Shannon, which is not only the largest river in this country, but one of the finest in the British isles, rises in the county of Leitrim. After running a few miles, it spreads into Lough Allan; from this lough it issues in a much fuller stream than it entered. After a progress of several miles, it again expands its waters, and assumes the name and form of Lough Esk; this lough, however, though long, is not very broad. On its exit from this, it forms another lake, called Lough Ree, 15 miles long and 5 broad; afterwards it appears a large and beautiful river. Between the counties of Tipperary and Clare, it expands, and forms Lough Derg, or Derke, 18 miles long and 4 broad. On leaving this, its stream, now of very considerable volume and rapidity, flows for several miles, and at length falls into the sea, about 50 miles below Limeric, at a place called Knockpatrick: below this city, it expands into a vast estuary from 3 miles to 10 in breadth. The whole course of the Shannon is about 170 miles; and it is nearly 7 miles broad at its mouth: in its course it divides the provinces of Connaught and Leinster, and afterwards the former, from Munster; its western banks are formed by the counties of Roscommon, Clare, and Galway; its eastern ones by Leitrim, Longford, King's County, Meath, Tipperary, Limeric, and Kerry. This fine river is almost throughout its whole course so wide and deep, as to be navigable for vessels of considerable burden; the only impediment of consequence is a ledge of rocks at some distance above Limeric, and a little below Killaloe, over which a cataract falls. The famous Earl of Strafford had formed the intention of removing this impediment, but his own troubles, and those of his country, prevented its being carried into execution. From Killaloe to Carrick-on-the-Shannon, near the source of this river, there is an inland navigation of some convenience and utility. The only other river in Connaught of any importance is the Suck, which falls into the Shannon a little below Athlone.

The Bandon is succinctly and well described by Spencer as

> "The pleasant Bandon, crowned with many a wood."

This river, which was anciently called Glasheen, rises in the mountains of Carberry; passing by Dunmanway, and receiving a tributary stream, it runs to the east through a bog, with a divided channel, and arrives at Inskeen: after passing the town of Bandon, it winds north-east to Innisshannon, a little below which it becomes navigable. Hence it winds in several beautiful reaches to Kinsale. The Lee rises out of a lake in the west of Musskerry; and after passing by several hills, and receiving a considerable accession of water, it expands into Lough Allan; on its exit from this, it flows to Cork; a little below this city, being joined by the Glanmire, it expands into a spacious and commodious haven, falling into the sea about 15 miles below Cork; it is not navigable any higher than this place. The Blackwater, or Broadwater, rises in a bog near Castle-island in the county of Kerry: its course is nearly due east for about 50 miles, till it comes to Cappoquin; here, making an angle, it turns to the south, and proceeding in a straight course, about 10 miles farther, it falls into the sea at Youghall; it is at present navigable only as high as Cappoquin for vessels of any burden, but formerly it was navigable as high as Mallow, about 40 miles from its mouth. This river is very liable to overflow its banks. The Bandon, Lee, and Blackwater, are all in the county of Cork, and run in a manner parallel to one another; the Bandon, about 7 miles south from the Lee, and the Blackwater, 14 miles to the north of that river.

The Sure rises at the foot of Banduff mountains in the county of Tipperary, near the source of the Nore; but they soon take different directions: the course of the Sure is at first south-west: afterwards due south; below the village of Ardfinane, it turns to the east, dividing the counties of Tipperary and Waterford; and having received a small stream, it bends northward till it reaches Spencer's "Sweet Clonmell;" after a progress of 8 miles more it comes to Carrick, and at last falls into the sea at Waterford: it is navigable for large vessels as far as this city, and for barges as far as Clonmell. The Barrow rises in the King's County; its course for a short space is north-east, then suddenly turning, it flows to the south-east, dividing King's and Queen's Counties from that of Kildare: it next passes through the centre of the county of Carlow, and then separates the counties of Kilkenny and Wexford; a little before it reaches Ross, it receives the Nore, already mentioned; after their junction, its course bends rather to the west, till it unites with the Sure, forming the right arm of Waterford haven. The Nore is navigable from New Ross to Inistioge; the Barrow and the Nore, previous to their junction with the Sure, are navigable for large ships to New Ross, and for barges to Carlow and Athy. After the junction of all these three rivers, there is a considerable bar, which prevents the passage of large ships, except during high tides.

The Slane rises in the south-west corner of the county of Wicklow; its course at first is very winding through the county of Carlow, sometimes to the south-east and sometimes to the south-west; afterwards, flowing in a south-east direction, it divides the county of Wexford till it reaches Enniscorthy; its course is then south, and afterwards east, which brings it into a bay a little below the town of Wexford. The Slane is navigable for barges from Wexford for Enniscorthy. The river Liffy rises about 10 miles south-west from the city of Dublin, and about 15 west from the sea: its course at first is south-west through the county of Wicklow; then running directly west, it enters the county of Kildare; where it again forms an elbow and flows north-west, and at length due north: in this part of its course, it is parallel to the sea, and nearly 30 miles distant: afterwards bending to the north-east, it enters the county of Dublin, and then turning at first to the north and next to the east, it flows with a full stream and pretty strong current to the capital, and falls into the Bay of Dublin; its course is about 50 miles.

The Boyne rises in King's county; by its junction, soon after its rise, with a great many rivulets, it becomes a very considerable river in its passage through the county of Kildare; and still stronger in its course, and more beautiful in its appearance, when it enters East Meath, where it passes by Trim, Navan, and Slane; its course from Slane to Drogheda, for about seven miles, is east; about two miles below Drogheda, it falls into the sea. The Boyne is navigable for ships of considerable size as far as this town; and, by means of cuts, barges may proceed from Drogheda to Navan. The river Bann rises in the plain called the Deer's, or King's Meadows, in the northern part of that ridge of mountains, in the county of Down, already mentioned, called the Mourne; it soon becomes a large stream; its course at first is winding, but generally in a direction to the north-west; at Portodown, it is joined by the canal of Newry; and, a few miles lower down, it falls into Lough Neagh at Banfoot ferry, after running about 30 miles. When it leaves this lake, it continues its former direction north-west, and divides the counties of Antrim and Londonderry. After passing over a ridge of rocks, called the Salmon leap, it flows with impetuous force into the sea, a few miles below Coleraine. The river Foyle passes by Londonderry, and has a considerable estuary called Lochfoyle; it is navigable to Lifford.

Ireland abounds in lakes, some of which are very extensive. They are commonly divided into salt water lakes, and fresh water lakes; but as the former, properly speaking, are estuaries, or inlets of the sea, they will be described afterwards, when we treat of the sea coast of Ireland; at present, we shall confine ourselves to the fresh water lakes, or lakes properly so called.

The most extensive lake of fresh water is that of Erne, which, however, sometimes appears as a river, and sometimes as a lake. Lough Erne is in the province of Ulster, and county of Fermanagh; as a river, it derives its source from a small lake on the borders of the county of Longford. Below Belturbet, it expands itself into a lake; it again assumes its former shape, and flows past Enniskillen; between this place and Church-hill, it is sometimes a lake and sometimes a river; but a little to the south of Church-hill, it widens into an extensive lough, appearing like an inland sea. From this description it will be seen, that Lough Erne, properly speaking, consists of two loughs; the one lies north and south, joining the other, which lies east and west, by a small canal; and from this last the river Erne runs into the sea; the first of these loughs is 20 miles long, the other about 15; the greatest breadth of Lough Erne is 12 miles; its medium breadth 10 miles. This lough contains, in its two basins, 300 or 400 islands.

Next in magnitude is Lough Neagh, which lies in the centre of the province of Ulster, and is bounded by five counties, Armagh on the south, Tyrone on the west, Londonderry on the north-west, Antrim on the north and east, and Down, which barely touches it on the south eastern angle. It was formerly believed that Lough Neagh covered 100,000 acres of land, and it is so laid down in all the old maps of Ireland; but, by a recent accurate survey, its area is reduced nearly to one half, as it does not exceed 58,200 acres; its length is 15 miles, and breadth seven miles. This lough is supplied by the constant influx of several rivers of considerable magnitude, although there is but one narrow channel by which these are again discharged, yet it very seldom inundates its shores. The river Bann, through which its waters find their way into the ocean, has been already described. In some places, the coast of Lough Neagh is bold and abrupt; but in general it is flat, and nearly bare of wood; nor are there in it "any of the delightful interruptions," for which Lough Erne and Killarney are celebrated; there being no breaks in the prospect, with rocky and wooded islands. The tameness of its surface is broken only in two parts, by Black-water island, in the south-western angle of the lough, at the mouth of the river of the same name, and by Ram Island, on its eastern borders, near the coast of Antrim. Lough Corrib, in the province of Connaught and county of Galway, is next in size to Lough Erne and Neagh; it is 20 miles long from north to south, and at the upper end broad, but grows narrower, so that its medium breadth is only about four miles. In the midst of the mountains of the county of Kerry is the celebrated Lakes of Killarney: they are three in number; the largest, which is called the lower lake, occupies an area of 3000 acres: its south-west shore is bounded by a majestic range of mountains, while, on the opposite shore, there is the fine and striking contrast of flat land, in a high state of cultivation. Mucross Lake, to the south, occupies 640 acres: it lies immediately under the Turk mountain. For about three miles, the lakes continue with a width which gives them the appearance of a river, till they approach the upper lake, containing 720 acres. As this lake lies in a hollow, among stupendous mountains, its scenery is magnificent and sublime in the highest degree. "These glassy lakes, overlooked by stupendous mountains, bordered with pendent woods, most delightfully variegated, ornamented with the most romantic verdant islands, resounding on all sides with waterfalls, and the reverberations of a vast variety of echoes, combine an assemblage of beauty, perhaps unparalleled,—at least far surpassing all power of language to express." The lakes are almost the only ones in the south of Ireland; in the east, there are none of any importance; on the north-west are the lakes of Gask, Frierty, Melno, Gill, and Macnean. Lough Allan is in fact the river Shannon, under another name, and has been already described.

The water-fall at Hungra-hill, in the county of Cork, may aptly be mentioned in this place; it is thus described by Dr. Smith, in his *Ancient and Present State of the County of Cork.* "Not far from Ross Mac-Owen, is one of the largest and highest water-falls in this kingdom. This cataract is very visible from the town of Bantry, at least 14 miles distant from it. The water is collected from various small rivulets and springs, forming a large lake on the top of a vast, high, rocky, and almost perpendicular mountain, called Hungra-hill, which is at least 700 yards above the level of the bay of Bantry. The water cascades from the top of this mountain in a beautiful sheet, at least ten yards broad, which expands as it falls; about half the height of the mountain it dashes perpendicular on a prominent rock, from whence a mist arises, almost the third part of the hill, which, in some particular stations, the sun's rays playing upon it, and meeting the eye of the spectator, must make a charming appearance, these kinds of mists, in such positions, generally reflecting the colours of the Iris: Hence it falls from rock to rock, till it has passed the rugged declivity of Hungra-hill; and before it joins the ocean it has another fall, cascading in an arch over a lower hill,—all which make a fine sight as one sails up and down the bay."

Not many years after the example set by the Duke of Bridgewater, a grand canal was begun from the city of Dublin to the river Shannon; but, in the original plan and survey, great errors were committed, and the work was interrupted in the year 1770, after the canal had been carried to the Bog of Allan, at an expence of 77,000*l.* At the time of the Union, 500,000*l.* was voted by government to assist the completion of this and other canals in Ireland; and the grand canal now extends from Dublin to Shannon harbour, while another branch proceeds to Athy, where it joins the Barrow; its greatest utility is to supply the capital with turf. The royal canal, one branch of which begins at Glassmanogree, in the county of Dublin, and the other at the Liffy, near the Lots, extends to Coolnahay, beyond Mullingar; it is principally used for the carriage of corn and turf. The Newry canal, which runs along the southern boundary of the county of Down, is one of the most useful in the kingdom. The improvement of agriculture, and the conveyance of coals from the Tyrone coaleries, suggested the execution of this canal; it is cut from Carlingford Bay, and, joining the Newry water, embraces the upper Bann at Portodown; thus continuing the navigation to Lough Neagh, while a branch strikes off to the Tyrone coaleries. This canal carries vessels of 50 or 60 tons burden. The navigation of Lough Derg, above Killaloe, of the Shannon from Lough Ree, and of the Barrow from Athy, has been improved, by directors appointed under an act of the 43d of George III.

Ireland has a circuit of 250 leagues of coast, which is deeply indented, particularly on the west and south-west, where the whole force of the Atlantic ocean, swelling to a tremendous height, and breaking with inconceivable violence on its shores, forms, in the deep recesses of the promontories, by which these coasts are distinguished, some of the noblest havens in the world. Fourteen harbours for the largest ships, seventeen for frigates, and thirty-six for coasting vessels, besides twenty-four good summer roads, are to be found on the different coasts of Ireland.

In the description of this coast, we shall begin with the province of Munster, proceeding by the south and east coasts to the north point of the island. The coast of the county of Clare extends from Galway Bay to the Shannon; in this extent there are several bays, but none of them form a good harbour. The mouth of the Shannon is formed by two promontories; that on the north is called Cape Leane, or Loupshead; that on the south Ballyleigh, or Kerryhead. On the Kerry side, about twenty-five miles from the sea, lies the Tarbet, a small but very safe and commodious bay, behind a little island. Without the mouth of the river, round Kerryhead, there is a large body of water, one side of which is called Ballyleigh, and the other Tralee Bay. Near this part of the coast are many sand hills, formed by the wind, and on some parts the sea gains rapidly: other parts of this coast present to view some of the highest mountains in Ireland The peninsula of Dingle is of great height, and behind it rises Brandon hill, a noted land-mark, 2250 feet high. Brandon Bay derives its name from this hill: many of the clifts that line this part of the shore are worn into deep and extensive caverns. On the east is flat low land, off which are seven small islands called the Hogs. On the north side of the peninsula of Dingle is the harbour of Smeerwick, corrupted from St. Mary Wick's Bay; it lies from north to south, is deep and sheltered from all winds but north and north-west. Between this harbour and Ferreter Cove the land is low, and has been much covered with sand by the sea and wind. Dunmorehead is the west point of the peninsula of Dingle, as well as of Europe: off it lies the Blasquet Islands, 12 in number; the largest of which is a great mountain, three miles long, and one broad: tradition reports that it was formerly joined to the mainland. The sound between it and the mainland is of great depth, occasioned probably by the currents of both ebb and flood setting through it with great rapidity. Fintry Bay is open, and much exposed to southerly winds: half a league to the east of Fintry, lies Dingle harbour, six leagues deep and four wide; the entrance is scarcely a quarter of a mile broad; the depth of water is 30 feet, and it is landlocked from all winds. The isle of Valencia lies on the south side of it. The rocks called the Skelligs lie to the south-west of this island, and 12 miles from the mainland; they are merely rocks: the great Skellig rises in two pyramids of naked grit-stone, united by a space of three acres of flat ground. Kenmore river is an inlet of the sea, ten leagues long and three broad at the entrance.

We come next to the shores of the county of Cork, Dursey island, off the south point of the entrance of Kenmore, is four miles long and one broad. Bantry Bay forms one of the most secure and capacious harbours in the world, being nine leagues long and two broad, and surrounded by stupendously high rocky shores, with few intervals of beach; nearly in the middle is Bear-island, six miles long, rugged and barren, but forming between it and the north shore the harbour of Bearhaven, fit for the largest fleets. At head of the bay is Whiddy island, also forming an excellent harbour. On the west side of Bear-island, the passage between it and the mainland is about one mile broad; the passage on the east is something broader: immediately before the island there is from ten to six fathom water, in the east passage from thirty to forty; and further up the bay, near the isle of Whiddy, from fifteen to twenty-five. Between the south side of this island and the mainland is the road for ships, with a depth of from twenty-four to forty feet. The tides move very gently in and out through the whole bay. Dunmanus Bay is separated from that of Bantry by a peninsula, of which Sheepshead is the promontory; the south point of the bay is formed by Three-Castle-head; this bay runs far up into the country, and is easy of entrance. The promontory which forms its west side terminates in a kind of half-moon, of which Three-Castle-head makes one point, and Mizenhead the other; the latter is the south-west point of the mainland of Ireland, and hence received the name of Notum from Ptolemy. A little within this lies Crookhaven, which in any other country except Ireland, and even in Ireland, in any other of its counties except Cork, would be deemed an admirable port; it is landlocked on every side, with an easy outlet, good anchoring ground, and a depth of three fathoms at low water. From the Mizenhead to Cape Clear, the course is east by north four leagues. This Cape is an island of the same name, and forms the most southern point of Ireland; it is three miles long and one broad. East from this Cape lies the peninsula of Baltimore, which forms one side of a spacious bay, in which there are many inlets and little ports. The coast to the eastward presents Castlehaven harbour, about half a mile across; the channel bold and deep, with a depth of water from thirteen to thirty feet; the harbour of Ross, now nearly filled up with sand; and Court Macsherry, a harbour, which has also suffered from the accumulation of the sand. Corkhead and Poorhead, a steep high promontory, are the two extremities of a bay, in the middle of which is the entrance to Cork harbour; this, which is one of the most capacious and secure in Ireland, opens, from an entrance about a mile in width, to a fine basin, in which are three islands that break the force of the winds and tides, and render it more secure. The sea has evidently encroached on the coast near Youghall, the beach at low water-mark being a bog covered with sea-sand, under which are found the remains of trees. The extent of the sea-coast of the county of Waterford, which, from Ardmore Head to Hook Tower, is about 12 leagues, is in fact a spacious bay. The coast is mountainous, presenting to view the highlands of Dungarvon, Cappoquin, and Knockandown. On this coast there are no inlets or harbours of moment. Above the bay of Tramore lies what is called the Strand of Tramore, containing about two thousand acres.

The province of Leinster has 30 leagues of sea coast, but is deficient in good harbours. Between Wexford and Dublin bay, the coast is lined by dangerous banks, particularly off Athlone. The limits of Dublin Bay are Dalkey island on the south, and the peninsula of Howth on the north, the distance between them being six miles. The south shore rises like an amphitheatre towards the lofty mountains of Wicklow; the north shore is lower and more level. The bay is exposed to the east. To the north of the peninsula of Howth, at the north point of Dublin bay, is the island called Ireland's Eye. The county of East Meath hath but four miles of sea-coast, and no port. Drogheda bay, which in fact is the mouth of the Boyne, lies between the counties of East Meath and Louth. The broad open bay of Dundalk may, when it is high water, be regarded as a harbour, but when the tide is out it is absolutely dry. Lough Carlingford is a deep inlet, dividing not only the counties of Louth and Down, but also the provinces of Leinster and Ulster. On both sides of its entrance there are dangerous rocks, but it is well sheltered, and has sufficient depth of water for the largest ships.

The province of Ulster comprehends four maritime counties, and has a sea-coast of 100 leagues. Point Cranfield makes the east side of Carlingford Bay, and from this place to Belachancir, along the mountainous country of Mourne, there are only a few creeks, capable of receiving nothing larger than fishing boats. The bay of Dundrum lies between that and St. John's Point, which is six miles broad, but shallow, and full of shoals; there is also an inner bay, but this, though convenient and safe, is rendered of little use, on account of the shallowness of the outer bay. The foreland of Point St. John, the *Isamnium Promontorium* of Ptolemy, lies a mile to the south of port St. Anne. The land now stretches to the north-east for five miles, till we reach Killard Point, which is the south-west extremity of Strangford Bay; the other extremity is Quintin Point. Strangford Bay is an inlet, five miles and a half long, and a mile broad; the sea runs through it with great rapidity. This bay opens into the great sea,—Lough Conne, or Lough of Strangford, which runs directly north up to Newton, and sends a small branch to the west, on which stands Downpatrick. Lough Strangford is a basin, fifteen miles long and five broad; in it there are 54 islands. This is the largest salt-water lough in Ireland. From Point St. Quintin to Bryal Point, the land runs north-east, but from the latter to Donaghadee it runs north, with a little inclination to the west, and a very dangerous coast all the way, the shore being lined with great rocks.

Belfast Loch, or the Bay of Carrickfergus, divides the counties of Down and Antrim: it is three leagues wide at its entrance, is easy of access, and well sheltered. Nouthead forms the south point of the entrance, off which lie the Copland islands, three in number.

The north coast of Antrim is the most interesting in Ireland, both to the geographer and the geologist: its geology will be considered afterwards, at present we shall merely attend to its geography. Two leagues north from Carrickfergus lies the small port of Oldfield; beyond this there is a bold coast and safe anchorage, to the height of Fairland Point. This promontory, and that of Bengore, constitute the leading features of this whole coast; they stand at the distance of eight miles from each other, both formed on an extensive scale, both abrupt towards the sea. The former lies about seven miles to the west of Ballycastle, and appears, when viewed from sea at a distance, to be an extensive land-head, running out from the coast a considerable length; but, when examined, it is found to be made up of a number of lesser capes and bays, each distinguished by name, the whole forming the headland of Bengore. The most perfect of these capes is called Pleaskin. The mean height of the coast near here is about 1000 feet, while the surface of Lough Neagh, situated in the midst of this part of Ireland, is not elevated more than 30 feet above the ocean. The total height of the cliff of Cape Pleaskin, from the summit to the base, is 374 feet. Fairhead, the north-east cape of Ireland, the *Robogdium Promontorium* of Ptolemy, is elevated more than 500 feet above the sea, and forms the eastern extremity of Ballycastle Bay. "It presents to view a vast mass of rude columnary stones, many of them exceeding 200 feet in length; and at the base of these gigantic columns lies a wild waste of natural ruins, of an enormous size, which, in the course of ages, have been tumbled down from their foundations by storms, or some powerful operations of nature. A savage wildness characterizes this great promontory, at the foot of which the ocean rages with uncommon fury. Scarcely a single mark of vegetation has yet crept over the hard rock, to diversify its colouring; but one uniform greyness clothes the scene all around." The island of Rogherry, or Roglin, six miles from Fairhead, is five miles long, and three quarters of a mile broad. The phenomenon of the mirage, similar to the *fata morgana*, is often observed in the strait that separates this island from the main.

Returning to the Bay of Galway, we shall now proceed to the west coast of Ireland. Galway Bay is very capacious, being six leagues wide and seven deep; before it lie the South Arran islands, among which there are no fewer than four passages; these belong to the county of Clare; there are various shoals, sands, and sunken rocks, especially on the north side. When the wind blows from the south and south-west, a heavy swell rolls into the bay of Galway. The coast to the north of this bay is lined with many rocks and small islets, and possesses several small bays, one of the principal of which is Butterby Bay; this has a narrow entrance, but within is four miles long, and two broad, with deep water. Conichin bay is deep at the mouth, but the entrance is difficult and dangerous; the other bays require no particular notice. The west point of Galway is Sline-head, which is rocky and steep. To the north of this head are many bays, but the coast in general is lined with rocks and shoals. The counties of Galway and Mayo are separated by Killery harbour. The county of Mayo has a long extent of coast, fronting directly towards the north, in which there are many coves and bays. Before Newport Bay, which is four leagues long, with many islands, and has several good roads for the largest vessels, lies Clare Island. The entrance to the Bay of Blacksod is four miles long; this bay is formed by the island of Achil on the south, and affords a landlocked harbour. The coast, in this quarter, is studded with islets, of which the most conspicuous are those called the Stags of Broadhaven; after passing these, the coast becomes clear of islets, with steep rocky cliffs. Killala Bay contracts into a harbour which admits small vessels. Sligo Bay is capacious, and has several good harbours and roadsteads. Three leagues west from Ballyshannon, off the coast of Sligo, lies a small island called Ennis Murry, at the south end of which is a large rock above water, with a ledge running for a great distance from it into the sea; so that, to the south-west, the coast is foul as far as Rala point.

The coast of Donegal is mountainous and dreary. Donegal Bay is six leagues wide and seven deep, and contains many harbours. On the north shore of this bay another stretches into the land, called Inver Bay. From the bay of Donegal, the coast is lined with islands, one group of which is called the Rosses; the largest of this group is the island of Arranmore, nine miles in circumference, and one mile from the main land. Sheephaven is spacious, but exposed to the north and north-east: near it is Horn Head; in this promontory there is a remarkable cavern, with an opening to the land, through which the waves force up a column of water, with a noise that is said to be heard 30 miles. There are some black rocks, called Ensterhull, over against Enisthon, the extremity of which, Caledagh Point, is the north cape of Ireland. To the west-south-west lies Lough Swilly, which is thought to be the *Angita* of Ptolemy: it is one of the noblest harbours in Europe, being 20 miles long, and nearly two deep, with good anchorage and deep water, so that a large fleet might lie there with ease and safety. As, however, there is scarcely even a village on its shores, it is little frequented, except occasionally by vessels for shelter.

The first object of importance, in tracing the coast of Londonderry, is Lough Foyle, or Foole. Into this loch runs the river Derg, and its tributary streams. Lough Foyle is an immense oval basin, 18 miles long and eight broad. Between Magilions and Green Castle, where it opens into the ocean, it is not above a mile and a half wide, with eight and ten fathoms depth of water. Before this entrance, there is a large sand called the Tunns, on which the sea sometimes beats with a prodigious noise and violence; the channel between this sand and the main is broad, and at all times 14 or fifteen fathoms depth of water. On the east side of the lough there are also shoals, or banks of sand, and some smaller ones on the west; but the two channels between them are wide, and generally four fathoms deep; at the entrance of the river, the water is ten or twelve fathoms; so that, upon the whole, Lough Foyle is a very safe, capacious, and commodious haven, for the largest fleets.

We shall subjoin to this description of the coasts of Ireland, the following Table of the principal geographical positions on them.

Place.	Latitude.		Longitude.	
Clare	52°	51′	9°	32′
Limcrick	52	42	9	11
Louphead, Shannon	52	37	10	24
Dunmore Head	52	13	10	54
Skelling rocks	51	52	10	59
Codshead, Kenmare river	51	43	10	28
Dursey Island	51	37	10	36
Bantry Bay, Sheep head	51	34	10	4
Cape Clear	51	22	9	37
Kinsale light	51	35	8	29
Cork	51	54	8	28
Youghall	51	43	7	48
Waterford	52	13	73	10
Carnsore Point	52	11	6	18
Wexford	52	22	6	19
Wicklow light	52	59	6	1
Dublin	53	21	6	16
Drogheda	53	44	6	12
Belfast	54	35	5	57
Torhead	55	12	6	1
Galway	53	28	9	13
Broadhaven	54	28	10	18
Sligo	54	22	8	41
Donegal	54	41	8	10
Entrance to Lough Swilly	55	17	7	33
Mullinhead	55	24	7	25
Londonderry	55	0	7	15

The effects of such an immense volume of waters as the Atlantic Ocean, acted on, as they often are, by violent westerly winds, upon the west coast of Ireland, in rendering it more angled and indented than any of its other coasts, have already been noticed. But it may be proper also to notice in this place, other effects of the winds on the coasts of Ireland; we allude to the immense accumulation of sand which they have forced up, by which, in many places, the land, and even villages, have been overwhelmed. The following instances in point are drawn from a memoir on the climate of Ireland, by the Rev. William Hamilton, published in the 6th volume of the *Irish Transactions*.

"The effects of the winds," he observes, "are particularly distinguishable in the northern province of Ulster; but they are by no means confined to this coast, being strikingly observable even on the east coast. At the entrance of the river Bannow, in the celebrated barony of Forth, in the county of Wexford, vestiges of ruins, traced with difficulty amidst the heaps of barren sands, serve to ascertain the site of a town," which derived its name from the river on which it stood. The town of Bannow had the privilege of sending representatives to Parliament; and so late as the year 1626, it is registered in the custom-house books of Wexford as having four streets which paid quitrent to the crown. The only remains visible in 1786 were the walls of the church; there is not, on or near the site of the town, but one poor solitary hut. Amid the sands between Portrush and Dunluce in the county of Antrim, in the year 1783, the ruins of a village might be seen, deserted by its inhabitants. In the year 1787, the peninsula of Hornhead, in the county of Donegal, contained vestiges of enclosures, so small and so numerous as to mark the residence of a considerable number of families; but then it was quite a desert. Rather more than a century ago, the peninsula of Rosgull, which lies between the harbours of Sheephaven and Mulroy in the county of Donegal, was selected as the residence of one of the noble families of Hamilton; at present the gardens are totally stript of trees and shrubbery by the fury of the western winds; the limits of the courts, the flights of steps, and the terraces, can scarcely be traced amidst the heaps of sand which overwhelm them. The mansion itself was, when described by Dr. Hamilton, fast approaching to destruction, the lower apartments being already filled with sand, which was beginning to rise above the thresholds; it is said that 1200 acres of land were also buried, in a short time, in irrecoverable ruin. Dr. Hamilton mentions two other striking instances of the encroachment of the sand on the coast of Donegal; one of a house which had not been long built when he saw it, the roof of which was just emerging from the sand; the owner told him that the house had at first a considerable tract of pasture ground between it and the sea shore, but that latterly he was obliged every year to dig it out of the encroaching sands. Thirty or forty years before Dr. Hamilton wrote, there was a forge in a village of Favet on the northern coast of Donegal, but then there were no vestiges of it, except some stones in the midst of loose and shifting sands.

Dr. Hamilton is of opinion, that the Atlantic storms on the west coast of Ireland are of more frequent occurrence, and superior potency, to what they formerly were. "Every person on our coasts," (he observes,) "whose situation has made the construction or preservation of embankments against the influxes of the ocean necessary, knows, by painful experience, how much his labours have of late years increased, and how impotent works, formerly effectual, are now found to be repelling the increasing tides of the present day; public roads encroached on, walls beaten down, strands less passable than heretofore, meadow and tillage land oftener and more deeply inundated ; all concur to prove encreasing tides and frequency of storms on our coast."

A short description of the Nymph bank seems properly to belong to the hydrography of Ireland, and may therefore be inserted in this place. It lies in Saint George's Channel, about 10 leagues off the coast of Waterford in Munster. Its distance from the high land of Dungarvon is about 11 leagues S.S.E. The appellation of Nymph bank strictly applies to that part of this sand bank which lies opposite Waterford ; the extreme point of it is nearly 20 leagues from the land ; the depths on it are from 45 to 70 fathoms ; the ground consists chiefly of pebbles and broken shells. It is a great fishing bank, and abounds in cod, hake, ling, bream, skate, whitings, red gurnet, &c. The sand banks, or *grounds*, as they are called, between Dublin and Wexford, have been already shortly adverted to. They are very extensive, but not winding, as *grounds* of this description usually are, but running in a straight line N.N.E. and S.S.W., being far short from the land with their north end ; as they go to the south, they come nearer the land. Near the Tusker rock, two leagues E. N.E. from Carnsore point, where they terminate, they are not much more than 2 miles distant from the land ; whereas the distance between the north end, near the island of Dalkey, at the entrance of Dublin bay, and the land, is above eight miles. They are all of stony ground, in some places but one fathom deep ; but, at the north end, two fathoms and a half, or three fathoms ; the channel between these grounds and the land is deep all over. The ground of the Irish Sea, generally speaking, as well in the middle as under the land, is almost every where clear sand ; in some places black and muddy earth ; in very few places, rough and sharp ; and scarcely any where, but in the bay of Wicklow, so hard that the anchors cannot take hold of it. On the west side of Ireland the tide flows against the land, and the ebb falls back from it into the sea ; the flood tide going from, and the ebb towards the west. Hence the tides on this coast are often very strong and high, not only on the open shores, but in the bays and inlets. On the other side of Ireland the tide ebbs and flows along the land. On the north side, the tides run in the same direction as on the west side ; that is, the flood from the west, and the ebb towards it. But upon the east side, from Fairhead to Carlingford, the flood comes from, and the ebb falls to, the north ; from Carlingford to Carnsore it flows from the south, and ebbs from the north. Forthough, on all this side, the flood runs along the land, yet not beginning from the same, but from opposite points, the two floods coming, the one out of the main sea in the north, and the other out of the main sea in the south, the two meet and stop each other before Carlingford haven. From the Tusker rock and Carnsore as far as to Cape Clear, being the whole south-east coast of the province of Munster, the flood falls along the coast E.N.E., and the ebb W.S.W. ; but upon the rest of the coast of Munster beyond Cape Clear to the westward, which coast lies west and by south, the flood flows eastward, and the ebb falls to the west. In the entrance to the channel or haven of Wexford, the tide ebbs and flows three hours sooner than without in the open sea ; so that when it is high water in the entrance to the haven and upon the bar of Wexford, the flood is still running by it to the north for the space of three hours ; the effect of which is, that the end of the great sand which lies just before the haven of Wexford is cast up more and more to the north, and the channel on the north side of that sand, which is the entrance of the haven, is more open to the north than it was formerly.

CHAP. II.

Soil of Ireland—Bogs—Forests—Climate—Botany—Zoology—Mineralogy—Mineral Waters.

It is extremely difficult to give a clear, definite, and accurate idea of the nature and properties of the soil, even of a farm consisting of a few hundred acres ; for, in the first place, very different ideas are affixed by different people to the terms by which the various kinds of soils are designated. The farmer in Norfolk, for instance, when describing what he deems a clay soil, has reference to a very different kind of soil from that which the Suffolk farmer means by the same term ; the latter, accustomed to soils of the most tenacious and stubborn clay, would deem the soil to which the Norfolk farmer gives that appellation only a loam, or, at most, a clayey loam. But, in the second place, in most tracts of land, even of a few thousand acres, there are not only a great variety of soils, but the passage from one kind of soil to another is often so sudden and extreme, that no one appellation will properly designate the soil even of a single field.

The first of these difficulties applies, but only in a slight degree, to any attempt to describe the soil of Ireland ; the second scarcely applies at all ; for if there be one circumstance by which the soil of this country is distinguished from the soil of most other countries, and especially from the soil of England or Scotland, with which we should most naturally compare it, it is, that the soil of Ireland is nearly uniform throughout the whole of that kingdom. We do not by this mean, that there are not varieties of the particular *genus* of soil which does prevail in Ireland ; but that, with very few exceptions, there is only one *genus* of soil over the whole country. In order, therefore, to give as accurate and clear account of the soil of Ireland as we can, in a few words, we shall, in the first place, describe it negatively, and then point out the soils that actually prevail in it.

There is no clay soil in Ireland ; by that term we mean such clays as are found in Oxfordshire, in some parts of Essex, throughout high Suffolk, in some parts of Surry, &c. or, in other words, soils of uncommon strength, stubbornness, tenacity, and retentiveness. Generally speaking, there is no sandy soil, such as is met with in Low Suffolk, near Godalmuir, in Surry, &c. and there are no chalky soils, such as abound in Surry, Sussex, Hampshire, Wiltshire, &c. Gravelly soils, either such as prevail in some parts of Middlesex, consisting of yellow gravel, evidently tinged with the oxide of iron, or such as consist of uncoloured gravel, and are, in Scotland, called sharp soils, are seldom or never met with in Ireland.

Having thus pointed out the kinds of soil which are not at all or scarcely found in Ireland, we shall next describe the kind of soil that prevails over the country. It may be aptly described as a *loam ;* this is the genus, but there are many varieties. Though there is no clay soil in Ireland, there is in some places, especially in the county of Tyrone clayey loam so strong as to make good bricks. The loams, however, most prevalent over the whole Island, are of a lighter nature ; they are fertile, not merely on account of their component parts, but also because they, for the most part, rest on a calcareous basis, and are, in fact, mixed up with limestone rubble. One of the most striking features is the shallowness of the soil of Ireland, in many places the rocks appearing on the surface, or at no great depth, even in the most flat and fertile parts, as Limerick, Tipperary, and Meath. Such is the nature of the soil of Ireland, generally speaking, a fertile loam, with a rocky substratum.

The extent of this rich soil is not very considerable in the hilly part of Ireland; though, even amidst the rocky and dreary mountains of Donegal, the soil of the vales is extremely fertile. Mr. Wakefield says, that the richest loam he ever saw turned up by the plough prevails throughout Meath; and a similar soil, on a calcareous subsoil, is to be found throughout Roscommon, and in some parts of Galway, Clare, and other counties. In the counties of Limerick and Tipperary, there is another kind of rich land, consisting of a dark, friable, dry, sandy loam; this also is on a calcareous subsoil. The soils just described are, in general, very shallow; but there is another kind of rich soil of great depth, and of rather a singular nature; we allude to the "corecass, or caucas" land, on the banks of the Fergus and Shannon. This is evidently soil of a nature, quality, and formation, very similar to the carse land found in Scotland, on the banks of the Forth and Tay; though perhaps not so strong and tenacious as the Scotch carse land. In both countries this kind of soil has been formed by deposition from the rivers, on the banks of which alone it is found. The substratum of the "caucas" land on the Fergus and Shannon is a blue silt, which differs in appearance and fertility from the upper soil, only, from the circumstance that the latter has been long exposed to the atmosphere, and cultivated. The most remarkable divisions of soil in Ireland are formed by some of the rivers, especially the Barrow, Blackwater, and Kenmare; to the west of the Barrow, limestone is found in abundance, whereas it does not exist throughout the counties of Wexford and Wicklow. The Blackwater, in its course through the county of Cork, is the southern boundary of the limestone soil; and in its course through the county of Waterford, it is the northern boundary of the same soil; but in both counties the limestone lies to the west of that river; the same circumstance is observable in the Kenmare, the Bride, and the Lee.

The greatest drawback to the general fertility of the soil of Ireland consists in the immense extent of the bogs by which that country is disfigured. These differ from the English mosses, in being rarely level, but rising into hills; there is a bog in Donegal, which is said to be a perfect scenery of hill and dale; the most common plants are heath-bog-myrtle, and a little sedgygrass; the colour of the peat is, for the most part, reddish, whence they are called red bogs. The dry heaths are, for the most part, confined to the mountains, unless the curragh of Kildare be reckoned such. This curragh is rather elevated ground, highest near Kildare, and thence descending by degrees towards the Liffy, about three miles long, and two or three broad, divided into rows of heath and grass.

Boate, in his *Natural History of Ireland*, divides the bogs, strictly so called, into four sorts: First, the grassy bogs, in which the surface is covered with some kind of herbage; hence they are very deceitful and dangerous to travellers. Some of these, in particular the great bog in the county of Kerry, dry up during the summer, so that cattle may graze upon them. But the deepest grassy bogs are impassable in the summer as well as in the winter. There are, however, at all times, firm places in them, by means of which those who are well acquainted with them may pass over. 2. Watery and miry bogs, which contain grass, covered, however, with water and mire. 3. Hassocky bogs, or shallow lakes, overspread with little tufts or islets, consisting of reeds, rushes, coarse grass, and sometimes small shrubs. As the roots of these are closely interwoven, and sometimes rest on ground rising to the surface of the bog, these bogs may be passed over. Most of them are found in Queen's and King's counties. 4. The peat moors.

There is also another division of the bogs of Ireland into three sorts—mountain bogs, red bogs, and floating bogs. With respect to the last, which is the most singular kind, it has been ascertained that a quantity of water lies in a body between the turbary and the gravel, which keeps the turbary in a buoyant state, and contributes to the growth of the fungus substance. When the turf-cutter incautiously approaches the bottom of a turf-hole, the water frequently bursts up through a close covering of two or three feet, and exposes him to imminent danger.

In September 1809, a warrant was issued, by which commissioners were appointed to inquire into the nature and extent of the several bogs in Ireland, and the practicability of draining and cultivating them. These commissioners laid before Parliament four reports on this important subject, from which the following particulars have been collected. The limits of this article necessarily compel us to draw from them only the most relevant and interesting information; and we must refer such of our readers as wish for further particulars, especially on the substances found in these bogs, the analysis of these substances, and the most eligible means of draining and cultivating the bogs, to the reports themselves.

In the first report, the commissioners state, that they consider the greater part of these bogs as forming one connected whole; and that a portion of Ireland, of little more than one-fourth of its entire superficial contents, and included between a line drawn from Wicklowhead to Galway, and another drawn from Howthhead to Sligo, comprises within it about six-sevenths of the bogs in the island, exclusive of mere mountain bogs, and bogs of less extent than 500 acres. This portion, in its form, resembles a broad belt, drawn across the centre of Ireland, with its narrowest end nearest the capital, and gradually extending in breadth as it approaches the Western Ocean. This great division of the island, extending from east to west, is traversed by the Shannon from north to south, and is thus divided into two parts. That portion of the bogs which lies to the westward of this river contains more than double the extent that are to be found to the eastward. The commissioners are of opinion, that if the bogs of Ireland (exclusive of mere mountain bogs, and bogs under 500 acres) be supposed divided into 20 parts, about 17 of them will lie in the great division just described, viz. 12 to the westward, and 5 to the eastward, of the Shannon; and, of the remaining three parts, two will lie to the south, and one to the north, of this division. Most of the bogs which lie to the eastward of the Shannon, occupying a considerable portion of King's county, and the county of Kildare, are generally known by the name of the Bog of Allan; but this is not one great morass. On the contrary, the bogs to which this appellation is applied are perfectly distinct from one another, often intersected by ridges of dry country, and inclining towards different rivers. In general, there is no spot of these bogs, to the eastward of the Shannon, so much as two Irish miles distant from the upland and cultivated districts.

The result of the investigations, set on foot by the commissioners, with regard to the extent of the bogs in Ireland, is given in their fourth report, laid before Parliament in the session of 1813–14, as follows:—

	English Acres.
Eastern extremity of the Bog of Allan, in the County of Kildare, ...	36,430
District of the river Barrow, in Kildare,	41,075
——— of the Boyne, in E. and W. Meath,	42,370
——— of the Brusna, in King's county,	44,594
Carry over	163,469

	English Acres.
Brought over	163,469
District of the Shannon, in W. Meath, Longford and King's county, ...	34,500
——— of the Inny and Lough Ree, in Longford and W Meath, ...	34,569
——— of Lough Gara, in Roscommon, Sligo and Mayo, ...	83,689
——— between Roscrea, and Killenaut, in Tipperary, Kilkenny, and Queen's county,	36.025
——— to the west of Maryborough, in Queen's county, ...	14,754
——— forming the western extremity of Clare, ...	22,340
A small district on the Barrow, in Kildare and King's county, ...	7.459
District of Lough Corrib, in Galway and Mayo,	83 724
——— in Mayo, ...	161,962
——— surrounding Lough Neagh, and extending to the mouth of the Ban, . . .	64,855
Exclusive of 10,673 acres inundated by the winter level of the lough.	
——— of Iveragh, in Kerry, .	45,567
——— of Kenmare in the same county, .	14,605
——— of the rivers Lanne and Maine, in Ditto, ...	17.990
——— of the Upper Maine, in Ditto. . .	8,566
——— of Slieve Laughar, in Cork and Kerry,	32,902
——— of the Cashen, in north of Kerry, .	31,514
——— contiguous to Loughree, in Longford, Leitrim, and Roscommon, ...	26,630
——— southern extremity of the Suck, in Galway and Roscommon, ...	76 848
——— northern extremity of ditto, . .	52,390
Total	1,013,358

Besides, there are the three mountain districts of Wicklow, Erris, and Cunnemera, which contain, respectively, 97,000, 170,090, and 120,000 acres; and in the two last districts, there are of mountain peat soil, respectively, 155,500 and 200,000 acres. The extent in Wicklow has not been ascertained. The mountain peat soil in other parts of Ireland is supposed to amount to about 900,000 acres. Of the bogs under 500 acres, there are about 90 in the county of Cavan alone, containing 17,600 acres in all; and the commissioners suppose, that the other parts of Ireland cannot contain less than ten times as great an extent of these lesser bogs as the single county of Cavan.

"From all the above data (the commissioners observe) we can confidently pronounce, that the extent of peat soil in Ireland exceeds 2,830,000 English acres, of which we have shewn at least 1,576,000 to consist of flat red bog. The remaining 1,255,000 acres form the covering of mountains."

The strata of which the bogs in Ireland in general consist, or which lie below them, will more properly be considered when we come to treat of the geology of Ireland. At present we shall extract from the reports of the commissioners the heights of some of the bogs.

In that which is generally called the Bog of Allan, the highest summit of Lullymere bog is 256 feet above high water mark in Dublin Bay, the lowest point 214 feet; the highest point of Timahoe bog 289, the lowest point 232; the highest summit of the Bog of Mounds 296, the lowest point 254; and the highest point of Clane bog 298, and the lowest point 255 feet above high water mark in Dublin Bay. The greatest height of the bogs on the west of the Shannon, above Lough Ree, is 76 feet, the lowest point 29 feet; the greatest depth 43 feet, the least depth 21 feet. The greatest height of the bogs on the east of this river, in the counties of Longford and Leitrim, is 114 feet, the lowest point 30 feet; the greatest depth 43 feet, and the least 30 feet. The greatest height of the surface of the bogs in the district of the Boyne, above the sea at high water mark in Dublin Bay, is 336 feet, the least height 218; the greatest depth 40, the average depth 22 to 25 feet The greatest height of the surface of the bogs to the northward of the Brusna is 274 feet, the least height 114; the greatest depth 44, the average depth 30. The greatest height of those to the southward of this river is 310 feet, the least height 111; the greatest depth 45, the average 22 to 25. The greatest height of the bogs in the district of the Inny and Lough Ree is 253 feet, the least 176; the greatest depth 47 feet, the average 30 to 35 feet.

As it is obviously a matter of the highest national importance, that these bogs, if possible, should be reclaimed, and rendered capable of conducing to the sustenance of man, the commissioners particularly directed their attention and investigations to ascertain how far, and by what means, this was practicable. They remark, that "peat moss ought to be considered as partaking, in its general nature, of the property of sponge completely saturated with water, and giving rise to different streams and rivers for the discharge of the surplus waters which it receives from rain or snow." In the district of Allan, as well as in many other districts, these streams have worn their channels through the substance of the bog down to the clay or limestone gravel underneath, dividing the bog into distinct masses, and presenting in themselves the most proper situations for the main drains; and which, with the assistance of art, may be rendered effectual for that purpose.

Another circumstance is favourable to this great undertaking. Their surfaces, in general, are by no means level, but with planes of inclination amply sufficient for their drainage. The highest summit of any part of the bogs in the eastern district of Allan is 298 feet above the level of the sea, taken at an ordinary spring tide in the Bay of Dublin; and the lowest point is 214 feet above the same level. In the Bog of Timahoe, a part of its water is discharged into the sea at Drogheda, and another part below Waterford.

We have thus stated the two grand facts on which the commissioners rested the practicability, and indeed the facility, of effecting the drainage of the bogs of Ireland, and on which they accordingly formed their plans. That they will be successful, there can be little doubt, provided they are executed with skill, and sufficient funds are allowed. And as far as the estimates of the engineers may be depended upon, the expence will be amply counterbalanced by the quantity of useful land recovered. The estimate for draining the eastern district of the Bog of Allan is 147,052, 6s. 11d., and the quantity of land which would be gained is 36,430 English acres, or about 40*l.* an acre.

Ireland, like all other countries, formerly abounded in forests. According to Boate, on the authority of Geraldus Cambrensis, who came into Ireland on its first conquest, in company with Henry II., this country was full of woods on every side; but the English, on gaining possession of it, cut them down, partly in order to deprive the banditti of their lurking places, and partly to gain the greater scope of profitable lands. Another cause operated, which operates in all countries—the desire to obtain wood for fuel. Forests, however, were still numerous in those parts, especially, over which the English had not acquired a perfect and tranquil power; but after the quelling of the great rebellion in the time of Elizabeth, the forests were still more reduced in extent and number. The same motives which operated with the conquerors on their first invasion, operated now. Besides, the prospect of gain for the sale of the timber was a further inducement. Immense ship loads were sent to foreign parts; and whereas, before this period, there was not a single charcoal manufactory, on the subduing of the rebellion, a great number on a very extensive scale were erected.

All these causes, however, though operating probably with a progressive effect, had not denuded Ireland entirely of forests in the middle of the 17th century, the period when Boate published his Natural History of that country. He complains, indeed, that great part of Ireland was very bare of woods in his time; and that, in some places, you may travel whole days long without seeing any wood or trees, except a few about gentlemen's houses; and particularly instances the route from Dublin, as far as Dromore, by Dundalk and Newry, being above 60 miles, in some parts whereof you shall not see so much as one tree in many miles; and adds that the "great woods, which the maps do represent to us upon the mountains between Dundalk and Newry, are quite vanished." Notwithstanding these complaints, there were, in the time of this author, large forests, which no longer exist. In Leinster he states that the counties of Wicklow, and King and Queen's Counties, were throughout full of woods, some many miles long and broad; and that part of the counties of Wexford and Carlow were greatly furnished with them. In Ulster, there were, in his time, great forests in the county of Donegal, and in the north part of Tyrone; likewise in Fermanagh, along Lake Erne, in Antrim, and in the north part of Down. The greatest part of the latter county, however, as well as Armagh, Monaghan, and Cavan, which, in the war with Tyrone, were encumbered with great and thick forests, were, in the time of Dr. Boate, almost everywhere bare. With respect to Munster, he represents the counties of Kerry and Tipperary as possessing sundry great forests, notwithstanding the English, especially the Earl of Cork, had made great havoc with the woods. In Connaught he states, that there were very few forests, except in the counties of Mayo and Sligo.

Such was the state of Ireland with regard to forests, during the middle of the 17th century; but it is much changed at present, for in Donegal and some other of the counties, represented, by Boate, as possessing extensive forests in his time, there are now none. Wood is more general in the county of Fermanagh than in any other county of Ireland. Oak abounds throughout the glens of Wicklow, and upon the mountains of Killarney, but it is of inconsiderable size; and in other parts of the country is by no means common. Ash is confined principally to Fermanagh, and in some parts of Tyrone and Cavan. As proofs of the denuded state of parts of Ireland with respect to wood, it may be mentioned, that in the county of Clare there are only 780 acres of wood, or rather of plantation; and that in Kilkenny there are only 18[illegible]0 acres.

The fertility of every country depends mainly upon its soil and climate. The soil of Ireland, we have seen to be, in general, of a very fertile quality, but at the same time, in most places very shallow, and resting upon a rocky substratum. Such a soil, in a dry climate, could not be very productive; but, fortunately for Ireland, her climate is most admirably adapted to her soil. The situation of this country, which, on all sides except the eastern, lies quite open to the Atlantic, in connection with the circumstance, that westerly, and especially south-westerly, winds prevail more in this country, even than on the opposite coast of England, renders its atmosphere extremely clouded and moist. These winds, generally speaking, may be said to blow three-fourths of the year; and as they blow often with considerable violence, this circumstance, and the dryness of the soil, prevent the excessive moisture of the climate from being unhealthy. The same causes which render the climate of Ireland more moist than that of Britain, and the winds from the west and south-west more prevalent, render also the climate more uncertain, and the seasons more irregular; generally speaking, however, showers are very frequent, especially in the winter season. In this season, also, the south-west and south winds prevail more than in the other seasons of the year; in summer and autumn, the west prevail; in spring, the east, south-east, north-east, and north. Storms are more frequent in autumn and winter than in spring and summer; the months most liable to them are, November, December, January, and February.

The temperature of Ireland is milder, and throughout the year averages a higher degree than the temperature of England; but this must be understood as applying not so much to the higher heat of the summer, as to the less cold of the winter and spring. In the south and south-west of Ireland, it does not often happen that winter covers the low ground with snow, or locks it up in frost, for any length of time; and even in the middle of the country, snow of a month's duration on the plains is very uncommon. Rain, however, in winter, through all Ireland, is abundant; and the moisture this occasions gives a feeling of coldness, which, if not compared with the thermometer, would lead to the supposition, that the temperature of the air was really very low. The winter continues commonly in the north and central parts seven or eight months, fires in chambers being requisite from about the middle of September to the middle of May. The seasons are later than in England: "the spring and autumn more tardy in their approach, as also the winter; the fall of the leaf being later than in England."

The differences of temperature between the north and the south of Ireland seem to arise more from the different elevation of the land, than from difference of latitude. The latter cause, indeed, cannot produce much effect, the extent of Ireland, in a meridian line, not being above four degrees of latitude. The situation of the country with respect to the ocean also affects its temperature. The western and southern parts are more moist and temperate than the eastern and north-eastern, and the coasts than the interior. It has been also remarked, that, where the substratum is limestone, the snow dissolves sooner than elsewhere.

Such is a general description of the climate of Ireland; but it may be proper to select some particular facts, to confirm and illustrate the truth and accuracy of this description.

And, first, with respect to temperature. Generally speaking, the mean temperature of the north of Ireland is about 48°; of the middle 50°; and of the south 52°, of Fahrenheit. The following are the results of a series of experiments made by Mr. Hamilton, to ascertain the temperature of the soil of Ireland, from its southern to its northern coast, by examining the temperature of covered wells of pure water.

1. *Mean Temperature of the Sea Coast of Ireland, observed in different Latitudes.*

Lat. 55° 12'. Mean temperature of the northern coast of Ireland, near the town of Ballycastle, observed in 1788, by means of copious springs flowing from limestone soil . . . . 48°

Lat. 54° 48′. Mean temperature of the island of Enniscor, one of the Rosses islands, on the western coast of Ireland, observed by means of a covered well in a granite rock; the maximum of temperature taken in 1787, the minimum in 1788 . . . . 48°.6

Lat. 53° 20′. Mean temperature of the eastern coast of Ireland, near Dublin, observed by means of deep covered wells, in soils of clay, gravel, and limestone, 1788 49°.4

Lat. 51° 54′. Mean temperature of the south coast of Ireland, near the city of Cork, observed by means of deep covered wells, in limestone and other soils, 1788 . 51°.2

2. *Mean Temperature of Places distant from the Sea, and elevated above its Surface.*

Lat. 53°. Mean temperature in the neighbourhood of Londonderry, distant 20 Irish miles from the northern sea, and at a supposed elevation of 100 feet above it, 1788 . . . . 46°.9

Lat. 54° 20′. Mean temperature in the neighbourhood of Armagh, distant 25 miles from the Irish Channel, and elevated about 58 feet above the coast, by means of a well 60 feet deep, sunk to the bottom of a gravelly hill, 1788 . 47.°5

Lat. 53° 12′. Mean temperature derived from the maximum of 1787, and the minimum of 1788, in the neighbourhood of Tullamore, King's County, near the centre of the kingdom, distant fifty miles from both the seas, and elevated 206 feet above the coast, in a level country, which may be counted the highest ground of the general surface of Ireland . . . . 48°

3. *Mean Temperature in Cities.*

Mean temperature in different parts of the city of Londonderry, by maximum of 1787, and minimum of 1788, various, from . . 47°.6 to 49°

Mean temperature in different parts of the city of Dublin, in 1788 . . . . . . 50° to 52°

Mean temperature in different parts of the city of Cork . . . . 52°.5 to 53.5°

Comparative Heat of the several Seasons, in London and Dublin.

	In London.	In Dublin.
Winter	1.00	1.45
Spring	3.00	2.14
Summer	5.00	4 68
Autumn	3.00	3.80

State of the Thermometer at Londonderry, from the Year 1795 to 1801, both inclusive.

Year.	Max.	Min.	Year.	Max.	Min.
1795	74°	21½°	1799	74°	21°
1796	71	17	1800	81	28
1797	72	30	1801	76	22
1798	74	26	Mean.	74+	25.7+

State of the Thermometer at Belfast from the Year 1796 to 1809, both inclusive.

Year.	Highest.	Mean.	Lowest.
1796	68°.50	52°.78	30°.00
1797	68.00	53.83	38.00
1798	78.00	51.05	33.00
1799	68.25	51.13	31.00
1800	73.00	52.29	33.05
1801	79.00	55.444	35.00
1802	73.00	52.90	53.00
1803	77.20	52.60	25.00
1804	73.00	53.55	31.60
1805	72.52	53.01	32.50
1806	73.00	53.76	32.50
1807	75.00	51.91	28.00
1808	75.60	52.80	27.00
1809	78.80	55.20	30.05

At Kilkenny, the thermometer during winter seldom sinks below the freezing point; and during the summer it seldom rises above 79° in the shade. It has been observed as high as 84°. The average heat of summer is between 70° and 75°. At Limerick, the greatest height of thermometer in the shade is 72°; the greatest depression 58°. In winter, it is under 55°, but never below 28.

State of the Thermometer at Dublin, from 1792 to 1804, inclusive.

Year.	Greatest.	Least.	Mean.
1792	77°.	19°.5	50°.509
1793	75.5	28.	49.64
1794	79.50	32.	51.915
1795	78.	19.50	49.191
1796	73.5	20.	48.847
1797	75.	22.	49.49
1798	81.	25.	49.22
1799	74.	14.50	45.06
1800	81.50	23.	47.809
1801	75.	34.	49.278
1802	76.	22.	48.637
1803	79.50	22.	49.16
1804	75.	31.	49.916

According to Dr. Rutty, the range of the thermometer in Dublin is about 36°. The medium atmospherical heat of five years, viz. 1794, 1796, 1797, 1799, and 1800, was 50.15 plus; the maximum is 81.50; and the minimum was 14.50

II. *State of the Barometer in different parts of Ireland; in Dublin from* 1791 *to* 1804, *inclusive.*

Year.	Greatest.	Least.	Mean.
1792	30.69	28.76	29.958
1793	30.68	28.68	30.054
1794	30.71	29.12	30.036
1795	30.88	28.94	30.047
1796	30 70	28 76	30.044
1797	30 72	29.00	30.535
1798	30.88	28.80	30.56
1799	30.75	28.86	30.51
1800	30.94	29.07	30.478
1801	30.76	28.80	30.531
1802	30.68	29.10	30 586
1803	30.77	28.80	30.64
1804	30.87	28.86	30.567

According to Dr. Rutty, the range on the variation in the barometer at Dublin is about 2$\frac{4}{10}$ inches; but, according to others, it is 2$\frac{2}{10}$.

Range of the Barometer at Londonderry.

Year.	Max.	Min.	Year.	Max.	Min.
1795	30.84	28.64	1799	30.64	28.76
1796	30.61	28.37	1800	30.49	28.85
1797	30.53	28.80	1801	30.59	28 64
1798	30 68	28 60	Mean.	30 62	28.66

Range of the Barometer at Belfast, from 1796 *to* 1809.

Year.	Highest.	Mean.	Lowest.
1796	31 00	30.07	28.76
1797	30.80	30 05	29.00
1798	30 88	30.01	29.08
1799	30.60	29.96	29.00
1800	30 68	29.93	28 90
1801	30.58	30 07	28 00
1802	30.80	29 98	28.92
1803	30.66	22 85	28 51
1804	30.70	29 96	28 80
1805	30.52	30.00	28 88
1806	30 70	30.07	28.65
1807	30 38	29.15	29.00
1808	30 90	29.97	28.92
1809	30.64	29.85	28 60

From observations made at Limerick, it appears that, for the space of ten years preceding 1811, the barometer was never observed higher than 30.5, nor lower than 28.5, except in two instances, when it stood at 28. The greatest height to which the barometer rose, in the course of thirteen years, at Cork, was 30.4 inches, and that only once; its lowest height was 28.2.

III. Prevalent winds in different parts of Ireland, at the various seasons of the year.

Prevalent Winds at Dublin, for a space of upwards of 40 *years.*

	E.	N. E.	S. E.	N.	W.	S. W	N W	S.
Spring . .	74	111	129	54	129	148	126	18
Summer . .	74	62	134	32	182	199	139	29
Autumn . .	39	51	108	47	200	165	119	31
Winter . .	39	52	146	24	157	176	73	8

Table of the Winds at Londonderry, from 1795 *to* 1801.

Years.	N.	S.	E.	W.	N. W.	N E.	S. W	S. E.
1795	31	38	26	79	109	62	83	60
1796	32	33	42	103	101	45	69	49
1797	19	51	16	98	55	29	82	50
1798	26	68	34	100	42	23	98	57
1799	49	34	34	109	67	16	70	56
1800	41	27	21	136	79	27	36	75
1801	37	46	36	141	86	23	38	29
Total	225	297	209	766	539	225	479	376

Dr. Smith, in his *History of Cork*, remarks, that it appears from a regular diary of the weather, kept for several years in that city, that the winds blow from the south to the north-west three-fourths of the year at least.

IV. *Quantity of Rain that fell in different parts of Ireland in different years.*

AT DUBLIN.

Years.	Greatest in one month.	Total.	Days of rain or snow.	Stormy.
1792	5.85	30.700	288	
1793	2.71	22 855	214	
1794	7.67	28.82	222	
1795	6 62	26 48	196	24
1796	4.33	21.94	204	19
1797	3.15	24.45	216	24
1798	3.31	20.16	161	27
1799	3.94	22.	126	
1800	3.98	23.56	197	24
1801	3.46	21.96	194	22
1802	6 22	27 97	222	13
1803	5.92	19.67	193	17
1804	4.34	30.03	231	23

Register of the Rain Gauge kept at the Botanic Garden near Dublin, from the conclusion of the above period till 1810.

Year.	Most rainy month.		Least rainy.		Total.
1805	Oct.	2 860	March	.550	22.470
1806	Nov.	3.920	June	.900	24.490
1807	Sept.	7.332	March	.450	26.500
1808	July	4.500	March	.654	23.[illegible]2
1809	Jan.	4.960	July	.456	28 809
1810	Nov.	3.867	Feb.	.700	23.663

From a register kept at the Botanic Garden, from 1802 to 1811, it appears that the following is the order of the months, according to their dryness. June, February, April, March, May, October, January, September, August, November, July, December. In all the months of June, during the above period, there fell only 12.070 inches, and in February only 12 321; whereas in December there fell 27.310, and in July, 24,146.

From the following Table it will appear, that the order of the months, taken according to their dryness, varies considerably from this at Belfast.

Year.	Most rainy month.	Least rainy.	Total.
1795	Sept. 3.242	August .392	19.405
1797	July 3 743	June .726	33.916
1798	Sept. 4 649	March .525	26 121
1799	Aug. 4.334	Nov. .626	22 812

The months, arranged according to their dryness, are, June, March, April, February, May, November, October, August, December, January, September, and July.

Register of the Rain Guage and Hygrometer of De Luc, at Londonderry.

Years.	Hygrometer.		Rain Guage.
	Max.	Min.	
1795	$55\frac{1}{2}$	32	32.861+
1796	$56\frac{3}{4}$	31	25 718
1797	50 3	$25\frac{1}{4}$	30 821
1798	$44\frac{4}{5}$	$21\frac{3}{4}$	33 231
1799	$47\frac{1}{2}$	31	34 770
1800	$52\frac{1}{6}$	$33\frac{1}{3}$	29.226
1801	$52\frac{2}{5}$	$26\frac{1}{2}$	32.197
Mean	51.37+	29 13+	31.118

Quantity of Rain which fell at Cork.

Years.	Inches.	Years.	Inches.
1738	54.5	1744	33.6
1739	Nearly the same	1745	48.4
1740	21.5	1746	30.0
1741	33 6	1747	Nearly the same
1742	38 1	1748	37.4
1743	39.3		

The materials for the natural history of Ireland are by no means rich or abundant. Consequently, as they cannot be systematized, and as our limits, as well as the nature and object of this article, compel us to be brief and general, we shall merely give some notices on the three great branches of botany, zoology, and mineralogy.

"The study of botany, (observes Mr. Aikin.) has been less cultivated here than in any other part of the united empire; and the neighbourhood of Dublin, which has been the best explored, affords no rare and few characteristic plants. From the general mildness of the climate, the extensive tracts of bog, and the vast mountainous ranges that intersect the country, and affords capacious basins for its numerous lakes, it is obvious that the flora of Ireland, when complete, will probably contain several species that are strangers to the rest of the British islands. On the mountains of Sligo is found the *Saxifraga umbrosa*, known in our gardens by the name of *London pride;* and the romantic scenery of Killarney, in the county of Kerry, is the most northern habitat of the *Arbutus Unedo*. The heaths abound with the stately *Erica Daböeci;* and the mountain aven, bear-berry, with other alpine plants, expand their neglected blossoms, and trail their glowing festoons of clustered berries, unnoticed, amidst the wild solitude of their rocky fastnesses."

The zoology of Ireland is very similar to that of England. It is said that magpies and frogs were unknown here, till introduced by the English, toward the beginning of the 18th century. Moles, toads, and all kinds of serpents, are still unknown. The Irish grey-hound, or wolf-dog, formerly of great use in clearing the country of wolves, is now seldom met with, the breed being nearly extinct. Its appearance is at once beautiful and majestic; its height about three feet; its colour generally a white or cinnamon; its aspect mild; its disposition gentle and peaceable; but its courage and strength so great, that, in combat, the mastiff or bull-dog is far from being equal to it. The breed of the wolf was not extinguished in Ireland till the beginning of the 18th century. Herds of deer were formerly very numerous; but the progress of cultivation has rendered them rare. A species, at present entirely extinct, existed in ancient times, as enormous horns are dug up in various parts of the kingdom. "Some of these horns have been found of the extent of fourteen feet from tip to tip, furnished with brow antlers, and weighing three hundred pounds. The whole skeleton is frequently found with them. It is supposed, that the animal must have been about twelve feet high." The cattle, horse, sheep, &c. of Ireland, will be noticed under the head of agriculture; and the salmon and other fish, which are made an object of important traffic, under the head of fisheries. But, to this short notice of the zoology of Ireland, we shall here add a few words regarding some rather rare species of fish, which are found in its lakes.

Lough Neagh contains a great variety of fish. Besides salmon, a large kind of trout, bream, and perch, it contains the pollen, which is the same as the *ferra* of the lake of Geneva, and the *gwynia* of Bala Lake in North Wales. Lough Erin, a small water in the county of Down, is remarkable for producing pike, trout, and eels, of an enormous size. Pikes of 26 lb. weight; and yellow trouts, little inferior in flavour to the char, of 12 lb. weight. The char is said to be found in the loughs in the mountainous part of the county of Waterford. The oysters taken near Carlingford are celebrated for the peculiar richness and delicacy of their flavour.

Ireland is said to rest on a bed of granite; and this is highly probable, since granite is very conspicuous and abundant on its highest mountains. Of it the central mountains in the county of Wicklow are formed, and likewise that ridge which separates the counties of Wexford and Carlow. That portion of the county of Kilkenny, which lies between the Nore and the Barrow, abounds in granite of various shades, grey, red, and yellow; there is a valuable quarry of it at Mount Loftus. In some parts of the county of Down it is met with in detached masses; and in other parts it appears to compose the hills; it also abounds in the neighbourhood of Dublin; and is found emerging from beneath the basalt mountain of Sleeve-Gallen in the county of Derry. It is every where used for architectural purposes.

The following facts respecting the granite near Dublin may be interesting in a geological point of view. From the shore, on the south side of Dublin Bay, there passes, in a south-western direction, a broad body of granite, bounded on its eastern and western sides by incumbent rocks of great variety. At Killarney, schistose rocks repose for a considerable extent on granite; and the line of junction, which begins at the sea side, may be traced for some miles across the country. On the shore, it is traversed by numerous veins, many of which are themselves composed of granite; and, in some instances, two veins of this substance, differing from each other, and from the mass, in fineness, and in the proportion of their ingredients, are seen to intersect. The actual contact of granite with incumbent rocks, has been observed at several places in the counties of Dublin and Wicklow. On the shore of Dublin Bay, not far from Blackrock, a mass of compact limestone is visible within a few fathoms of the granite; but, in the intermediate space, the rock is concealed. On the western boundary of the granite rocks nearest to Dublin, rocks composed of trap occur; and thence, to the south-west, along the borders of the counties of Wicklow and Kildare, there are various intermediate rocks between the granite and the limestone of the flat country to the westward.

Limestone is met with in general in great abundance in all the counties of Ireland, except Wexford, Wicklow, Tyrone, and Antrim. It has already been mentioned, in treating of the soils of Ireland, that the rivers Barrow, Lee, Bride, Kenmare, and Blackwater, form the boundary of the limestone districts in their respective courses. Of this mineral there are several kinds, both such as are interesting to the geologist, and such as are useful in an economical point of view. The quarries in the immediate vicinity of Dublin afford many varieties of calcareous productions. The cælp of Mr Kirwan is the prevailing rock. Brown spar is found in some quarries; and beds of magnesian limestone have been observed on the Dodder. The limestones of Ireland are not less important in an economical point of view. Limestone of a fine white grain, lying in strata from four inches to two feet thick, and of which columns have been raised between nine and ten feet long, and from fifteen to eighteen inches in diameter, abounds at Ardbraccan, in Meath. This limestone receives a very high polish; and, when long exposed to the air, assumes a greyish colour. Blue and white limestone are found in the county of Derry. Some of the former is little inferior to marble. But perhaps the most useful limestone for building is that found at Kilkenny. It is of various colours, white, reddish, and black. The last is of a remarkably fine texture, and susceptible of a high polish. All the limestone of Kilkenny contains marine shells of various species, as well as impressions of coraleries, &c. Marble, by no means of inferior quality, is met with in many parts of Ireland. The most beautiful is that of Kilkenny. The Black Quarry, which lies about half a mile to the south of the town of Kilkenny, affords a species of marble nearly equal in quality to that of Italy. The ground is black, varied with white marks, which assume a stronger tint when exposed to the air. About 50 tons annually are exported. Marble is also found in the counties of Cork, Armagh, Down, Kerry, &c. Limestone, containing iron and manganese, is found in various parts of Kilkenny. A species of whetstone, which, after being boiled in oil, is used by the country people for whetting razors, &c. is met with on the mountain of Mangertan. The mountain of Altahoney, in county Down, abounds in white calcareous spar, which is used for tombstones, window-stools, &c. In the Cave of Dunmore, in the county of Kilkenny, alabaster abounds in large masses.

Basalt next claims our attention, in this necessarily imperfect account of the mineralogy of Ireland. "The basaltic district of this country occupies a range of coast stretched out from the estuary of Carrickfergus on the one hand, to Lough Foyle on the other, and extends inland to the southern shores of Lough Neagh." The basaltes of this district is generally amosphous, but not unfrequently disposed in thick beds. At the Giant's Causeway it is most perfect in its form. Here, there are large pillars of it perpendicular to the horizon; in other places, their position is oblique; and in a few, the basaltic pillars form a variety of regular curves. At the Doon Point, in the island of Raghery, all the three kinds are seen, the pillars being perpendicular, horizontal, and bending. (See GIANT'S CAUSEWAY.) The promontories of Fairhead, and Bengore, (see **FAIRHEAD**,) and Cape Pleskin, have already been mentioned, in describing the coast of Ireland; but it will be proper in this place, again to advert to the last in a geological point of view. About ten or twelve feet from the soil Cape Pleskin "begins to assume a columnar tendency, forming a range of massy pillars of basaltes, which stand perpendicular to the horizon, presenting, in the sharp face of the promontory, the appearance of a magnificent gallery or colonnade upwards of sixty feet in height. This colonnade is supported on a solid base of coarse black irregular rock, near sixty feet thick, abounding in *blebs* and air-holes; but though comparatively irregular, it may be evidently observed to affect a peculiar fissure, tending, in many places, to run into regular forms, resembling the shooting of salts, and many other substances, during a hasty crystallization. Under this great bed of stone stands a a second range of pillars between forty and fifty feet in height, less gross, and more sharply defined than those of the upper story; many of them, of a close vein, emulating even the neatness of the columns in the Giant's Causeway. This lower range is borne on a layer of red ochre stone." The ranges of pillars are more perfect in proportion as they lie deeper in the ground. The second range of Cape Pleskin consists of pillars more perfect than the upper range, and the basalt itself has fewer irregularities and imperfections; and the pillars of the Giant's Causeway, which lie still lower, are yet more perfect, as well as the basalt more close and uniform in its texture. Where the forms of crystallization of the basalt are imperfect, the pillars assume various directions; but their general and natural position appears to be horizontal. The following is a list of the strata at Cape Pleskin, as given by Mr Hamilton in his *Letters* on this coast.

No. 1.	Summit, irregular basaltes, shivered and cracked at the surface, . . .	12 feet.
2.	Perpendicular range of gross pillars, containing air-holes, ...	60 feet
3.	Gross bed of rude basaltes, shewing marks of a tendency towards forms, resembling an imperfect crystallization, . . .	60 feet.
4.	Second range of regular pillars, neat, and divided into joints, ...	40 feet
5.	Bed of red argillaceous ochre, on which the second range of pillars rests.	
6.	A thin course of iron ore amid the bed of ochre.	
7.	Soft argillaceous stone, of various colours, and a mottled appearance, friable, and resembling a variety of steatites, ...	22 feet
8.	Succession of 5 or 6 gross beds of table basaltes, between which thin strata of ochre, and other substances, occur,	180 feet.
	Total	374 feet.

The reports of the commissioners for examining and draining the bogs of Ireland, (to which we have already been indebted,) enable us to add to the sketch just given, of the geology and mineralogy of some parts of this country, a few particulars on these subjects. At the northern edge of the Island of Allan, which adjoins the bog of that name, stratified limestone makes its appearance at the surface, at an angle of 5°, and with a dip 20° east of south. Between this edge and the base of the Hill of Allan, hills of limestone gravel occur; but at the base a rock appears, composed of breccia; thin beds of a deep brick red slate; clay much interspersed with mica, is found interstratified with the breccia. To the south rises the Hill of Allan, composed of an irregular unstratified mass of fine grained greenstone, the crystals of hornblende and felspar being very minute. Near the summit, the rock becomes more crystalline. Detached masses of beautiful porphyretic greenstone, thickly studded with large crystals of felspar, are frequently met on the surface. A hill to the south-west of the Hill of Allan, is also composed of greenstone.

The information regarding the strata of part of the Bog of Allan, (and it is highly probable, that the other bogs of Ireland are similarly constituted,) which is contained in the first report of the commissioners, we shall give in the words of that report.

"It appears from Mr. Griffith, (the gentleman employed to survey this district,) that each of the four bogs included in the subject of his report, is a mass of the peculiar substance called peat, of the average thickness of 25 feet, nowhere less than 12, nor found to exceed 42; this substance varying materially in its appearance and properties, in proportion to the depth at which it lies. On the upper surface, covered with moss of various species, and to the depth of about 10 feet, composed of a mass of the fibres of similar vegetables in different stages of decomposition, proportioned to their depth from the surface,—generally, however too open in their texture, to be applied to the purposes of fuel. Below this lies generally a ligh blackish brown turf, containing the fibres of a moss still visible, though not perfect, and extending to a further depth of perhaps 10 feet under this. In the instance exhibited in the section at the close of Mr. Griffith's report are found small branches and twigs of alder and birch; but we do not understand him as being of opinion, that such is by any means generally the case. At a greater depth, the fibres of vegetable matter cease to be visible; the colour of the turf becomes blacker, and its substance much more compact, its properties as fuel more valuable, and gradually increasing in the degree of blackness and compactness proportionate to its depth. Near the bottom of the bog it forms a black mass, which, when dry, has a strong resemblance to pitch, or bituminous coal, and having a conchoidal fracture in every direction, with a black shining lustre, and susceptible of receiving a considerable polish. Immediately below this lower stratum, there is generally found a thin stratum of yellow or blue clay, varying in thickness from one to six feet. In some places, the peat rests on a thinner stratum of yellowish white marl, containing on an average about 60 per cent. of calcareous matter. This stratum of clay in this district, universally rests on a solid mass of clay and limestone gravel mixed together, and extending to an unknown depth."

Recent researches have discovered some rare minerals in Ireland, which it will be proper briefly to notice here. Vesuvian has been found at Kilranelah, in a rock composed of common garnet, quartz, and feldspar. The crystalline form of the vesuvian, however, is not well exhibited. Grenatite occurs, in a micaceous compound, in the lead mines in the county of Wicklow. The precious beryl has been found imbedded in granite near Lough Bray; and cronebane in the same county, and in the Dublin mountains near Dundrum. The Douce mountain, in the county of Wicklow, is composed of micaceous slate, in which andalusite has been found. A variety of the same mineral has been found in great abundance at Killiney, in the county of Dublin. The andalusite of Douce mountain, is accompanied by a crystallized mineral, the characters of which have much affinity to those of indurated talc, the occurrence of which in crystals has hitherto been very rare. Very distinct specimens of hollow spar have been found at and near Baltinglass, in the county of Wicklow. Pitch stone, traversing granite, has been found near Newry, in the county of Down The granular sulphate of barytes, accompanied by iron pyrites, has been found on the sea shore near Clonakilty; and Wavellite, very similar in its external characters and analysis to the Wavellite of Devonshire, as described by Sir H. Davy, has been found about ten miles south east from the city of Cork. Near the extremity of the granite district in Kilkenny, jaspers of various sizes have been discovered, a few feet below the surface, in yellow clay. The county of Kerry is remarkable for transparent regular crystals, known under the name of Kerry stones. They are harder, larger, and possess more brilliancy, than the Bristol stones. Amethysts have been discovered in the clefts near Kerryhead.

Pieces of native gold have, at different times, been discovered in a mountain stream flowing down from Cronebane, and on the declivity of a mountain, seven miles west of Ashlon, in the county of Wicklow. About twenty years ago, government thought it worth while to prosecute the search for gold here; but it was soon proved, that the quantity found would not defray the expense. Considerable quantities of silver appear formerly to have been obtained from the lead mines in Antrim, Sligo, and Tipperary; but the works were destroyed in the Irish insurrections in the time of Charles I. Copper is found at Ross Island, in the Lake of Killarney; at Mucross; at Cronebane and Ballymurtagh, in the county of Wicklow; and also in some parts of the counties of Cork, Clare, Meath, Waterford and Dublin: but at present, it is believed no copper mine is wrought in Ireland. Lead is found near Enniscorthy, in Wexford; and near Glendallogh in Wicklow, in the vicinity of Dublin; and in the county of Donegal: but not above one or two of these mines are wrought. Iron ore is very plentiful in various parts of Ireland; and in the middle of the seventeenth century, iron works were very common; but at present there are few or none. In the peninsula of Howth, grey ore of manganese has been obtained in considerable quantity. It is also found in various parts of Kilkenny, in the mountains of Glanmore, in Mayo, and in several other counties. Cobalt is found in the copper mine at Mucross; and a variety of the earth black cobalt ore of Werner, has been found in the peninsula of Howth. Fragments of tin-stone occur in the gold mine in Wicklow. Porcelain earth, in purity equal to the "China clay" of Cornwall, has been found on the south-western side of the same county.

Coal is met with in various parts of Ireland. In Ulster there are two coal mines wrought; one in Antrim, at Ballycastle, and the other in Tyrone, near Dungannon. In Connaught, collieries are wrought near Arigna, in the county of Leitrim. The province of Leinster, however, seems to possess the most abundant supplies of coal, which is wrought near Castle Coomer, at Doonane, in Queen's county, and at Kilkenny. Castle Coomer colliery is the largest in the kingdom. Forty thousand tons are raised annually. The number of colliers employed is 600. The coal is extracted at the expense of 10*s. per* ton. This coal is generally deemed one of the most pure found anywhere. Mr. Wakefield, however, represents it, as well as all the other coal of Ireland, as of an inferior quality to the bituminous coal of England. In the province of Munster, a vein, the continuation of the Castle Coomer coal, is wrought in Tipperary. The barony of Duhallow, in the county of Cork, is the only part of the southern portion of the province of Munster in which coal has been discovered. This vein extends to Kerry.

Mineral springs are found in almost every county. They are chiefly chalybeates. Those most frequently visited by invalids, are Lucan, near Dublin; Swadlenbar, in the county of Cavan; Johnstown, near Urlingford, in the county of Kilkenny; and Mallow, in the county of Cork.

CHAP. III.

Landed Property—Tenures—Estates—Farms—Leases—General Character of the Agriculture of Ireland—Arable Husbandry—Implements—Crops—Wheat, &c — Potatoes—Flax—Dairy Husbandry—Grazing Husbandry—Cattle—Sheep—Horses—Hogs, &c.

The tenures by which almost all the estates in Ireland are held, are derived from grants made in the times of Henry VII. Queen Elizabeth, Cromwell, or William III. A few proprietors, however, especially in the province of Connaught, hold their estates by original title to the soil.

In the History of Ireland, we have already adverted to the forfeitures of landed property, which arose out of the frequent resistance which the Irish made to the power of the English. In this place, it may be proper to consider them more particularly, as we shall thus more clearly point out the titles on which by far the greater part of the landed property of Ireland is held. By the attainder of John O'Neil, and his associates, in the reign of Queen Elizabeth, more than half of the province of Ulster was vested in the crown, which was bestowed upon the English lords, in such a manner as to secure the English power in Ireland. After the rebellion of the Earl of Desmond was quelled, his immense estate was forfeited, and appropriated to the same purpose. On this occasion, lands were offered to settlers so low as twopence *per* acre. At this period, and on these terms, Sir Walter Raleigh and others obtained grants. On the flight of Tyrone, and those who had espoused his cause, more that 500.000 acres were to be disposed of in the six northern counties. As abuses had arisen from the grants having been too large on former occasions, they were made considerably smaller at this time. The Corporation of London obtained its large possessions in the county of Derry by this forfeiture. The forfeited lands in the time of Cromwell were appropriated chiefly to the discharge of the arrears due to the English army. Connaught was entirely reserved for the Irish. After all these assignments, however, the counties of Dublin. Kildare, Carlow, and Cork, were still unappropriated, and these were reserved to be disposed of as parliament thought proper. On the Restoration, the act of settlement, and the subsequent bill of explanation, (both of which have been adverted to in the history,) were passed, for the purpose of regulating and assorting the grants. In the reign of King William, forfeitures were made to the extent of upwards of one million acres, and of the value of upwards of 200,000*l.* a-year. By the articles of Limerick and Galway, part of these forfeitures were restored; but it is calculated, that the gross value of the estates forfeited, from the 18th of February 1688, and not restored, amount to upwards of one million and a half.

The tenure of landed property in Ireland differs, in one respect, very considerably from that by which land is held in England; for, with but two exceptions, there are no manorial rights in Ireland. The income of estates varies very much—from the lowest value to upwards of 100,000*l. per annum.* There are several estates of upwards of 50,000 acres. It was formerly a common practice to grant leases for ever, or for 999 years, or renewable for lives on a payment of a certain fine. Hence the property of very extensive estates at present is vested in those who receive very little rent from them. In Ireland, landlords never erect buildings on their estates, nor expend any thing in repairs; and the leases in general, contain very few clauses. Six months credit is generally given on the rents, which renders the tenant very dependent on the landlord. In many leases the tenant is bound, besides paying his rent, to labour for his landlord at an inferior rate of wages. The system of what are called "middle men" prevails very much in Ireland: these are persons who rent land from the proprietors, and let them again to the real occupiers. Sometimes there are several renters between the landlord and the occupier; and the latter is answerable, not only for the rent to the person under whom he directly holds, but also for the rent due by each renter to the person above him, and by the first renter to the proprietor. This system arises from the poverty of the Irish farmers in general; but it evidently not only proceeds from poverty, but tends to increase it. The leases commonly granted are. 61 years and lives—31 years and lives—31 years—21 years and lives—and 21 years according to Mr. Wakefield, or 1*l.* 7*s.* 1*d.* Irish money *per* Irish acre. In some counties, the green, or cultivated acres average from 2*l.* 10*s.* to 3*l.* 8*s.*; the latter is the case with the pasture land of Limerick, whereas the green acres in Mayo and Fermanagh do not average above 1*l* 5*s.* In some parts of Ireland the value of estates is at 30 years purchase; in general it does not exceed 20; and in some places it is not more than 16 or 18.

In considering the agriculture of Ireland, it will be proper to divide it into three parts. The arable husbandry, the dairy husbandry, and the grazing husbandry. The general character of all the three kinds, particularly of the arable husbandry, is very low.

That the agriculture of Ireland has improved much within these few years is evident, from the greater supplies of corn which she has been enabled to export to Great Britain. On this point, the Report of the Committee on the Corn Trade, which sat in 1813, is decidedly satisfactory. This committee put certain queries to the Farming Society of Ireland; and the following is their report of the answers to these queries, and of the result of other investigations which they entered into on the same subject.

"The answers of the Farming Society of Ireland to the queries of the committee shew, that there has been a very considerable increase of tillage in that country, in the course of the last ten years; estimated, by many skilful persons, at nearly one-fourth. That the land already in tillage is capable of being rendered much more productive—that the same land in some parts, upon which formerly seven barrels of wheat the acre was considered a good return, now yields, by better management, (without the loss of two seasons rent and labour under the system of open fallow,) at least ten barrels the acre; and that there are very considerable tracts of land now in grass fit to be converted into tillage; almost all the meadows and pastures which are dry and free from rock being capable of producing a crop of lea oats with one ploughing, and of being made productive afterwards, by rotation crops, in the usual way.

The evidence of several persons, well acquainted with Ireland, concurs in proving, that the tillage of Ireland has of late years increased very much, and is capable of being still farther increased. Of the actual practicable increase, it is impossible to form any correct opinion; but when all the various circumstances are taken into consideration, which exist in Ireland favourable to such an increase, the production of a much greater quantity of corn may be expected, than would be sufficient to provide for the average deficiency (calculated upon the importation for the last ten years) of the produce of this country to supply its own wants.

The following comparison of the prices of corn in Ireland, coupled with the value of corn exported from thence in the last year, *L*2,958.180, affords a striking practical illustration of the foregoing reasoning:

	April 1812.	April 1813.
The highest price of wheat, *per* barrel of 20 stone, was . . .	83s.	60s.
——— of Barley, *per* barrel of 16 stone,	44s.	29s.
——— of oats, *per* barrel of 14 stone,	34s.	23s.

It is worthy of observation, how much larger the proportion of corn imported into Great Britain from Ireland is to the whole of the corn imported into Great Britain in the last five years, than it was in the preceding 16 years.

In the last five years, the value of the whole imported was *L*18.934,359; of this was Irish corn *L*6.507,884, being something more than one-third of the whole.

In the preceding sixteen years, the value of the whole imported was *L*54,586.787; of this was Irish corn *L*8,379,027; being *L*616,075 more than one-seventh of the whole."

Tillage husbandry forms a small part of the agriculture of Ireland. In consequence of the village-partnership system, which prevails in the western counties—the small manufacturing farmers in the eastern parts of Ulster—the small subdivisions of property throughout the greater part of the southern coast—the large tracts of mountains—and the extensive grazing pastures and dairy farms in other parts of Ireland, there is little room for tillage husbandry. This husbandry varies so much in different parts of Ireland, that Mr. Wakefield, in order to give a clear and accurate idea of it, divides the whole country into nine districts.

In the first district he comprehends the flat parts of Antrim, the eastern side of Tyrone, Down, Armagh, Monaghan, and Cavan. In this district the farms are extremely small; in consequence of which the land is generally dug with the spade. Potatoes, flax, and oats, are the crops commonly cultivated; and these are grown till the land is exhausted, when it is recruited by the cow, the goats, two or three sheep, and the poultry, lying upon it for some years. The ploughs used in this district are of the most rude and imperfect structure, and do their work in the most slovenly manner. When a plough is used, three or four neighbours unite their strength, each bringing his horse, or his bullock, or his milch cow. Most ploughs are attended by a person, whose employment it is to turn back the furrow, which would otherwise revert to its bed. All the other operations of agriculture are performed in this district in the same rude manner. The little wheat that is raised in it is "lashed;" that is, the grain is knocked out by striking the sheaf across a beam placed above a cloth; it is, however, afterwards thrashed with a flail. "In this district, as well as in the greater part of Ireland, the corn is thrashed on the highways, and is dressed by letting it fall from a kind of sieve, which, during a pretty strong wind, is held by a woman as high from the ground as her arms can reach.

Under the second district, Mr. Wakefield comprises the northern part of Antrim, Londonderry, the north and west of Tyrone, and the whole of Donegal. Tillage here is in a much worse state than in the first district. There is no clover; and, with the exception of a little near Derry, no wheat.

The third district comprehends the northern part of Fermanagh. Here the farms are much larger than in either of the former districts, the agriculture better, and the crops more productive. Some wheat is grown, but oats are the most prevalent crop. A small portion of the land, however, is only employed in tillage.

The fourth district comprises Sligo, Mayo, Galway, Clare, and parts of Roscommon, and Longford. In some parts of this district, the spade culture is generally pursued; but in other parts the land is cultivated with the plough, drawn by four horses a-breast. In Roscommon, the practice of yoking horses to the plough by the tail is still followed, at least with two-year-old colts in the spring. Oats are chiefly raised in this district; but along the sea-coast of Sligo considerable quantities of barley are grown. A large portion of this district is let on partnership-leases, according to the village system.

In the fifth district, which comprehends Limerick, Kerry, the south-west and northern parts of Cork, and part of the county of Waterford, little corn is grown, with the exception of the southern part of Cork.

In the sixth district, which takes in the remainder of Cork, most of the land is in pasture; and, where it is in tillage, the spade is generally used.

The seventh district comprehends some parts of Tipperary, and King's and Queen's counties. Here a great deal of corn is grown, and the agriculture is good, in comparison with that which is pursued in any of the preceding districts. More attention is paid to a systematic course of cropping, and keeping the land in good heart. Oxen and horses are used for the plough. In some parts turnips are grown, but they are seldom hoed. Ninety acres are considered a large tillage farm.

The eighth district comprises Wexford, and a part of Wicklow. In some parts of this district beans are cultivated; but they are sown broadcast, and never hoed. Even here, their mode of ploughing is very awkward. One man holds the plough, another leads the horses, and third presses on the beam, to keep it down.

The last district comprehends the northern part of Kilkenny, Kildare, and the cultivated parts of West Meath, Meath, and Lowth. Wheat enters into the common course of crops; but the fallows are bad. Clover has been introduced, but it is sown on exhausted land. The farms are much larger here than in any other parts of the country. The ploughs are very badly constructed, and are drawn by six oxen and horses.

The following Table, given by Mr. Wakefield, exhibits, according to him, the average produce of the nine districts.

DISTRICTS.	In Pounds Avoirdupois.		In Pounds Avoirdupois		In Pounds Avoirdupois		In Pounds Avoirdupois		In Pounds Avoirdupois		In Gallons.	
	Wheat.		Bear.		Barley.		Oats.		Potatoes.		Flax.	
	Seed.	Produce.	Seed.	Produce.	Seed.	Produce.	Seed.	Produce.	Seed.	Produce	Seed	Produce.
1st. *District.* Part of Antrim, part of Tyrone, Down, Armagh, Monaghan, and Cavan	228	2274	205	3500	[illegible]	2982	[illegible]	2636	[illegible]	22,248	30	785
2*d*, Part of Antrim, Londonderry, part of Tyrone	175	2135	—	——	[illegible]	[illegible]	291	3227	[illegible]	[illegible]		
3*d*, Fermanagh	No return.											
4*th*, South of Fermanagh, Sligo, Mayo, Galway, Clare, Roscommon, and Longford	222	2024	196	3584	244	2765	308	2749	[illegible]	22,289		
5*th*, Limerick, Kerry, part of Cork, Waterford	[illegible]	2537	261	4180	[illegible]	3024	[illegible]	2970	2592	24,328	—	972
6*th*, Southern part of Cork	The returns being according to the English acre, are not taken into the average.											
7*th*, Tipperary, Queen's and King's county	232	1857	187	3131	173	2325	320	2265	[illegible]	22,358		
8*th*, Wexford, and part of Wicklow	186	2020	—	——	296	2614	368	[illegible]	[illegible]	21,140	—	896
9*th*, Kilkenny, Kildare, West Meath, Meath, Lowth, and Dublin	257	2353	211	3494	246	3235	361	3063	[illegible]	27,113	—	824
Average in Winchester Bushels to the Irish acre	[illegible]	33.6	4.01	69.2	[illegible]	54.6	8.4	72.4				
To the English acre	2.086	20.74	2.17	42.7	2.71	33.7	5.18	44.5				

The rudeness of the Irish plough has been already adverted to. It is made chiefly of wood, with a very long beam, without a swillyard: the breast, which is also of wood, has seldom any ground; and the share has hardly any wing. In Wexford, the beam is shorter than in any of the other counties, and the sock in general is of cast iron. The Scotch plough has been introduced within these few years. The flail is seldom heavier than a schoolboy's whip. The spade is much narrower than the English spade; the handle generally five feet long: the handle of the shovel is still larger, it is sometimes rounded, sometimes pointed, and often square at the end. The loy, which is much used in Ireland, is a long narrow spade, which projects entirely on the right side of the handle: its breadth is that of the foot. The slane is a double loy, used in cutting turf. The sliding cars have no wheels: the ends of the shafts are shod with iron, with a wicker basket suspended between them. Cars are small carts, having the wheel fixed to the axle-tree, which turns round along with it. The wheel is not spoked, but solid. The cars are difficult to be turned.

Little labour is bestowed on fallows in Ireland; and that little is very ill done. Three ploughings are deemed amply sufficient; and in consequence of these being performed with a rude and inefficient plough, not followed by the other necessary operations, the ground is generally full of weeds. The Irish, however, bestow a great deal of labour in trenching their land. By this operation they form it into beds, and shovel out a deep trench between them, throwing up the earth; this is done to all land, whether ploughed or dug, while the crop is growing: the expence is eight shillings per acre.

When Boate wrote his natural history of Ireland, wheat appears to have been cultivated only in a very partial manner in the province of Connaught; and, from the account which has been given of the agriculture of Ireland in its different districts, it will be seen that, even at present, its cultivation is very limited. There is little or no wheat grown in the counties of Monaghan, Tyrone, Derry, Donegal, Sligo, Mayo, Leitrim, or Cavan; the principal wheat districts are, the counties of Kilkenny, Carlow, Dublin, Meath, Louth, and parts of Limerick, Tipperary, Clare, and Cork. The red Lammas is the kind most in use. Spring wheat grows well near the sea coast of Wicklow. Wheat is generally sown after potatoes, or a fallow: little attention is paid to it while growing. The Irish wheat is for the most part coarse, and of inferior quality; in consequence either of the wetness of the climate, or bad harvesting, it all requires to be kiln dried. Barley is by no means generally cultivated in Ireland: it is of inferior quality to that grown in England, not yielding so much saccharine matter by 20 per cent. Where barley is cultivated, it is sown after potatoes. Bere, or big, is grown in Kildare, Meath, West Meath, Longford, and in the north on cut-out bogs. Meslin, or a mixture of wheat and rye, is sown near Drogheda, at the market of which it finds a ready sale.

Of all the species of corn, oats are the most extensively cultivated; forming the principal part of the food of the people, a market for them is every where to be found. It is calculated, that, throughout the whole kingdom, there are ten acres of oats for one of any other species of corn. They are sown after wheat, potatoes, flax, and barley; and even year after year in succession, till the land is quite exhausted. In the mountainous districts, the black oat is generally sown; of late years the potatoe oat has been introduced into the lower grounds. The Irish oats are not equal in weight or quality to the English. Beans are cultivated no where except in parts of the county of Wexford. Rape is grown for seed in King's and Queen's counties, and some parts of Tipperary.

Ireland has long been celebrated for the immense quantities of potatoes it produces, as well as for their excellent quality. They are planted on every kind of soil, either in drills or on lazy beds. The former method has been introduced lately, but it is gaining ground fast. In general, the potatoes are stored up by the poorer classes in their cabins; where they are in large quantities, they are pitted in the fields where they grow. A potatoe pit, lined with turf, is deemed preferable to one lined with straw. Potatoe land rents from 6*l.* 6*s.* to 10*l.* 10*s.* per acre; the whole expence of growing them, including rent, varies from 13*l.* to 16*l.* per acre. The produce varies very much; perhaps from 40 to 50 sacks, of 20 stone to the sack, and 21lbs. to the stone, may be deemed not unusual produce on good land.

Flax is cultivated through almost the whole of Ireland, except Wicklow and Wexford; but it is principally grown in the province of Ulster: it follows potatoes, oats, and barley. The plough is seldom employed; the ground, for the most part, being prepared by the spade, but the earth taken from the trenches is not always shovelled over the beds.

The culture of hemp was formerly pretty extensive on the rich lands in the county of Limerick; but it is now abandoned there; nor has it succeeded in other parts in any considerable degree, notwithstanding government afforded premiums for that purpose. The quantity of land sown with hemp, as returned to the Linen Board in 1808, was only 325 acres.

Of the indigenous grasses of Ireland, it does not seem necessary to specify any, except the fiorin grass, or *agrostis stolonifera*, which has been lately very highly extolled by Dr. Richardson. Its merits, however, are not nearly so great as he represents them; and, indeed, the only situation for which it is adapted is sea-walls, where its roots run and bind them together.

Considering the very imperfect and backward nature of Irish husbandry, it is not to be expected, that laying down land to grass is well understood. In fact, this is seldom done with seeds; but, in most places, the ground is suffered to clothe itself with its natural herbage. Soon after grass is cut for hay, it is formed by the hand into what are called "lap-cocks," each of which is as much as a woman can twist round her arms like a muff; these being laid on the ground in the direction of the wind, which blows through them, are soon dried; and are then put into a "tramp-cock." In this state it becomes heated, and its quality is further injured by the heated hay being put into ricks, so that the quality of by far the greater part of Irish hay is very indifferent. From the account of the arable husbandry of the different districts, it has already been seen that very little clover is cultivated. In the west and south-west it is scarcely known; and, according to Mr. Newenham, there are not 5000 acres in the whole island; where it is cultivated, it is sown on exhausted and foul land. There are few quickset hedges in Ireland. In the limestone districts, stone-walls, and in the other districts, earthen banks, are the usual fences. ;In the southern counties, furze is sometimes planted on thèse banks.

The dairy husbandry is the most extensive, and the best managed in Ireland. Kerry, Cork, Waterford, and parts of Kilkenny, Carlow, Meath, West Meath, Longford, and Fermanagh, as well as the mountainous parts of Leitrim and Sligo, are principally occupied by dairy farms. Butter is the only produce: a great deal is also made on the small tenures in Cavan, Monaghan, and Down. The method practised in Dorsetshire, Devonshire, and other counties in the west of England, of letting dairies to dairymen, at so much a cow per annum, is followed in the south of Ireland. The average number of cows on a dairy farm is about thirty or forty; three acres of land, of middling quality, are deemed necessary for the subsistence of each cow. The average produce of milk is eight quarts in 24 hours in summer: and five quarts in winter; four good cows will give half a cwt. of butter in a week. The best butter is make in Carlow, and the worst is produced from the rich soil of Limerick and Meath. Butter of the first quality is sent to England, where it is either consumed or shipped for the East and West Indies; the next sort is sent to Spain, and the third to Portugal. The fattening of calves for veal is little practised in any part of Ireland.

The grazing husbandry of Ireland is not, as in England, united with the tillage husbandry; nor are there large tracts of land, exclusively devoted to the breeding of cattle, as in the Highlands of Scotland. The mountains of Ireland, instead of being grazed by those who farm them, are frequently let, on a partnership-lease, to the inhabitants of a neighbouring village, each of whom turns in a certain number of cattle, horses, goats, or geese, according to the rent he pays. The few cattle that are fed on the mountainous districts are generally very poor. The most extensive and valuable lands for fattening cattle are in Munster, viz. the Caucases on the banks of the Shannon and Fergus, and in parts of the counties of Limerick and Tipperary. Some parts of Cork, Queen's County, West Meath, a small part of Louth and Kildare, also contain rich grazing land.

The native Irish cattle are nearly extinct; they are narrow in the loins and thin in the quarters; with short legs, large bellies, and white faces. The Kerry stock are a distinct breed. The Holderness, Staffordshire, and Devonshire breeds, are the principal ones which have been introduced from England: the Staffordshire is the most common on the grazing lands, or rather a mixture of the native Irish and the Staffordshire.

A greater extent of country is employed in Ireland for the grazing of sheep, than for the grazing of bullocks. Roscommon, Galway, Clare, Limerick, and Tipperary, are the great breeding counties for sheep. In the province of Ulster there is not a single breeding flock. Galway, Clare, Roscommon, Tipperary, and Meath, are the principal fattening counties. Mr. Wakefield says, that in the whole course of his tour he never saw a sheepfold; and only once sheep feeding on turnips. The native Irish sheep are small, and are covered with nearly as much hair as wool; but they are now not common. In consequence of their having been crossed with different kinds of English sheep, the Irish sheep at present are of the polled, long-woolled kind, and, in the great breeding counties, very large. In many parts of Ireland, they are kept only for their wool, and this only for the use of the family. A breed of fine woolled sheep, peculiar to the mountains of Wicklow, exhibit the only traces of a distinct race of short woolled sheep in the island.

The native Irish horse is a very useful animal: it seldom exceeds 15 hands in height, and is very hardy and sure-footed. This breed is very much used by the linen-merchants of Ulster, in riding from market to market. A large, long, blood horse is much reared in Meath, and is to be found in most of the rich grazing counties. But the horse, usually employed for all kinds of labour in Ireland, is the one first described. There are few parts of this country in which goats are not kept. Those belonging to the cottars, are generally confined by a tether to the tops of the banks. In the mountains, where they are numerous, they are quite at liberty. Many of the poorer families have no other milk but what their goats afford. The Irish breed of hogs is very tall, long, and narrow in the loins. They are met with in every part of the kingdom. No peasant is without one. They are fattened principally with potatoes; and afterwards sold, for the purpose of paying the rent. Breeding sows are generally kept by dairymen. Rabbit warrens are not numerous in Ireland; but some of them are very extensive. On the east side of the river Bann, there are two, one of which contains 500 acres, and the other about two thousand. It is singular, that the hair of the hares in Ireland will not felt; whereas the rabbit hair in that country answers remarkably well in the manufacture of hats.

Bees thrive remarkably well on the dry hills in the county of Down, and the honey there is highly esteemed for its fine flavour; but the breeding of them is much on the decline in this county, as well as in Kilkenny, where formerly a considerable quantity of mead was made. The county of Wexford is celebrated for crammed fowls; and there is a fair at Bellyheague, in that county, expressly for the sale of poultry of all kinds. Families send thither from a great distance, to purchase store fowls. Turkeys are numerous in Ireland. The warmth of the cabins, into which they are always admitted, is favourable to their increase. In the county of Cork there is a fair for a sale of them.

CHAP. IV.

Manufactures—Linen—Cotton—Woollen, &c.—Distillation—Flour Mills—Salting Provisions &c.—Fisheries—Trade and Commerce—Revenue and Finance.

The linen manufacture is very justly considered as the staple manufacture of Ireland. It was established by the Earl of Strafford, when he was lord lieutenant of this country, in the reign of Charles I. In order to fix it on a firm foundation, he brought flax seed from Holland, and spinners and manufacturers from the Netherlands and France. His lordship himself afterwards embarked in the business, and expended 30,000*l*. of his private fortune.

In consequence of the civil wars between Charles and his parliament, this manufacture languished, and had almost been annihilated, when the Duke of Ormond gave it his patronage, and took measures for its re-establishment. His measures were successful; and, as he sent persons into the Netherlands to learn the best mode of raising flax, and procured manufacturers from Brabant, France, and Jersey, it was soon placed on a better and firmer footing than it had ever been. The places where the manufacture was first carried on in the Duke of Ormond's time were near Dublin, where cordage, sail cloth, ticking, and linen of Irish yarn, were manufactured, of excellent quality; and at Carrick. Before he quitted the government of Ireland in the year 1669, the linen trade was fully established, and in a promising condition. In the beginning of the next century, parliament took it under its protection; considerable sums of money were voted for its support; a board of trustees was established; and bounties were granted on the exportation of Irish linen. In 1737, the board exerted themselves in the introduction from France, and establishment in Ireland, of the cambric manufacture.

The raw material for the linen manufacture is almost entirely grown in Ireland. The following Table shews the number of acres sown with flax in the year 1810. It does not include pieces of land less than an acre sown with flax. Hence it may fairly be calculated, that the total number of acres under this plant, in the year 1810, was about 100,000, which, allowing the average produce to be 30 stone per acre, at 10s. and 6d. per stone, the average price, for the seven years before 1810, will give an annual produce of the raw material worth 1,500,000.

Counties.	Number of Acres supposed to be sown with Flax.	Number of Bushels of Flax seed supposed to have been grown.	Number of Bushels of Flax-seed on which bounty is likely to be claimed.
Antrim	11,000	3,100	2,900
Armagh . . .	15,000	6,000	6.000
Londonderry . .	5,000	3,200	3,000
Tyrone	10,241	8,460	7,000
Donegal . . .	6,000	7,200	5.600
Fermanagh . .	5,000	5,000	4,[illegible]00
Monaghan . . .	3,200	4,000	3.600
Cavan	4,300	6,500	700
Down	2,700	3,200	3,000
Meath	112	842	840
King's County .	252	2,000	1,000
Louth	1,253	11,590	10.431
Longford . . .	1,325	250	240
Kildare and Wicklow	36	100	80
Queen's County .	18	114	48
Kilkenny . . .	50	350	50
West Meath . .	950	3,000	800
Carlow and Wexford	111	500	280
Dublin			
Cork	1,462	4,481	1,734
Clare	58	340	340
Limerick	1,500	1,100	400
Kerry	554	1,572	1,572
Tipperary . . .	117	1,600	832
Waterford . . .	25	63	19
Sligo	684	1,800	600
Mayo	1,333	5,308	4,8[illegible]
Galway	1,196	9.568	8,57[illegible]
Leitrim	1,565	1,300	1,000
Roscommon . .	1,707	1,707	1,707
Total	76,749	94,145	71,4[illegible]5

Till the beginning of the present century, the flax was entirely spun by the hand. Spinning by machinery was first introduced in the county of Down, and afterwards spread into other counties; but it is by no means general. This has arisen principally from the very low price of labour in every part of the land. Yarn spun by women is sold in this country much cheaper than the same article manufactured by machinery in England. The earnings of the poorer females are frequently not more than twopence a day, working diligently from morning to night. There is also another reason why machinery has not been more generally established. It cannot with any material, however fine, exceed the fineness of three hanks in the pound; whereas women, when the flax is good, can spin it from twelve to twenty hanks. "To sum up the whole," observes Sir Charles Coote in his *Survey of Monaghan*, "the quantity of yarn spun by machinery, the greater price given for it, and the better means of obtaining a market, are in favour of that mode with respect to coarse yarn. On the other hand, the low price of labour, the superior fineness of the wrought material, and the expence of machinery, with its wear and tear, are very great drawbacks; yet it may be estimated, that the balance is in favour of the former, to the amount, it is supposed, of one half-penny per hank." The Irish women have long been celebrated for their skill in spinning yarn. This is supposed to arise from their labouring little with their hands, and hence having their fingers very supple and soft.

In many parts of Ireland, the manufacture is confined to spinning yarn, which is sold to the weavers at established markets; but, in several instances, the flax is grown, prepared, spun into yarn, and manufactured into linen, by the same person and his family. If, however, we look to the country in general, those who grow flax are much more numerous than the spinners. This appears by the exportation of unspun yarn; and the spinners are more numerous than the weavers, as appears from the exportation of linen yarn.

The earnings of the weaver depend partly on his skill and industry, and partly on the fineness of the linen which he weaves. The looms they employ cost from four to five guineas each; many houses have three looms; one third of a pound of tallow is required to dress a web. Children are hired to attend a loom, at from 13s. to 17s. the half year, with diet, washing, and lodging: in some cases journeymen are employed, at eight guineas per annum, with board and lodging. The weavers estimate thus; when working themselves, they gain 10s. a web, and if they worked every day could weave a web in a week; this, however, must depend on the fineness of the linen. The average earnings of a linen weaver may, perhaps, be estimated at 7s. a week.

The linen manufacture flourishes most in Ulster; but it is established also in Galway, Mayo, and Sligo, and towards the south, in the whole neighbourhood of Drogheda; it exists also in some places in the King's County, Kerry, and along the coast of Carlow; in fact, with the exception of Wexford and Wicklow, where it is unknown, it prevails, more or less, over all the other parts of Ireland. Linen is woven of different widths, from 10 inch bundle linen, made at Kerry, to 5-4th sheetings, manufactured near Cootehill; and of different qualities, from coarse, thin, 3-4ths wide, manufactured in Antrim, which sell for 6d. per yard, to cambrics, worth one guinea per yard. The manufacturing of linens of certain widths seems confined to certain districts. Narrow linens, not exceeding, when bleached, 32 inches, are manufactured in Donegal, Londonderry, Tyrone, and Antrim; in this last county also are made all the 3-4th wide linens. The fine yard wide, or cambrics, lawns, and diapers, are made near Belfast, Lisburn, and Largan; in Armagh, coarser yard wides. In Cavan are manufactories for thin linen, for the most part 7-8ths wide. Fermanagh and Sligo manufacture 7-8ths. A strong kind of 7-8th dowlas, some 9-8th and 5-4th sheetings, are made in the counties of Louth, Meath, and Dublin. A coarse cloth, like the Scotch Osnaburghs, is manufactured in Kerry and Cork; it is exported for negro clothing. There is a damask manufactory at Lisburn, and a manufacture of sailcloth in the neighbourhood of Cork. Most of the bleach-greens, which finish for sale those linens that are sent in a bleached state to England, are in the counties of Fermanagh and Sligo. The bleachers are distinct persons from the manufacturers; the latter carry their webs to market, where they are purchased by the former. It is calculated that every bleacher in the county of Londonderry furnishes, on an average, 5000 pieces annually; so that, on the supposition that there are 50 bleachers, the pieces bleached in this county will amount to 250,000; and at 2*l*. 5s. 8d. the piece, the total value will be 562,500*l*. Sterling. On the Bann, which is the principal river in the county of Down, there are 20 bleach-greens, which bleach on an average 8000 pieces annually, or 160,000 pieces; the value of which is estimated at upwards of half a million.

The quantity of linen sold in Dublin, in 1808 and 1809, will be seen from the following statement, extracted from the Appendix to the Linen Board Report.

A return of Linen, inwards and outwards, at the Linen Hall, for one year, ending 1st of March, 1809.

	Packs and Boxes.	Average Value.	
Inwards . . .	10,227 . . .	160 each	*L*1 636 320
Outwards . . .	9,279 . . .	170 each	1,738 590
Value remaining in the Hall, 1st March, 1808,			408,615
From which deduct linens sent from the Hall to merchants' warehouses . . .		*L*50,000	
More in value outwards than inwards		102,227	152.527
			L 256,388

Comparative view of the Linen, outwards and inwards, at the Linen Hall, for one year, ending 1st March 1809.

	Inwards.	Outwards.
Year ending 1st March 1809 . . .	10 277	9279
Do. Do. 1808 . . .	9.495	9060
Increase in 1809 . . .	732	219

The cotton manufacture is of very late introduction into Ireland. The first mill for spinning cotton twist by water was erected in 1784; and, in the year 1800, it appeared, in evidence before Parliament, that the cotton manufacture, established within a circle of ten miles round Belfast and Lisburn, and including those towns, employed 13,500 working people; and that the whole number, to whom it gave occupation, amounted to 27,000. This manufacture is spreading rapidly, and seems as if it would supplant that of linen in many parts of Ireland. Being similar, in some respects, to the latter, it made its way with greater facility among the lower classes. It also affords them higher wages, principally from the manner in which it is carried on; for, instead of the raw material, as in the case of the linen manufacture, being purchased by the weaver, and sold afterwards in a manufactured state, the cotton-yarn is either given out by the master manufacturer to the weaver, who receives so much per piece for his labour, or it is wove in manufactories. All the spinning is performed by machinery. The cotton manufacture is established chiefly near Belfast, where it was first fixed. It has also spread to Dublin, Kildare, Wicklow, Wexford, and Louth. At Collon, in Louth, there are 1300 looms employed in calico weaving; and at Stratford, in the county of Wicklow, there is also a large calico manufactory: the yarn for this is brought from Scotland, and wound and wove in the village. The manufacture of muslins is also carried on in some parts of the counties of Cork, Down, and Queen's County; and, indeed, it is highly probable, that all the branches of the cotton manufacture will fix themselves in Ireland, especially in those parts where linen is made, from the great and obvious advantage which is derived from the similarity of the manufactures, in enabling the weavers to turn their labour to the one or the other, as the demand for either is more prevalent.

In treating of the sheep husbandry of Ireland, it has been remarked, that the demand for them as mutton is very limited; consequently not very many are kept, and of those that are, a considerable proportion are exported to England. Hence it will appear, that the woollen manufacture, on a large scale, cannot exist in Ireland. We have already mentioned, in the history of this country, that it was formerly much checked and depressed by the jealousy of the English woollen manufacturers, to which the English government very unjustly, as well as unwisely, gave its sanction and support. And since the union, which placed the two countries on the same footing, this species of manufacture does not seem to have flourished. Besides the cause already mentioned, which perhaps ought more properly to be deemed the effect of the absence of woollen manufactories, there is another which operates very powerfully and generally. The great mass of the people manufacture their own woollen cloths. All the wool that is shorn is manufactured into frieze and linsey by the proprietors of the sheep, who card, spin, weave, dye, and consume it. The poorer classes, who cannot afford to purchase oil for their woollen goods, extract, in the summer, the juice of the fern root, which answers the purpose of oil; and the twigs of the alder, walnut, and oak, with elder berries, &c. are used for dyeing. In some parts of Ireland, the common farmers and cotters, and their wives and children, manufacture not only frieze, stockings, linseys, flannels, petticoats, &c. for their own children, but also some woollen goods for sale.

As the woollen manufacture on a great scale is not established in this country, there are few or none of those people, who, in England, prepare the wool for the manufacturers. There are no wool breakers. There are plenty of wool merchants, who buy whole fleeces, but none who understand the art of sorting it. As the exportation of wool in the yarn is permitted by the Irish laws, the principal part of the wool, not used in the domestic manufactures, is purchased by the merchants in the south of Ireland; and after it is spun there, it is exported to England for the Norwich manufacturers. There are, however, a few woollen manufactures of different descriptions in some parts of this country. A small quantity of broad cloth is made at Carrick on the Suir; blankets are made at Kilkenny; but both these manufactures are on the decline. In 1800, there were employed at Kilkenny about 780 people; the average number of pieces wove in the year were 2500, and the greatest capital at any time employed did not exceed 36,000*l*. There is a flannel manufactory in the county of Wicklow, also on the decline. Between 1794 and 1809, the total number of pieces exposed to sale scarcely exceeded 55,000. A small quantity of broad cloth is manufactured at Dublin; and very lately, in the county of Kildare, a woollen manufacture has been established, with shearing machinery, and all the other improvements of Yorkshire. Broad cloth and blanket manufactories are established no where to the north of the capital. In the neighbourhood of Cork, and along the coast of that country, stuffs are manufactured.

Gloves are manufactured in some parts of Ireland. What are called Limerick gloves are made of the skins of calves taken from fat cows. Iron is not manufactured to any considerable extent at present; though it appears, from Boate, that, in the middle of the 17th century, there were several very large iron founderies and manufactories in various parts of Ireland. Hardware articles are manufactured in Dublin; and reaping hooks, scythes, shears, and other coarse implements, at Carlow.

This country has long been celebrated for its distilleries, both legal and illegal. The latter prevail most in the northern and north-western counties, and even in some of those to the south-west. The following table contains the number of unlicensed stills that were seized in the course of five years, from June 1802, to June 1806:

Year.	Stills.	Heads	Worms.
1802	4131	3190	2809
1803	2573	2018	1744
1804	2360	2021	1732
1805	2974	2656	2373
6 months to June, 1806	1401	1213	1074
Total	13 439	11,098	9732

The number of fines imposed on Townlands for illicit distillation in the year 1814 were 3555, and the amount of fines was 90,210*l*. The greatest number and amount were in the counties of Donegal (727), Cavan (501), Galway (363), Leitrim (326), and Sligo (304). The whole receipt of duty on home-made spirits, consumed in Ireland, on an average of the year 1808 and 1809, was about 664,051*l*.; whereas it is supposed, if duty had been paid on all the home-made spirits, it would have amounted to upwards of 2,280,000*l*. The principal licensed distilleries are established at Limerick, Cork, Ross, Dublin, and Drogheda. In the year 1808, the largest distiller in the kingdom made 17,000 gallons of spirits per week, and worked his stills between nine and ten months in the year. Distillation was first carried on in the north, and has been introduced into the south only within these 30 years. The following table will farther illustrate the state of legal distillation in Ireland:

Account of the Quantity of Corn Spirits for which Duty has been paid in Ireland, in each of the last ten Years, to 5th January 1813.

Year ending 5th January		Gallons.	Year ending 5th January		Gallons.
1804	. .	4,426,085	1809	. .	3,643,751
1805	. .	3,611,312	1810	. .	72,996*
1806	. .	3,756,671	1811	. .	4,719,159†
1807	. .	3,931,829	1812	. .	6,500,361
1808	. .	5,707,158	1813	. .	4,085,913

Public breweries have been introduced into Ireland only within these few years. At present, the principal breweries are at Cork, Fermanagh, Limerick, Waterford, Roscommon, Dublin, Belfast, Cavan, Armagh, Donoughmore, Dungarvon, &c. Malt is prepared by the brewers themselves, and never purchased by maltsters. One of the largest breweries in Ireland brews upwards of 100,000 barrels per annum. The following Table shews the quantity of malt used in the breweries and distilleries for several years.

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* During the greater part of this year distillation from corn was suspended.

† Suspension of distillation from corn, and continued during the first quarter of this year. From the 29th of September 1816, to 5th February 1817, there were 335,347 barrels of corn, 12 stone to the barrel, used in distilling.

Account of the Quantity of Malt for which Duty has been paid in Ireland, in each of the last Ten Years, to 5th January 1813.

Year Ending 5th January,	Barrels.	Year ending 5th January,	Barrels.
1804	[illegible]	1811	642 850
1805	715,479	1812	683 446
1806	705,111	1813	562.234
1807	717,232	1815	[illegible]
1808	604 561	1816	679 018
1809	661,019	1817	479,033
1810	753,981		

In the south of Ireland there is some cider made. That made in Clare is of excellent quality: it is manufactured from the cockagee apple, which grows principally near a town in that county, called Six-mile-Bridge, not far from the sea, and in a part of the country where frost and snow are unknown.

In consequence of wheaten bread being more generally used than it was formerly, flour mills are more common. When Mr. Young was in Ireland, between thirty and forty years ago, there were no flour-mills to the north of the river Boyne; now there are several. Armagh, Belfast, and Derry, have mills; but there are none to the north-west of Navan. They are numerous and very large on the Blackwater, near Navan, some of which grind from 15,000 to 20,000 barrels per annum. Flour-mills abound in the south of Ireland.

In times of war, Ireland is distinguished for its extensive dealings in the provision trade. The principal part of this trade is confined to the city of Cork. During the last war, the average number of oxen slaughtered was about 10,000, and of cows 8.000. In the time of the American war, the number of bullocks slaughtered in Ireland, annually, was 50,000; last war they were not nearly so many, principally arising from a greater number having been exported alive. In 1807, 50.000 hogs were slaughtered in Cork. Bacon and hams are salted on an extensive scale, at Limerick, Clonmell, and Waterford. One half of the hides of the cattle slaughtered at Cork are exported; the hoofs are also exported, and made, at Birmingham, into snuff-boxes. The horns are made, in Ireland, into lanterns, combs, &c. Glue is manufactured, at Limerick and Cork, from the ears, &c. of bulls. A great deal of bone is converted into ivory-black, particularly at Dublin. On the western coast, large quantities of kelp are made; it is used by the Irish bleachers. There are manufactories for making vitriol, muriatic acid, and Glauber's salts, at Lisburn, Belfast, and Moyallon. At Dublin, Waterford, and Belfast, there are glass manufactories. Sugar is refined at Dublin and Belfast. There are salt works at Sligo and Dungarvon; and Cheshire rock-salt is refined at Waterford.

The principal fisheries in Ireland are those of herrings and salmon; the herrings caught off the coast near Galway, are particularly large and fine: this fish is exported from Ireland to Spain, Portugal, Italy, the West Indies, North America, and France. Londonderry, Colerain, Dublin, Waterford, Limerick, and Drogheda, are also noted for producing fine salmon; but the north of Ireland abounds more in this fish, and the fisheries there are more valuable than in any other part of the kingdom. The salmon fishery on the Bann, near Colerain, is particularly celebrated. In the year 17[illegible], no less than 320 tons were taken in this fishery; and in a single draught, there were once 840 fish caught. The mouth of the Bann faces the north; and hence is well situated for receiving the fish that roam along the coast in search of fresh water. In this river they fish with nets 18 score yards long, and are continually drawing, night and day, during the whole season; two sets of 16 men each alternately relieving each other. The best fishing is when the tide is coming in. The famous salmon leap, or fishery on the Bann, lets for *L*1000 a-year. The main stream is always left open for the free passage of the fish up the river; but on the 12th of August the fishery ceases here, (as it does all over Ireland,) and all the other weirs are opened. At this leap, the salmon are caught in a trap of basket-work. The fishery for salmon at Ballyshannon, on the river Erne, is, perhaps, the most productive, after the fisheries on the Bann: the rent is about *L*1100. There is also a productive eel fishery here.

In the south of Ireland, particularly on the Blackwater, the mode of fishing is different from that followed in the north; and is thus described in the statistical survey of Kilkenny: "The country people catch salmon with a snap-net suspended between two cots, which are small boats, flat-bottomed, narrow, equal at both ends, and governed by paddles. Two men are in each boat, one of whom conducts it; and when the fishers find the net drawn, the boats are closed immediately." At almost all the places where salmon are taken, the fish is smoked by means of turf fires, which communicate a pleasant flavour to it, and render the Irish salmon a valuable commodity in many foreign markets. The Carlingford oysters have already been noticed; the demand for these oysters is so great in Ireland, that none are left for exportation.

The commerce of Ireland was most unjustly shackled till the year 1780; and even then was not placed on a fair and equitable footing. The union, however, has given to this branch of the empire, with respect to commercial privileges, what they ought always to have had. Ireland imports from Great Britain, iron, hops, shot, pepper, tea, pearl-ashes, seeds, tobacco, spices, indigo, drugs, colours, alum, coals, cotton wool, logwood, silk, calicoes, earthenware, hardware, beer, sugar, coffee; cabinet and upholstery goods, hats, &c.: and exports to Great Britain, corn, hides, horse hair, provisions, butter, whisky, cattle, flaxseed, yarn, tallow, &c. The trade between France and and Ireland is considerable; from France she imports wines particularly, and exports to France, provisions, linen, &c. Portugal sends her wines, particularly their port, and her fruits, &c. and receives provisions, butter, &c. The trade with Spain consists nearly of the same articles. The commerce between Ireland and the north of Europe is principally carried on through England. With North America and the West Indies, the trade is very extensive. To the former, Ireland sends her linens principally, and occasionally butter; and receives from it flaxseed, &c. To the West Indies, Ireland sends linens, provisions, &c. and receives sugars, &c.

In further illustration of the commerce of Ireland, we shall subjoin the two following sets of Tables. The first set exhibiting the export, in different years, of the principal produce and manufactures of this country; and the second the imports and exports generally.

1. Linen Cloth.—The annually average quantity of linen cloth exported from Ireland, from 1700 to 1750, was not 4,000,000 yards; from 1750 to 1756 11 796,361 yards annually; from 1757 to 1763, 14.511,973, from 1764 to 1770, 17.776,862; from 1770 to 1777, 20,252,239; from the year 1756 to 1773, England was the market for nearly 9-10ths of the whole Irish exportation.

Account of the Quantity of Linen Cloth exported from Ireland, from the 24th of March 1800, to the 5th of January 1809, inclusive.

	Years.	Yards.
Years ending 25th March	1800	35,676.908
3-4th to 5th January .	1801	25,141,516
5th January	1802	37.767,077
———	1803	35,491,131
5th January . .	1804	36,432.365
———	1805	42 988.621
———	1806	43.534,971
———	1807	39.049.727
———	1808	40,901,442
———	1809	43,904,382

Official Value of Linen exported from Ireland, from 1809 *to* 1815.

	1809.		1810.		1811.			1812.			1813.			1814.			1815		
	L.	*s.*	*L.*	*s.*	*L.*	*s.*	*d.*	*L.*	*s.*	*d.*	*L.*	*s.*	*d.*	*L.*	*s.*	*d.*	*L.*	*s.*	*d*
Linen, plain	2,926,958	16	2,470,790	12	2,456,464	14	8	2,092,856	6	8	2,385,844	14	8	2,599 625	8	0	2,864,270	18	8
——coloured	6,151	1	7,738	10	3,697	10	0	2,446	19	0	3,655	5	6	2,149	11	6	165	6	0
——cambric			340	0	218	10	0	354	0	0	222	15	0	11	5	0	52	15	0
Total	2,933,109	17	2,478,869	2	2,460,380	14	8	2,095,657	5	8	2,389,722	15	0	2,601,786	4	6	2,864,488	19	8

The plain linen exported to Great Britain generally amounts, in official value, to upwards of two millions. Formerly the United States took off the next largest quantity —in the year 1811, to the value of upwards of *L*180,000, but none in 1814 or 1815. The export to the West Indies appears to be increasing; being, in 1804, rather more than *L*30,000, and in 1815, upwards of *L*100,000. Spain, since the commencement of her revolution, has taken, in 1809, upwards of *L*120,000; and in 1815, upwards of *L*90,000. The exportation of coloured linen, as appears from the Table, is decreasing. In 1804 it amounted to upwards of *L*10,000.

The following Table gives the same result as the preceding, only continued to 1816, and with the addition of the official value of cotton and linen mixed.

Years ending	Linen Plain.			Cotton and Linen mixed.			Total Value.		
	L.	*s.*	*d*	*L.*	*s.*	*d*	*L.*	*s.*	*d.*
Jan. 5, 1811	2,456,464	14	8	87,679	9	2	2,544,144	3	10
——— 1812	2,092,856	6	8	24,585	3	2	2,117,441	9	10
——— 1813	2,385,844	14	8	49 070	2	0	2,434,914	16	8
——— 1814	2,599,625	8	0	64,934	11	3	2,664,559	19	3
——— 1815	2,864,270	18	8	31.352	17	6	2,895,623	16	2
——— 1816	2,892,248	16	[illegible]	133 067	1	10	3,025,315	17	10

II. *Butter.* Exported from Ireland, on an average of seven years, ending 1770 . . . 201,510 cwts.

Of seven years, ending 1777 . . .	267.212
Of five years, ending 25th Mar. 1782	245,683
Of four years, ending 25th Mar. 1789	307.591
Of seven years, ending 25th Mar. 1796	299,294
Of seven years, ending 5th Jan. 1803	298.737
One year, ending 5th January, 1804	334 251

Real value of the butter exported, ending 5th January, 1804, *L*1,704,680, 2s.

Butter exported to

	England. Cwts.	Scotland. Cwts.	Total.
Year ending Jan. 5, 1814	335,761	16.071	351,832
——————— 1815	334.856	16,819	351 675
——————— 1816	316.209	21,169	337,378
——————— 1817	286,678	17,286	303,964

To foreign parts butter exported, in 1814 109.682; in 1815, 80.479; in 1816, 90815; in 1817, 87,154—most of which was exported to Portugal, generally between 40 000 and 50,000 cwts. The West Indies took off the next largest quantity; then Spain, Newfoundland, and the Straights. The exports to the United States has increased, during the above period, from 61, to 3154 cwts.

III. *Account of the Quantity of Corn and Grain of all Sorts, Meal, Flour, and Rice, exported from Ireland.*

Years.	Barley.	Barley Meal.	Beans.	Indian Corn	Indian Meal.	Malt.	Oats.	Oatmeal.	Pease.	Rye.	Wheat.	Wheat Flour.	Total quantities exported.			Total value at the average Market Price.
													Corn and Grain.	Meal and Flour.	Rice.	
	Barrels.	Cwts.	Barrels.	Barrels.	Cwts.	Barrels.	Barrels.	Cwts	Barrels.	Barrels.	Barrels.	Cwts.	Barrels.	Cwts.	Cwts	
1792	974	16	1715				657,577	96,552	53		92,788	34.156	732.835	130,724	256	*L*493,649
1793	38,601	2	6712				513,932	24,427	69	46	36,701	4239	595,061	28,668		416.969
1794	7,381	1	591				644 504	36,576	12	137	31,231	5411	683.856	41,988	122	460,619
1795	3	2	4517				150,541	37,505	4			1366	157,065	38,871	468	133,349
1796	1						648,596	112,464	21		15	2562	648,636	115,026	15[illegible]	505,725
1797	18,[illegible]		4631				557,756	79,535	25		67,526	18,051	678,287	97,5[illegible]	892	462,284
1798	48,963	7	5197				594,572	93,14[illegible]	2		40,325	5602	695,459	98,737	1110	511.906
1799	[illegible]		1355				157,[illegible]	27,066	4[illegible]		345	261	[illegible]	[illegible]	[illegible]	138,899
1800								640				1157		1797	[illegible]	8915
1801		1248					200	1276	2			457	[illegible]	[illegible]		[illegible]
1802	12,686	4	2747	1960	15,570	3175	475,076	188,189	[illegible]	391	168,937	91,759	665,328	215.522	1[illegible]	782,308
1803	32,867	1634	2249	250	20	57	391,102	76,619	1004	1131	102,037	43,[illegible]	[illegible]	111,[illegible]	21[illegible]	[illegible]
1804	17,560		4052				372,786	67,263	2543	600	153,088	71,5[illegible]	550.625	88.826	[illegible]	681,208
1805	30,140		4670				[illegible]	34.297	3575	56	136.638	22,774	[illegible]	[illegible]	[illegible]	[illegible]
1806	18,408	4	3742			50	461.7[illegible]	[illegible]	4013	477	153,214	[illegible]	641.61[illegible]	[illegible]	[illegible]	[illegible]
1807	68,785	8	[illegible]				724,347	46.772	1512	793	71,475	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1808	69,295	12	4562			200	935.850	72,088	175	[illegible]	79.5[illegible]9	806[illegible]	[illegible]	80.16[illegible]	156	1,2[illegible]
1809	46,480	1067	3837				1,285,028	99,610	211	640	141,695	18,603	1,478,097	110,220	5890	1,616,338
1810	76,882	363	4375				756.254	57,299	272	65	194,621	91,469	1,032.469	149,131	3548	1,429.725
1811	178,680		10,066				565,581	42,114	81	822	364.752	125,984	1,119,982	168,098	2087	1,717.599
1812	225,002		7871			100	824.[illegible]	45,818	109	480	339,094	127,526	1,397,469	173,344	594	2,938,180

An Account of the Quantity of Corn and Grain of all Sorts, Meal, Flour, and Rice, exported from Ireland, from the 5th day of January 1813, *to the 5th day of January* 1814.

		Total Export.	Real Value.		
		Barrels.			
Corn.	Barley	339,416	L.407,299	4	0
	Beans	7,296	10,944	0	0
	Malt	50	85	0	0
	Meslin	139	191	2	6
	Oats	1,253,806	1,191,115	14	0
	Pease	1,594	2,391	0	0
	Rye	702	965	5	0
	Wheat	377,763	786,631	4	0
		Cwt.			
Meal.	Flour	267,891	401,836	10	0
	Groat	1		18	0
	Oat	108,546	108,546	0	0
	Wheat	-	3	4	0
Rice	. .	131	275	2	0
		Total value	L.2,910,284	3	6

IV. *Spirits.* The quantity exported on an average of seven years, ending

	Gallons.
25th March 1796, was	10.284
Do. 5th January 1803, ...	200.426
Year ending 1804, ...	930,800

Number of gallons of Irish spirits exported from the several ports of Ireland, viz. Baltimore, Belfast, Cork, Drogheda, Dublin, Galway, Limerick, Newry, Ross, Sligo, Waterford, for the years ending

10th October, 1802, ...	950,180
Do. 1803, ...	990.898
Do. 1804, ...	917.476
Do. 1805, ...	1,121.968
Do. 1806, ...	550,441

V. *Beef and Pork.*—Beef exported from Ireland, on an average of five years, ending

	Barrels.	Bullocks and Cows.
25th March 1782, . . .	172 690	2993
1790, . . .	138,016	Not known
1795, . . .	128,598	Do.
Eight years ending		
25th March 1796, . .	123,877	17,258
5th Jan. 1803, . . .	112,059	25.494
1804, . . .	79,347	28,522

Pork exported from Ireland, on an average of seven years, ending

	Pork Barrels.	Bacon Flitches.	Hams. Cwt.	Hogs
1770 . .	41,649	7861	Not men-	223
1777 . .	55 240	19,125	tioned.	624
Of five years, ending 25th March,				
1782 . .	87,085	5983	317	280
Of seven years.				
1792 . .	94.079	41,418	945	Not given.
1796 . .	114,844	70,144	Not mentioned.	
1803 Jan. 5.	117.676	90,772	Do.	
1804 . .	119,049	114,382	3955	12,976

	lbs.
Tobacco imported, year ending 5th Jan. 1815, . . .	1,568.030
Tea	3,387,012

	East Indies.	West Indies.	Refined.
	Cwts.	Cwts.	Cwts.
Sugar	1288	330,414	27,217

Cotton goods exported,

1811.	1812.	1813.	1814.	1815.
*L.*93 482	*L.*23,640	*L* 67,271	*L.*79,436	*L.*40,794

Cotton Wool.	Imported.	Exported.
	Cwts.	Cwts.
1810	49 786	11,454
1811	53,133	16,148
1812	47,122	4,709
1813	26,109	6,891
1814	30,162	16,285
1815	20,551	12,455

Wine imported :

	1809.			1810.			1811.			1812.			1813.		
	Tuns.	Hhds.	Gals.	Tuns.	Hhds.	Gals.	Tuns.	Hhds.	Gals.	Tuns.	Hhds.	Gals.	Tuns.	Hhds.	Gals.
French	708	2	35	304	3	42	242	2	0	881	1	0	375	0	0
Madeira	266	3	17	150	3	49	96	1	7	92	3	21	138	0	28
Port	3108	2	49	3895	0	56	798	3	56	1826	3	56	2591	2	28
Rhenish	9	0	14	3	1	0	5	1	35	1	1	7	3	3	42
Spanish	2509	3	21	1392	1	49	1008	0	28	3038	2	56	1850	1	35

Import of the Materials of Manufacture, on an average of Three Years, ending 5th January.

	1777.	1783.	1793.	1800.	1811.	1815.
Ashes, Cwt. . . .	72,996	81,027	133.721	110,599	146 216	87.652
Bark, barrels . . .	184,711	75,438	137.097	117.049	124,339	131 256
Hops, cwt. . . .	14,876	19,032	15.285	15,578	26.938	21,005
Spanish wool, cwt. .	301	684	391	407	254	221
Other wool . . .	none.	none.	17	$\frac{1}{2}$	6550	9405
Cotton wool, cwt. .	3830	3236	15,128	11.216	41,846	13,730
Worsted yarn, lbs. .	857	841	1860	1800	465,057	1,278,348
Cotton yarn, lbs. . .	8883	5405	276 302	558,396	972.036	1,392 645
Salt, foreign, bushels	351 208	397,224	235,770	196 069	552,183	240,000
white, bush. .	369.832	532,781	269.008	299,183	281,733	234 603
rock, tons . .	15 429	16 404	19,062	14.067	25,938	28,273
Iron, cwt.	152,978	174,815	224,306	207,382	289.037	391,055

Import of the Materials of Manufacture, on an average of Three Years.—Continued.

Articles for General Use.

	1777.	1783.	1793.	1800.	1811.	1815.
Sugar, loaf, cwt.	10,800	12,088	6,224	8 393	24.905	28.368
raw, cwt.	212 620	140,662	184,406	217,122	330.299	343,925
Brandy, gallons	413.278	352,891	140,003	9,310	69,351	10,449
Geneva, gallons	137,129	75,587	83,888	2.358	58.579	5,650
Rum, gallons	1,594,716	290,465	682 277	185.102	792.770	384,989
Tea, lbs.	808.748	1.703.855	1,858.791	2,773,070	3 340.334	3.552.879
Tobacco, lbs.	4,409,761	4,261,639	2,935,559	7,386,182	8,364.147	1,998,034
Wine, tons	5.106	4.223	5,897	6,232	5.644	3,431
Coals, tons	330,753	227,557	354,395	364.613	516.573	614.232
Blankets, No.	- -	- -	- -	14 455	73,826	29.701
Carpeting, yds.	Not distinguished till 1794.			57.610	187,998	182.268
Watches, value	- -	- -	- -	L. 3.181	L. 30,838	L. 27,417
New drapery, yds.	624,638	466,985	468 510	728.786	1.346,593	1.364.449
Old do.	317,641	353.759	792 854	1,446,631	1.578,020	2,279,379
Haberdashery, value	L. 10,508	L. 14.618	L. 26 958	L. 21.485	L. 118.087	L. 153,215
Hats, number	1337	2 [illegible]12	6,703	17.732	89.899	106,109
Cotton Stockings, pairs	13 948	2[illegible] 540	246 780	302.666	443.704	460 243
Hardware, value	L. 45.238	L. 58,821	L 88 781	L 71 438	L. 238 925	L. 325.315

Official Value of Imports.

Average of three years, ending 25th March.	From Great Britain.	British Colonies.	All other Countries.	Total.
	L.	*L.*	*L.*	*L.*
1777	1.949 420	161.058	651,820	2,762,298
1783	2 334 900	76 184	631,938	3.043,021
1793	2.753.969	242 995	1,168.020	4 164 985
1800	3.727 859	146.069	783,885	4.657.784
5th of Jan.				
1811	5 464,951	658.071	932.192	7,055 214
1815	6 930.370	586 927	652,523	8,170,820

Official Value of Exports.

25th March	To Great Britain.	To British Colonies.	Other Countries.	Total Irish produce.	Total Foreign goods.	General Total.
	L.	*L.*	*L.*	*L.*	*L.*	*L.*
1777	2,494,455	287,628	401,889	3,153,181	30,791	3,183,992
1783	2,300,561	315,798	460,976	3,054,680	22,766	3,077,446
1793	4,039,581	371,145	715,259	5,060,040	65,944	5,125,984
1800	3,778,520	265,629	306,491	4,225,254	125,386	4,350,640
5th Jan.						
1811	5,159,884	304,954	458,557	5,525,606	397,507	5,923,113
1815	5,731,119	443,781	913,856	6,614,646	474,110	7,088,756

The *real* value of exports, on an average of three years, to 5th January 1811, was . . . *L.*11.607 610

Do. to 5th January 1815 . . . 14,073,206

Official Value of Irish Produce and Manufactures, exported from Ireland, distinguishing the Principal Articles.

Species of Exports.	Years ending 5th January.								
	1815.			1816.			1817.		
	L.	*s.*	*d.*	*L.*	*s.*	*d*	*L.*	*s.*	*d.*
Aquavitæ	141,305	14	0	87,083	17	0	29,440	4	0
Bacon	351,841	10	0	354,523	10	0	341,502	0	0
Beef	193,392	10	0	142,222	10	0	105,602	0	0
Bread	25,468	4	0	5,827	4	0	8,183	8	0
Bullocks and cows	105,012	0	0	203,646	0	0	190,890	0	0
Butter	918,327	5	0	909,910	2	6	831,125	15	0
Candles	18.502	0	0	22,412	0	0	31,06[illegible]	0	8
Copper ore	1,679	6	8	3,300	0	0	2,841	13	4
Barley	59.193	12	0	85,590	12	0	112,161	0	0
Oats	374,118	7	6	350,907	0	0	415,[illegible]23	7	6
Wheat	474.284	14	0	457.381	7	0	265,975	13	0
Drapery, new	1.049	7	6	1,216	12	6	292	15	0
——— old	397	10	0	3,795	7	6	1,182	0	0
Feathers	16,197	15	0	16.884	0	0	18.488	5	0
Herrings	2,129	0	0	1,610	0	0	915	0	0
Flax	24,372	12	6	29,945	5	0	33.515	15	0
Glass	8.721	4	10	28,650	0	11	22,333	8	4
Hides	28.174	13	4	33.030	13	4	69,010	13	4
Carry over	2 754.167	6	4	2,737 733	1	9	2,679 738	18	2

Official Value of Irish Produce and Manufactures, exported from Ireland, distinguishing the Principal Articles. Continued.

Species of Exports.	Years ending 5th January.								
	1815.			1816.			1817.		
	L	*s.*	*d*	*L*	*s.*	*d*	*L*	*s*	*d.*
Brought over	2 754 167	6	4	2,737 733	1	9	2 679 738	18	2
Hogs	45,392	0	0	127,577	0	0	83,629	0	0
Hogs' lard	29,233	10	0	32.169	0	0	32,893	10	0
Kelp	3.720	0	0	4,521	0	0	2.677	10	0
Linen and cotton, mixed manufacture	31,187	11	6	132,490	9	10	*54	10	0
Linen, plain	2,864,[illegible]70	18	8	2,892,248	16	0	3,041,190	5	4
—— coloured	165	6	0	576	12	0	7,574	8	0
Flour	254,656	16	0	109.299	17	4	87,168	13	4
Oatmeal	13,610	8	0	13 450	18	0	11,8[illegible]3	2	0
Pork	247.584	0	0	232,078	10	0	155,377	10	0
Rape seed	5,833	15	0	4.896	2	6	2.507	7	6
Sheep, alive	11,721	0	0	26 578	0	0	34,483	0	0
Soap	26,944	15	0	23,915	10	0	19,346	5	0
Skins, calf	10,343	13	4	15.852	18	4	19.455	6	8
Tallow	678	0	0	772	0	0	342	0	0
Tongues	3.610	0	0	3,183	2	6	1.886	5	0
Wool	21,548	2	0	73,172	18	6	22,640	2	0
Yarn, linen	68,172	0	0	71,604	0	0	83,112	0	0
—— worsted	4,518	0	0	19	10	0	7,210	10	0
Other merchandize	190,746	17	6	241.573	3	5	363,048	2	10
Total	6,597,683	19	4	6,943,667	7	2	6 654,938	5	10

Official Value of Foreign and Colonial Merchandize, exported from Ireland, distinguishing the Principal Articles.

Species of Exports.	Years ending 5th of January.								
	1815.			1816.			1817.		
	L.	*s.*	*d.*	*L.*	*s.*	*d*	*L.*	*s.*	*d.*
Ashes, Barilla, &c.	7.562	5	0	1,082	10	0	2 433	15	0
Coffee	182.840	0	0	67,240	0	9	26 420	0	0
Cottons	502	2	6	1.971	13	6	2.833	14	11
Drapery, new	410	10	0	2.136	15	0	1.556	5	0
——— old	18 995	4	0	71 206	16	0	38,720	10	0
Drugs	2 342	5	6	2 755	19	10	1.511	16	3
Logwood	22.671	0	0	12,919	10	0	1.550	5	0
Earthenware	850	8	10	784	2	10	2,214	16	5
Herrings	5,835	0	0	4 225	0	0	1,161	0	0
Flax-seed	7.560	0	0	6.705	0	0	21,432	0	0
Sugar	24,303	10	0	1,755	0	0	3 656	5	0
Hides	21,197	6	8	1,138	13	4	133	6	8
Spirits, foreign	23 911	7	0	8.830	1	0	7.112	8	6
Tallow	843	0	0	1,033	10	0	663	0	0
Tobacco	29,083	14	0	8,692	14	0	24 922	1	4
Wine	82.834	3	4	30.526	18	10	33.428	1	1
Wool, cotton	49,820	0	0	16 408	0	0	8.264	0	0
Other merchandize	99,661	16	5	93.805	13	5	69 843	17	9
Total	581,332	13	3	333,217	17	9	247 856	12	11

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* Calicoes were formerly included, the value of which, for the year ending 5th January, 1817, amounted to *L.*128,338, 19*s.* and placed under the head of other merchandize.

Official Value of Imports into Ireland, distinguishing the principal Articles.

Species of Imports.	Years ending 5th of January,								
	1815.			1816.			1817.		
	L.	s.	d.	L.	s	d.	L.	s.	d
Ashes, Barilla, &c.	74,208	15	0	113,631	5	0	155,491	17	6
Bark	4[illegible],140	12	0	39 712	8	0	35 880	12	0
Blankets	13,510	10	0	6,359	0	0	3 367	0	0
Carpets and carpeting	14 326	17	0	7 759	0	6	5 496	10	0
Coals	472,993	10	0	524,214	0	0	497,032	10	0
Cottons	139,115	14	7	137 057	7	8	90 808	16	9
Drapery, old	1,399,563	4	0	745,432	16	0	537,122	12	0
——— new	122,065	17	6	92 384	15	0	68,277	2	6
Earthenware	88 590	2	10	67 246	9	1	56 566	14	6
Herrings	63,563	0	0	67,667	0	0	60,161	0	0
Flax-seed	109 722	0	0	156,453	0	0	218 565	0	0
———, undressed	4,966	10	0	432	5	0	785	15	0
Sugar, loaf	156 786	0	0	175,164	0	0	137 868	0	0
——— muscovado	746 329	10	0	590,098	10	0	580 889	5	0
Tea	344 874	0	0	352 082	4	0	306 503	16	0
Haberdashery	143,919	18	0	111,373	7	11	79 954	16	0
Hats	72,006	15	0	45,399	15	0	27 326	5	0
Hemp, undressed	23,798	14	0	19,856	5	6	7,287	6	6
Hides	84 368	0	0	66 384	0	0	49 334	13	4
Hops	102,725	0	0	85,535	0	0	64,220	0	0
Cotton stockings	50,301	3	0	48 538	7	0	33,947	17	0
Iron, unwrought	238,209	12	0	204 984	16	0	114,146	8	0
Iron and Hardware	296 383	7	5	238 246	5	4	173,684	4	3
Salt	42,823	13	2	53 936	4	6	4[illegible] 49	4	6
Silk, organzine	50 [illegible]62	10	0	43 679	3	4	40 085	16	8
Spirits, foreign	43 433	15	6	30 070	0	0	7,480	6	6
Tallow	42,247	10	0	67 930	10	0	22 480	10	0
Tobacco	39 200	15	0	205 650	2	6	126,302	2	6
Watches, and watch movements	30,035	1	2	14,494	12	3	8 511	7	1
Deals	29 434	1	8	45,306	11	10	19,653	6	6
Staves	5,600	0	0	9 196	5	0	13 721	10	0
Timber	49 824	10	0	96 679	0	0	89,100	12	6
Wool, cotton	82 204	0	0	97 484	0	0	7[illegible] 899	0	0
Yarn, cotton, and cotton twist	71 315	18	6	40 941	4	[illegible]	4[illegible] 759	1	0
Other merchandize	1 856,161	2	8	1 385 703	16	0	1,132 017	1	2
Total	7 245 043	2	11½	6 106,877	12	5	5 084 890	13	2

Imports into, and Exports from, Ireland, for three Years, ending 5th January, 1817.

	Official Value of Imports.			Official Value of					
				Irish Produce and Manufactures exported.			Foreign and Colonial Merchandize exported.		
Year ending	L.	s	d.	L.	s.	d.	L.	s.	d.
5th Jan. 1815	7,245,043	2	11½	6,558,103	19	4¾	581,332	13	3¼
——— 1816	6,106,877	12	5½	6,742,905	5	2	333,217	17	9½
——— 1817	5,084,890	13	2½	6,455,943	5	2	247,856	12	11½

The *real* value of Irish produce and manufactures exported in the year ending 5th January, 1817, computed at the average prices current, amounted to *L*9,111,766 6s. 9½d.

The registered shipping of the several ports of Ireland, viz. Dublin, Cork, Youghall, Belfast, Newry, Wexford, Waterford, Kinsale, Limerick, Baltimore, Larne, Strangford, Drogheda, Donaghadee, Ross, Wicklow, Londonderry, Dundalk, Galway, Coleraine, Killebegs, Sligo, Tralee, Newport, Ballyrain, was 1003 vessels 54,262 tons, and 5057 men, on the 30th of September, 1800.

Ships which entered inwards.

Average of three years		Ships.	Tons.	Men
ending 5th Jan.	1805	7843	61[illegible],955	44,140
	1811	8983	817 678	47,681
	1815	10,606	955,331	55,994

Number of vessels belonging to the ports of Ireland, on an

average of three years,		Ships.	Tons.	Men.
ending 30th Sept.	1790	1[illegible]76	64 457	6335
	1800	1009	5[illegible] 358	4937
	1810	1116	59,584	5430
	1815	1146	59,699	5512

And the number and tonnage of vessels built and registered in Ireland, on an average of

three years, ending 5th Jan.		Ships.	Tons.
	1790	63	2551
	1801	2[illegible]	1285
	1811	28	1403
	1815	45	1992

Account of the number of vessels, with the amount of their tonnage, that were built and registered in the several ports of Ireland, in the three years ending 5th January, 1817, distinguishing each year.

	Vessels.	Tonnage.
Year ending 5th January, 1815	46	1973
1816	36	1922
1817	41	1985

Account of the number of vessels, with the amount of their tonnage, and the number of men and boys usually employed in navigating the same, which belonged to the several ports of Ireland, on the 30th of Sept. 1816.

Vessels.	Tons.	Men and Boys.
1178	63,229	5681

Vessels entered inwards, and cleared outwards, in the three years ending 5th January, 1817.

	Irish.			British.			Foreign.		
	Ships.	Tons.	Men.	Ships.	Tons.	Men.	Ships.	Tons.	Men.
INWARDS.									
1815	2066	142,690	9282	7890	707,232	40,379	296	51,755	2990
1816	2314	157,283	10,175	7984	693,107	39,921	501	92.474	5037
1817	2016	153,637	9377	7864	690,165	39,696	323	68,674	3441
OUTWARDS.									
1815	1937	139,302	9118	8690	693,422	40,130	274	50,708	2617
1816	2187	153,354	9917	7782	684,179	39,259	514	98,115	5007
1817	1931	139,827	9058	7200	641,205	36,480	350	75,516	3633

The revenue of Ireland is principally derived from customs, excise, stamps, and post-office duties; and also from taxes on hearths, windows, houses, carriages, servants, horses, &c.

The following Table exhibits a view of the produce of the three last taxes, from 1811 to 1814.

An Account of the Net Produce of the several Taxes upon Hearths, Windows, Houses. Carriages, Servants, Horses, Dogs. and Coachmakers, in Ireland, in the several Years of 1810, 1811, 1812 *and* 1813.

Year ending 5th January, 1811	L435 806	7	5¼
1812	435,116	12	0¼
1813	427 946	1	10½
1814	449 287	9	1¾
Total	1,748.156	10	7¾

And the following Table exhibits a view of the net produce of the customs, excise, &c. for the last three years.

	Customs.	Excise.	Stamps	Postage.	Total Irish currency.
1815	1.880,968	2,810 589	699 375	89.000	5.479,932
1816	2 [illegible]6 326	3 [illegible]85 662	546 315	79 5 0	5.7[illegible]5.808
181	1 437 902	2.480 098	544,315	78.000	4,540.315

The next Tables exhibit a view of the revenue and expenditure for several years; also for the year ending 5th January, 1817: and of the public funded debt of Ireland On the 5th January, 1817, the treasury of Ireland was consolidated with that of Great Britain.

Permanent Revenue.			Expenditure.	
	Gross Produce.	Net payment.	1792	L1,514.258
1791	L1 805 964	L1 84 684	1800	7.201,231
1800	3,445,718	2.805.536	1805	8,043,764
1806	4.193 915	3.364,137	1810	9,348,476
1815	6,937 558	5,525.699	1815	13,326,433

Gross receipt, within the year ending 5th January, 1817, of the ordinary revenue of Ireland, *L*6,136,010: of which the customs produced *L*2 082,043, at a rate for collection of *L*20 9s. 4d. per cent.; the excise produced *L*3,208,931, at a rate for collection of *L*12 8s. 2d. per cent.; the stamps produced *L*611,709, at a rate of *L*9 3s. 11½d. per cent.; and the post-offices produced *L*222,747, at a rate of *L*59 19s. 11d. per cent.

The principal custom duties were, sugar, *L*411,241; tea, *L*443,600; and tobacco, *L*256,321. The principal exexcise duties were, strong waters, *L*1,123,617; malt, *L*389,792; tobacco, *L*556,731; licences, *L*234.077; and window duty *L*485,293. The hearth-money was *L*58.828; carriage duty *L*98,460; servants' duty *L*54,999; and horse duty *L*99,255.

Expenditure of Ireland for the year ending 5th of January 1817.

Interest of debt . . .	L4.399,460	14	2¼
Charge of management .	30.305	5	8
Reduction of the national debt	2,434,427	13	1¾
Interest on exchequer bills	126,500	0	0
Issues for the separate service of Ireland	3,836.869	16	3¾
Do. for local purposes . .	43 690	12	2½
Civil list, pensions, &c. . .	584 066	15	5½
Payments in anticipation of exchequer receipts . . .	35,523	15	7½
Ordnance	140,000	0	0
Army	2,368.827	15	4¾
Miscellaneous services .	592,626	8	6½
Vote of credit, arrear of 1815	20,261	9	9¼
Total .	L14,612,560	6	4¼

Public Funded Debt.

	Total Capital.	Redeemed Capital.	Unredeemed Capital.	Proportion of Sinking Fund to Unredeemed Debt.
1792	L1,718 240			
1798	10 128,906	L80,025	*L*10 048,881	1.85th
1800	24,207,290	636 789	23 570,500	1 8[illegible]
1805	53.296,356	3,762,904	49.533,452	1 72
1810	81 510.856	10.579,315	70.931.541	1 58
1815	127,865,067	22,455,454	105,409.613	1.50

CHAP. V.

Population of Ireland—Mode of Life and State of the Peasantry—Ecclesiastical State—Education—Government—Language—Antiquities.

That Ireland has increased rapidly in population within the last half century; and that at present, considering the large portion of its surface, which is occupied by bogs, loughs, &c. its population is dense, compared with that of most other countries of Europe, are circumstances, the truth of which is generally admitted. But, as no enumeration has recently been made of the actual number of people, we must rest content with the authority, or rather the opinion, of those who have taken the most care, and possessed the best opportunities, to ascertain it. According to them, the population of Ireland nearly amounts to, if it does not really exceed, five millions. The first computation respecting the number of the inhabitants of Ireland was made in the year 1695, by Captain Smith. According to him, they were 1 034,102. In the year 1731, there was a return to parliament of the number of inhabitants in each parish, and from this it appears, that in that year they amounted to 2,010 221. Since that, there has been no official return of the population; but there have been returns of the number of houses; and supposing six to each house, (which seems to be the average in Ireland) there would be in the year 1754 2,372,634 inhabitants; in 1767, 2,544,276, in the year 1777, 2 690,556; in the year 1785, 2,845,932; in the year 1788, 3,900,000; and in the year 1791, 4,206,612 inhabitants. If, therefore, it be a fact, that there are on an average six persons to a house in Ireland, and if the population since 1791 has increased even in rather a smaller ratio than it did in the years previous to that period, we may fairly estimate the present population at five millions.

From the returns of houses in 1791, it appears, that there were at that time,

Houses inhabited by paupers, ...	112,556
Houses having one hearth, and not inhabited by paupers, ...	515 346
Houses having two hearths, . . .	33,785
Houses having three hearths, . . .	10,216
Houses having more than three, but less than nine hearths, ...	23,299
Houses having from 11 to 144 hearths, .	5,900
Total	701,102

Hence it will appear, that a very large portion of the inhabitants of Ireland are very poor. Those employed in the linen manufacture of Ulster are comparatively comfortable; but the great mass of the people, especially the labourers in husbandry, and even the very small farmers, are sunk in ignorance and poverty. The peasantry are miserably ill-lodged. Four mud walls, with one entrance, and frequently without either window or chimney, constitute an Irish hovel. The rent of these cabins is from one to two guineas a-year. To each cabin, there is commonly annexed about one acre of ground, which is cropped with potatoes, oats, and flax. There are numbers of the peasants who have not a bedstead, nor even a truckle bed-frame. They sleep on a bundle of straw or heath laid on the clay floor; sheets are scarcely known; and their blankets are scanty and tattered. The rain not unfrequently descends through the thatch on their beds. Amongst their peculiarities of dress is their long coat; it is made of wool, and generally of a grey colour. Their food is almost entirely potatoes and milk; and their fuel turf. They are indisposed to labour; and in their habits far from clean. The wages of the agricultural labourers is not only very low, generally less than 1s. a-day, but it is not unfrequently paid, partly at least, in kind, and not very regularly. The wages of the manufacturing labourers are, in general, much higher. The children of the lower classes are seldom employed; but are suffered to go about dirty, idle, and nearly naked. Notwithstanding these disadvantages, which result from political causes in a great measure, the national character of the Irish breaks forth, even amongst the most ignorant and brutal of the peasantry. This national character is considerably different from that of Great Britain. "Greater vivacity, and quickness of parts, propensities more social, and stronger sensibilities of all kinds, accompanied by the usual attendants on such qualities, unsteadiness, and want of self-government, sufficiently mark them as a distinct people. Among the lower classes, there is often a ferocity, which breaks out in savage and bloody deeds, especially in their party and political quarrels: yet no people display more faithful and affectionate attachment to those who have conciliated their good will. A precipitancy of manner, and a proneness to exaggeration, have introduced into the conversation style of the Irish a kind of hurry and confusion, which has subjected them to the imputation of often falling into ludicrous contradictions; but, on the other hand, eloquence is natural to them; and they display more imagination than their eastern neighbours."

The established religion of Ireland is the same as that of England. The kingdom is divided ecclesiastically, as well as civilly, into four provinces; but the boundaries of each do not coincide. An archbishop presides over each. The seven bishops of the northern province are suffragans to the archbishops of Armagh, who is lord primate and metropolitan of *all* Ireland. The archbishop of Dublin is lord primate of Ireland, and has three suffragan bishops in the eastern province. The archbishop of Cashel, lord primate of Munster, has five suffragan bishops; and the archbishop of Tuam, lord primate of Connaught, presides over the three bishops of the western province. The province of Armagh contains ten dioceses: viz. 1. Archbishopric of Armagh. 2. Bishopric of Dromore. 3. Down. 4, 5. Connor and Derry united. 6. Raphoe. 7. Clogher. 8. Kilmore. 9. Ardagh. 10. Meath. The province of Dublin contains five dioceses. 1. Archbishopric of Dublin. 2. Bishopric of Kildare. 3. Ossory. 4, 5. Fernes and Leighlin united. The province of Cashel contains eleven dioceses. 1. Archbishopric of Cashel, and bishopric of Emly, united with Cashel. 2, 3. Waterford and Lismore united. 4, 5. Cork and Ross. 6. Cloyne. 7, 8, 9. Limerick, Ardfert, and Aghadoe united. 10, 11 Killaloe and Kilfenora. The province of Tuam contains six dioceses. 1. Archbishopric of Tuam. 2, 3. Bishoprics of Clonfert and Kilmacduagh united. 4. Elphin. 5. Killala. 6. Achonry. The number of deaneries is 33, and of archdeaconries 34.

But, though the established religion of Ireland is the same as that of England, those who profess it bear but a small proportion to those who do not. The Catholics are far more numerous than the Protestants of all denominations. At least two thirds of the whole population are Catholics; according to some three fourths. And in the north and north-eastern counties of Ulster, the Presbyterians are much more numerous than those who profess the church of Ireland. The Catholics are by far the most numerous in Connaught, Munster, and the north-western counties of Ulster.

The means of education, which the great mass of the Irish people possess, are very limited. As early as the reign of James II. free schools were erected in several of the large parishes. They have since been extended to some parts of the country. There is but one university, that of Dublin. There is also a college for Catholics at Maynooth, supported by government. But the state of education at present, will best appear from the following quotations from the last report of the commissioners of education in Ireland.

It appears from these Reports, "that there are 33 endowed classical schools in Ireland (besides 14 of private foundation) the united emoluments of which amount to about 900 *l.* per annum, and the number of Scholars educated in them to nearly 1000.

"That, exclusive of the parish schools in the city of Dublin, and of other schools in different places, supported by *private* endowments, the number of which is 72,—there are 44 public establishments for the education of the lower classes, in which upwards of 4200 are lodged, maintained, clothed, and educated at an annual expence of about 70,000*l.*

"The following returns have been communicated to us from 17 dioceses out of the 22 into which Ireland is divided:

Dioceses.	Number of Schools kept by Masters who are Protestants.	Number of Schools kept by Masters who are Catholics.	Number of Scholars who are Protestants.	Number of Scholars who are Catholics.
Ardagh . . .	21	104	1068	4310
Clogher . .	120	221	5702	5588
Cashel and Emly	31	191	746	10.815
Cork and Ross .	78	103	2082	5401
Cloyne . . .	36	143	9[illegible]2	9347
Dromore . .	105	44	3806	1710
Clonfert and Kilmacduagh .	7	61	233	2741
Down and Connor	286	90	10.060	3619
Derry . . .	154	136	5835	3275
Elphin . . .	23	110	1101	4651
Leighlin . . .	46	144	1421	7691
Ferns . . .	53	161	2406	9635
Killaloe and Kilfinora . . .	43	176	1435	10.077
Kilmore . .	36	113	2034	4059
Meath . . .	91	231	2195	12 225
Ossory . . .	19	64	299	2841
Raphoe . . .	73	72	2381	1878
Tuam . . .	23	142	633	6972
Waterford and Lismore . . .	26	159	1001	10 162
Total	1271	2465	45.590	116,977

Ardagh and Tuam are united dioceses.

From the returns, it appears, that, exclusive of the charitable institutions, there are 3736 schools in these dioceses, in which are taught 162,467 children, of which number 45.590 are Protestants, and 116,977 Catholics. Of the schoolmasters, 1271 are Protestants, and 2455 Catholics.

"Hence we collect, that, as these dioceses may be estimated to contain four-fifths of the population of Ireland, the whole number of schools, including the parochial schools, amount to 4600—the scholars taught in them to 200,000 being an average of 43 to each school; and as these returns were made generally in the winter, when many children are unable to attend, and as itinerating schoolmasters, whose number is very considerable, are frequently not included in them, we are confident that more than 200,000 children, of the poorer class, receive annually such sort of instruction as those schools afford.

"That instruction, except in a very few instances, extends no farther than reading, writing, and the common rules of arithmetic, and the prices paid are, on an average, 10s. per annum for reading, 17s. 4d. when writing, and 1*l.* 6*s* when arithmetic is added." (*Fourteenth Report from the Commissioners of the Board of Education in Ireland.*)

In the history of Ireland, the union of it with England has been noticed; and also the number of peers and representatives, which, by that union, she is entitled to send into each house of the British Parliament.

The following Table exhibits the number of registered freeholds in each county, of the values of 40*s*. 20*l.*, and 50*l.*

Counties.	40s.	*L.*20	*L.*50.
Antrim . . .	8074	152	227
Armagh . . .	6053	120	144
Carlow . . .	3249	295	359
Cavan . . .	5720	177	134
Clare . . .	9290	508	378
Cork . . .	4605	1266	1733
—— City . .	508	420	215
Donegal . . .	6131	128	122
Down . . .	14.613	225	442
Drogheda Town .	188	29	10
Dublin . . .	10[illegible]7	229	974
—— City . .	12	130	470
Fermanagh . .	6869	301	232
Galway . . .	12 782	224	277
Kerry . . .	3970	336	480
Kildare . . .	1713	164	545
Kilkenny . .	1624	226	406
—— City . .	27	45	33
King's County . .	2557	288	235
Leitrim . . .	6035	211	102
Limerick . . .	5912	891	986
—— City . .	429	237	206
Londonderry . .	9902	194	278
Longford . .	2118	114	117
Louth . .	756	56	71
Mayo .	15 443	204	193
Meath . . .	1584	69	537
Monaghan . .	5521	146	162
Queen's County .	4169	437	847
Roscommon . .	5477	129	435
Sligo . . .	2007	114	75
Tipperary . .	13.696	1602	2270
Tyrone . . .	9854	281	147
Waterford . .	2646	312	527
West Meath . .	2449	131	421
Wexford . .	5878	509	265
Wicklow . .	1661	163	84

A viceroy, or lord lieutenant, still resides in Dublin, to administer the executive government of Ireland. There are some minute differences between the statute and common laws of this country and those of England.

The Irish language is a dialect of the Celtic. It is spoken throughout the province of Connaught by all the lower orders, a great part of whom scarcely understand any English. It is also spoken very generally in the other provinces, except among the descendants of the Scotch in the north. It is supposed that there are about two millions of people in Ireland, who are almost entirely ignorant of English. The music of the Irish is strictly national. It is distinguished by a pensive simplicity. "Few nations have given more undeniable proofs of a genius adapted to scientific and literary pursuits; but it is to be lamented, that the prevalence of dissipation has exerted so unfavourable an influence upon the general habits of life, that scarcely any European country is less distinguished by the productions of its press."

The principal antiquities of Ireland, are the cromlechs; the carnedds; the oratories, chapels, and round towers; the stone crosses; earthen works; and religious buildings. The round towers are singular buildings, supposed to have been erected about the ninth century. Of the religious buildings, the chapel at Cashel exhibits elegant and rich architecture, of remote and singular antiquity.

Beaufort's *Memoirs of a Map of Ireland.*

Young's *Tour in Ireland.*

Wakefield's *Account of Ireland.*

Preston's Prize Essay on the Manufactures of Ireland, in the 9th vol. of the *Irish Transactions.*

Dr. Stephenson on the Linen and Hempen Manufactures in Ulster, in the 2d fasciculus of the *Select Papers of the Belfast Literary Society.*

Newenham *On the Population of Ireland.*

Boate's *Natural History of Ireland.*

On the Mineralogy of the Vicinity of Dublin, in the 1st vol. of the *Geological Transactions.*

Dewar *On the Character of the Irish.*

Reports from the Commissioners of Education, and from the Commissioners for Improving the Bogs; and Accounts and Papers relative to the Manufactures, Trade, Revenues, &c of Ireland, laid before Parliament, from 1812 *to* 1817.
(w. s.)

IRENÆUS, Bishop of Lyons, is supposed to have been a Greek by birth, and to have been born near the city of Smyrna, about the middle of the second century. He acquired in his youth a competent acquaintance with the philosophy and literature which were then held in estimation in his native country; and, at an early age, was placed under the instruction of Polycarp, Bishop of Smyrna, who had been the disciple of the Evangelist John. Nothing more is known of his history till the year 177, or, according to others, 167, when he is found acting as presbyter of the church of Lyons in France, under Pothinus, who was bishop of that see. The church at Lyons had been planted, at no very remote period, by missionaries from some of the Asiatic churches, and thus probably continued to receive pastors from the same quarter. In 177, when the persecution of the Christians, under Marcus Aurelius Antoninus, raged with great violence in France, particularly in Lyons and Vienne, an epistle, containing an account of their sufferings, was written to the churches in Asia, and is generally understood to have been drawn up by Irenæus. Pothinus, the bishop, having suffered martyrdom in this persecution, Irenæus was chosen as his successor about the year 179. In the following year, the death of Aurelius afforded a respite to the Christians, which continued with little intermission till the year 202, in the reign of Severus; but during this period of external peace, the Christian church was agitated by pestilent heresies of every description. Irenæus applied himself, with the utmost assiduity, to detect the machinations and expose the errors of the corrupters of the faith; and to his unwearied exertions in word and writing, it is principally ascribed, that few of these false systems, though afterwards revived, obtained in his time a permanent footing. Between the years 180 and 192 he produced his celebrated treatise against heresies, which is the only one of his works now extant.* It sufficiently proves him to have been a diligent investigator and acute reasoner, as well as a faithful defender of sound principles; and though the greater part of the tenets which he opposes may appear to modern readers too monstrous and absurd to have required a refutation, yet the merit of his labours cannot fairly be estimated by those who enjoy the advantages which flow from the diffusion of true science and the general circulation of the sacred Scriptures. About the year 196, when Victor, Bishop of Rome, revived the dispute respecting the observance of Easter, and attempted, in a most imperious manner, to impose the Roman practice upon the Asiatic churches, Irenæus exerted himself, by letters to Victor and other bishops, to allay the violence with which the matter was agitated, and to maintain the peace and unity of the church. The external tranquillity which had thus been abused by animosities and contentions among the Christian pastors, was at length interrupted, in the beginning of the third century, by the persecution under Septimus Severus; which, though principally directed against Alexandria, was severely felt in other parts of the empire, and especially at Lyons, where the emperor is supposed to have formerly governed, when Pothinus was put to death. In this persecution, according to the testimony of Gregory of Tours, Irenæus, after suffering with magnanimous resolution various courses of torture, was finally put to death, according to some writers, in the year 202, when the emperor first published his edict, or, as others suppose, in 208, when he passed through Lyons in his expedition to Britain. The other works of Irenæus, mentioned by Eusebius, were, a book against the Gentiles concerning knowledge; a description of the Apostolic preaching; a book of tracts; a letter to Victor, Bishop of Rome, concerning Easter, of which a fragment is preserved by Eusebius; a letter to Blastus concerning schism; a letter to Horinus concerning the government of one God, of which some passages remain; a book concerning the number eight, addressed to the same Horinus, who had embraced the Valentinian heresy. See Mosheim's *Church History*, vol. i.; Lardner's *Works*, vol. ii.; Milner's *Church History*, vol. i.; *Christian Observer*, vol. iv.; Cave's *Hist. Liter.* vol. i. (*q*)

IRKUTZK is a Russian Government in Asia, partly continental, partly insular, including the whole eastern part of Siberia. The former is bounded on the north by the Icy Sea, on the east by the North Pacific Ocean, on the south by the River Amur and Chinese Tartary, on the west by the Governments of Tomsk, Tobolsk, and Kolhyvane. The latter includes all the islands between Cape Lopatka, the southern point of Kamtschatka, and Cape Alaska on the shore of America; and to the north, all the lands hitherto discovered in the Frozen Ocean. It stretches between 2500 and 3000 miles in a straight line from the confines of Tobolsk to East Cape, and is the most extensive of all the governments belonging to this vast empire.

No country, of equal magnitude, seems to present less diversity of climate. Extreme cold and continued snows prevail; the Northern Sea has obtained the name of the Frozen Ocean, from being navigable only for a short distance from the coast; and its islands are attained with greater facility by journies over the ice than in transport by shipping. In places about 20 degrees, or 1400 miles farther south, it is necessary in winter to breathe through a handkerchief on leaving an apartment; while a misty atmosphere, consisting of hoar frost, forms around the body. The northern lights are constant and brilliant; they seem close at hand; they may be heard to shoot along, and assume an amazing variety of aspects, while the rude inhabitants of the country believe them to be spirits contending in the air. But in summer, though the heats of the sun be short, they are of considerable intensity; and, notwithstanding the rigours of the climate, earthquakes are not uncommon in some places

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* The first book only is preserved in the original Greek, and the rest exists in a Latin version of very barbarous style, through which nevertheless, the eloquence and erudition of the venerable author are sufficiently apparent.

Irkutzk is watered by many great rivers, of which the largest are, in general, discharged into the Frozen Sea. Of these, the principal are the Lena, rising within the government on the north, pursuing a course of no less than 3450 miles, through 1550 of which it is navigable; the Kolyma, which flows 1200 miles; and the tributary streams, the Aidaen, the two Anuis, the Vitim, Olemka, and Kirenka. To the south eastern coast are the Anadyr, and the earlier course of the Amur, which is received by the sea of Okhotzk, opposite to the island or peninsula of Saghalien. The lake Baikal is likewise within the precincts of this government, and there are many medicinal springs

A great portion of the surface is occupied by vast ranges of mountains, sending out their subordinate branches in every direction. Some of the principal lines terminate on the eastern shores, and seem to rear their summits again in the Aleutian islands, until they reach the American continent. The chief portions of the Altasian chain proceed to the east and south. Many of the mountains are lofty and covered by snows; some have both active and extinct volcanoes. But almost all are imperfectly known, as Europeans have approached the bases of very few.

The views hitherto obtained of the mineralogy of Irkutzk are very general. Gold, silver, and lead, are procured in considerable abundance near Argunskoi, in the province of Nertschinsk; iron is got in different places, as also copper. The mountain Tshebedal, in the plains of Yakutzk, consists of iron-stone, free-stone, and strata of coal; six miles south-east of Argunskoi, there is a hill of beautiful green jasper; and on a hill by the side of the river Aldan, petrifactions of marine plants and shells are found at the distance of 333 miles from the nearest sea.

Most of the plants seen in northern and alpine countries grow here; but the climate is unfavourable for vegetation. At certain seasons those of an edible kind are carried 1100 miles up the river Lena to Yakutzk; and at Okhotzk the scarcity is such, that cattle are fed entirely on the offals of fish, and cows have been seen to prefer dried salmon to hay. Plants are low and stunted; but there are mountains covered with wood, and timber fit for ship-building is plentiful, whence the Russians have travelled thousands of miles from their European possessions to reach some point of this government, where they could construct vessels for their voyages of discovery. Birch, poplar, ash, willow, and numerous plants producing berries, are produced here, and also the larch, which ceases to vegetate in 68° 30′ north latitude.

Probably the climate has been milder anciently, and thence more favourable to vegetable and animal life. The fossil remains of large quadrupeds, which are now totally extinct, and seem to have belonged to warmer regions, are now found on the shores of the Icy Sea, and in the steep banks of the rivers falling into it. Numerous living animals, affording the finest furs, as the sable, ermine, sea otter, and squirrel, are dispersed in different parts. There are also the elk, rein deer, wild sheep, bear, lynx, wolf, and various kinds of foxes, besides the marmot and glutton. The most useful animals are horses and rein deer; herds of the latter quit the woods at particular seasons, and, descending into the plains, swim across broad rivers, having always a leader at their head.

The principal native tribes inhabiting the government of Irkutzk are the Tungoose, Yakutes, Koriacs, Kamtschadales, Tchutski, and Yukagirians. The Tungoose wander over an immense extent of country, from the mouth of the river Amur to the lake Baikal, and from the Sea of Okhotzk to the Frozen Ocean. They are constantly in pursuit of wild animals, and seldom remain more than 20 days in the same spot, though their tents should be removed only a few yards. Mountainous regions are preferred by them, and they rarely visit such places as are frequented by the Yakutes. The latter, who call themselves Socha, are supposed to amount to 50.000 males. But in the year 1787 about 6000 of them migrated, with all their possessions, to the Chinese frontier. Formerly they possessed considerable wealth in horses and horned cattle; some are known to have had 20,000; no one, however, is now the owner of above 2000. The Tchutski occupy the most eastern parts of Asia; they are divided into two tribes, the Stationary and Nomadic, though neither their numbers nor territory be great. The Yukagirians are reduced to an inconsiderable tribe, frequenting the sources of the Kovima and Yasasknoi in pursuit of wild animals; the Koriacs and Kamtschadales are also partly diminished, together with the islanders in the Northern Pacific Ocean. The islands in the Icy Sea are all uninhabited east of Nova Zembla, which, if it is to be included in this government, only receives temporary visits from the neighbouring shores. All these tribes are idolatrous, they worship demons, and practice some singular ceremonies, which would deserve further detail. Attempts have been made to introduce Christianity among them, with very partial success. The whole, except the Tchutski, are tributary to the Russians, but although these have entered into alliance with them, they have hitherto denied their supremacy; and they opposed the only obstacle to the imperial dominions extending to that extremity of Asia. In a late work published at Moscow, the male inhabitants paying tribute, are stated to be 58,097 Buriates, 14,480 Tungoose, 50.008 Yakutes, 505 Yukagirians, 46 Olatorians, 1224 Koriacs, 1782 Kamtschadales, 100 Kuriles, 545 Karagassians, a family of Samoeids. The total population is computed to amount to 407,758 souls.

This government is divided into four provinces—Irkutzk, Yakutzk, Okhotzk, and Nertschinsk. It contains one city, seventeen towns, a number of villages, and several fortresses. We believe, however, that the chief town of each of the provinces is called a city; and that the Russians, for the purpose of facilitating the administration of surrounding territories, are accustomed to confer that title on places which would be described as villages in the more populous and fertile states of Europe. Irkutzk, the capital, is situated on the right bank of the clear and rapid river Angara, which flows from the Lake Baikal, having the stream Ooshakofka on the north and north-east. The streets are broad, and in general uniform, but not paved, and the houses are for the most part built of wood. But their irregularity is great, and many miserable huts are seen amidst the finest edifices. There are, a cathedral, twelve churches, and two monasteries, all built of stone. A late traveller asserts that the churches amount to 30. There are various structures for the use of government; as an arsenal or dockyard, with the necessary buildings, called the admiralty, and a spacious custom-house. An infirmary was lately erected, and a workhouse for criminals. A gymnasium contains a library of several thousand volumes, and a collection of mineralogy, together with other subjects of natural history. The Japanese language was taught in it by command of the late empress of Russia. Irkutzk has a small theatre, wherein dramatic pieces are very tolerably represented by performers of both sexes, who are natives of the place. In the centre of the city there is an elegant square pile built of brick, with shops under piazzas, which support warehouses; the markets for provisions stand in a different quarter; and the slaughter houses are built over the Ooshakofka. Provisions are plentiful and cheap; and as this city is the seat of considerable trade, an European may purchase here almost every article to which he has been accustomed in his native country, though Irkutzk is 4295 miles from the Russian metropolis, St. Petersburgh. Even the best foreign wines can be obtained at a very reasonable price. The merchants are numerous and affluent. Irkutzk is the general depot of all the furs which are brought from America and the eastern parts of Asia; and through it also is transported, all the merchandise sent from Russia to the empire of China, as well as to America by Okhotzk and Kamtschatka. Here the furs are assorted, the best being sent to Moscow, where they meet with ready purchasers. The second in quality, namely those of the sea and river otter, and other animals, together with the worst sables, and the fox skins from the Aleutian Islands, are allotted for China; for the Chinese prefer at a lower price inferior articles, as they colour and disguise them so artfully, that the deception can scarcely be detected. Belonging to the city, but at some distance, are a glass-house near the Lake Baikal; a distillery 40 miles north, and salt-works at three springs for supplying the neighbourhood.

The manners of the inhabitants of Irkutzk, though of European origin, are marked by many peculiarities, and participate deeply in those of eastern countries. An evident change is said to have taken place about the year 1790, or soon after. At that time there were neither inns nor coffee-houses in the city; yet, such was the hospitality of the inhabitants, that a stranger never was at a loss for a home. Merit was as great a recommendation as wealth; the higher ranks were distinguished by their liberality, and some individuals kept open house. About seventeen or eighteen years later, the greatest distrust is said to have prevailed among all ranks: females were never seen in social circles, and appeared only on public occasions; as at church, on festivals, at marriages, or balls. From the great extent of jurisdiction embraced by the government, and its being in the vicinity of the Chinese and Mongol territories, numbers of civil and military officers dwell in the city. Part of its inhabitants also consists of those exiles, whom the cruel and reprehensible policy of Russia banishes from their own country, though their only crime may have been carrying arms in its defence. But they are left entirely at liberty; and some have acquired property by their industrious habits: the most skilful artizans and mechanics of every kind are to be found among them. It has been recently affirmed of this capital, that the inhabitants are not unhappy; that the climate is not so inhospitable as is in general believed; that the summer is pleasant; and that the surrounding districts produce a superabundance of corn, while those who wish for luxuries may obtain them at a reasonable rate. The population of Irkutzk is computed at 30.000. About 1733 miles north-east of this city stands Jakutzk, or Yakutzk, situated on the right bank of the Lena, a town consisting of 500 or 600 houses, five churches, and a convent. It is exposed to the inundations of the river, by one of which, in the year 1807, several of the inhabitants, and above 1000 cattle, were swept away. The streets are broad, irregular, and unpaved; all the houses are built after the old Russian fashion, and many are very spacious, with a court and garden. Bladder, or isinglass, is said to be substituted for panes in the windows during summer, and in winter plates of ice frozen into frames by means of snow. The situation of this town is less favourable than that of the former: the ground is never thawed above two feet deep, even in the heat of summer. We have already remarked the great distance which vegetables will be brought. Fish must be carried from places 266 miles off. In the month of June, every necessary of life is conveyed down the Lena, and at that time those who can afford it lay in a stock of provisions to serve twelve months. The town of Okhotzk occupies a sandy peninsula, at the confluence of the rivers Okhotzk and Kuchtui on the coast of the Sea of Okhotzk. Inundations, combined with the rise of the tides during storms, gradually sweep away the beach; and so much damage was suffered in the year 1801, that the Russian government resolved to change the site of the town. It is a port, with docks, yards, and magazines. Thither the Asiatic tribes resort for the purpose of traffic, as they receive all the articles they require in exchange for furs. Caravans of 6000 or 8000 horses sometimes bring goods from Yakutzk for the use of the more distant Russian settlements. The town of Nertschinsk is of much smaller size than any of the preceding, and is situated on the immediate confines of Chinese Tartary. Here criminals from the other towns are condemned to work in the mines on account of government. There is a fortress at Nertschinsk, which is probably the strongest in the government, as many of the rest are falling to decay from the decreasing enmity of the native tribes, once hostile to their invaders.

We do not know that the history of the government of Irkutsk can be traced to an earlier date than the middle of the 16th century. The Russians, penetrating by the west, progressively extended their conquests over the countries to the east, for the sake of the fur of wild animals, until they arrived at boundaries claimed by the Chinese, where they expected to find silver mines. A sanguinary warfare was carried on between them in the course of the 17th century, which terminated in a treaty dated 1689. Prosecuting the discoveries of their hunters, the Russians advanced as the natives were subdued, or retreated. Taking another direction to the south-east, towards the close of the preceding century, they had engaged in hostility with Tchutski tribes, who refused to acknowledge their authority, but who will probably find it difficult to preserve their own independence. (c)

IRON.

Iron, in chemistry, is an elementary substance, and one of the metals. In the arts and manufactures, it may be considered as the most valuable of the metals. Its great importance in agriculture and domestic economy leads us to infer, that the civilization of man must have begun with its application to the various arts of life. Its tenacity has rendered it almost indispensable, for uniting and binding the parts of bodies made of wood and stone. Its hardness, in the form of steel, has been of such importance in the various cutting instruments, that without it most of the useful, as well as the polite arts, would have been very little known to us. The great success with which it has been employed in the construction of swords and guns, is almost the only instance of its application we have to regret.

The first state in which it is necessarily presented to us when it is obtained from its ores, is in its combination with carbon, by which it is rendered hard and brittle. Under this form its most valuable properties are not observed: this is probably the state in which it was first known to man, and would be discovered perhaps as early as copper and brass. Gold and silver would be known much earlier; the first from its existence in the native form, and the latter in consequence of its easy reduction from its ores. Since malleable iron required to be formed from that called cast iron, and by a process requiring more skill and management, it is probable that it would not be known so early as cast iron, and the other metals more easily obtained.

Malleable iron must have been known to man, long before the methods of extracting it from its ores was understood, as masses of native iron have been found in various parts of the world, which are now supposed to be of meteoric origin.

In the manufacture of iron for the various purposes to which it is applied, it is divided into three branches, viz. cast or pig iron, malleable iron, and steel, the cast iron being the first state in which it is produced from the ore. We shall first describe the various processes which it undergoes, from the roasting of the ore to its being cast into pigs, in which state it is used for casting into various articles by the iron founder, and also employed for the manufacture of malleable iron.

The rich iron ores of Sweden and Russia, and the Cumberland ore, are the most proper for making what is called the forge pig iron, from its being the best fitted for making malleable iron by the forge used for that purpose.

The poorer kinds of iron ore, which are the most common in this country, and called iron stone, are more fitted for making the casting metals employed in the founderies. It owes this quality to its containing a greater portion of carbon than the forge pig. This depends upon circumstances which we shall hereafter explain.

In most of the rich ores of iron, particularly those of Cumberland, the iron is combined with oxygen only; and when the oxygen is extracted, pure malleable iron is the result. This change has always been produced, by heating the ores with charcoal till the iron became fused. This fused mass, however, was never found to be pure iron, but combined with more or less carbon, to the presence of which it owes its fusibility. It was formerly thought, that the change was effected upon the oxide of iron by the ore being first brought into a state of fusion, in order that each particle of the oxide might come in contact with the carbon, before the oxygen could be detached from the iron. Subsequent experience, however, has shewn, that the whole of the oxygen can be detached from a mass of the ore, without altering its form. The process by which this change is effected, is called *cementation*. It consists in stratifying the ore in small masses with powdered charcoal, in a close vessel, and exposing them to a bright red heat for a length of time, depending upon the size of the pieces of ore. If the process be stopped at one particular point, the masses of ore, which were previously an oxide of iron, will be found in the state of pure malleable iron, without any change of form or size. If the process be kept up longer, they will combine with the carbon, and first pass into the state of steel; and, with still more carbon, will be converted into the state of cast or pig iron. The same change is found to be produced in the poorer ores, in which the iron is sometimes not more than 25 per cent. the rest being earthy matter, which requires to be brought into a state of fusion before the iron can be developed, after the oxygen is separated. It is the separation of this earthy matter from the iron, after the oxide has been reduced by cementation, which constitutes the most difficult part of the art of smelting iron by the blast furnace. These preliminary observations will enable us to conceive the nature of, and lead us to the construction of the blast furnace, from the changes it has to produce upon the ore.

One part of the furnace has, first, to be occupied by the ore and the carbonaceous matter, by which the oxide of iron in the iron-stone loses its oxygen, and afterwards acquires as much carbon as the intended quality of the iron requires. After this is effected, the same furnace in another part, with the assistance of some foreign matter, must be capable of giving a greater heat than that required for the cementation, by which the earthy matter is separated, and the iron fused and collected in a recess at the bottom of the furnace. These different parts of the blast-furnace we shall more particularly describe in the plans and sections represented in Plate CCCXI Figs. 1, 2, 3, 4, and 5, &c. A, Fig. 2, is the opening for the introduction of the materials. B the body of the furnace, where the cementing process is carried on. C the place where the blast is introduced, and it is a little above this where the greatest heat is produced. At this point the earthy matter is separated from the iron, which earthy matter, uniting with the flux employed, is converted into a fusible cinder or scoria. The iron being now fused, sinks down into the recess, or trough D, while the liquid cinder floats upon the liquid iron, defending it from the action of the blast.

In smelting iron ore, a certain quantity of coke is employed. Part of this is to generate the heat necessary to its reduction, and another portion combines with the oxygen of the ore, and is deposited in the form of carbonic oxide. Besides this, a third portion combines with reduced oxide, converting it into a carburet of iron, which afterwards is cast into pig iron. The proportions of coke to the iron ore, or iron stone, is more or less dependent upon the quality of the iron to be formed; the richest and most highly carburetted iron, commonly called No. 1. requiring the greatest proportion of coal, while the inferior iron, such as is known by the name of forge pig, requires the least coal. The greater the proportion of the ore to the coal, the greater is said to be the burden of the furnace.

Besides the ore and the coke, a third substance is always found necessary, which has received the general name of *flux.* The quality of this substance varies with the nature of the ore; but limestone is commonly employed. The reason for this will be obvious, when it is known that the earthy part of the greater proportion of ores is clay, and that lime and clay, in certain proportions, are very fusible; while each of these earths, in a separate and pure state, is not fusible in the hottest furnace. Hence it is, that when the iron ore contains lime instead of clay, which is sometimes the case, it is found necessary to employ clay, or some argillaceous substance as a flux.

The proportion of the fluxing matter to the ore, is in general determined by a number of trials with the blast furnace itself; yet it must be allowed to be a very expensive and unscientific method of proceeding.

We have already on record, many facts relating to the fusibility of compound earths, and if such facts were yet to make out, a few experiments on a small scale would be sufficient for their accomplishment. This being ascertained previous to the commencement of an iron work, it would next be necessary to make a perfect analysis of the ore and the coal, with a view to determine the proportions of their earthy matter, the proportions of the ore to the coke being previously known. The fluxing material now to be added to these, must be such as to make the most fusible compound with the earthy matter in the coke and ore. This knowledge will enable the iron master to commence his work with the greatest chance of success, and the least risk of unnecessary expence, which is very considerable on the large scale of a blast furnace.

The preliminary experiments above mentioned, should always be made previous to any change in the coal or the iron ore, as the earthy matter in the former is very different in different beds, and sometimes even in different parts of the same bed. The argillaceous iron stone also varies in the proportion of its clay, and sometimes contains a considerable portion of silex, which, when it bears a certain proportion to the clay and lime, is easily separated. The iron stone abounding with shells, frequently contains carbonate of lime, and will require less lime to be added as a flux.

Formerly, the fuel employed in blast furnaces was charcoal, which is still used on the continent. The iron works of this country, with a few exceptions, are carried on with the coke of pit coal, which is found to be much better fitted for making cast iron.

The coke is prepared, by piling heaps of coal on the ground in the open air. In some works, a short brick chimney is placed in the middle of the piles, which, having holes round the bottom, has the effect of inducing a current of air through the mass of coals on fire, and bringing them sooner into a state of combustion. In any part of the pile where the combustion is too rapid, a quantity of ashes are thrown from time to time, without which the carbonaceous part of the coal would become destroyed. Indeed, the operation of coking is intended to dissipate the volatile part merely. As this change is effected, the finished part is covered with ashes, and ultimately the whole combustion is stopped. The covering is to be kept upon them till they are cooled below ignition. This coke, when cold and separated from the dust, is in the state to be used in the furnace.

The preparation of the iron stone is the next process, which consists in roasting it, for the purpose of separating its volatile matter. For this purpose, the stone is stratified with small coal, in a manner similar to that used in burning lime. These alternate strata are generally exposed to the open air, and the mass allowed to burn till all the fuel is exhausted. In some iron works, kilns, similar to the lime kiln, have been employed for this purpose.

During this process, camphor, carbonic acid, and water, are separated. The stone assumes a reddish purple colour, and consists of the pure oxide of iron and earthy matter, principally clay. The limestone, which is employed as the flux, requires no preparation, except being broken into pieces.

In the practical management of a blast furnace, the coke is in general made a constant quantity, the proportions of ore and limestone varying with the quality of iron to be made, the season of the year, and the working order of the furnace. The proportions of the ore to the limestone, will be pretty nearly the same at all times when the ore is the same. To give the precise proportions of each would not apply generally, and can merely answer for the iron work from which our statement has been taken. The ore is argillaceous, and contains on the average about 27 per cent. of iron.

The limestone is that abounding with shells, from Critch, in Derbyshire. The coal is rather soft, but not very bituminous, and contains a large proportion of carbon. The furnace is that described under this article, which, at its common rate of working, makes about 40 tons of pig iron weekly. The blowing cylinder is discharged 25 times in a minute, and contains about 100 cubic feet. Hence the air discharged in that time is 2500 cubic feet. The diameter of the nose-pipe is generally $2\frac{3}{4}$ inches.

At this, and most other blast furnaces, the metal is run out twice in the 24 hours, at intervals of 12 hours each. The latter periods are called shifts, from the workmen being changed, as the furnace is attended night and day. During the 12 hours, 50 charges of coke are used, at regular intervals, each charge weighing $2\frac{3}{4}$ cwts. During the same period, about the same quantity of calcined ore is added, at similar intervals. These are the proportions for the common melting iron, called No. 2. For No. 3, which has less carbon, and is called forge pig, the coke to the calcined ore is about 6 to 7. That of the best quality, called No. 1, and which contains the most carbon, requires less ore to the coke than No 2. The limestone is also added at stated intervals; the whole quantity in the 12 hours being, in proportion to the coke, as 4 to 11.

These proportions cannot be applied generally, so much depends on the nature of the materials, and other circumstances; some furnaces work to such a disadvantage, as to consume a quantity of coke equal to that above stated, and yet will not admit of more ore than will produce from 12 to 20 tons of iron weekly. Some of the Welsh furnaces, on the contrary, will carry so much burden, that they will bear the use of so much ore, as to give from 60 to 75 tons weekly. These great differences are dependent upon so many circumstances, as frequently to baffle the skill of the most experienced iron masters. Experience and strict observation are very essential points in iron-making; but science, mechanical as well as chemical, much facilitates the progress of this useful branch of manufacture.

We have before attended to these stages of the process, between the entrance of the materials into the furnace, and the discharge of the iron at the tap hole at the bottom.

The blast which enters at the point C, Plate CCCXL. in Figures 1 and 2, produces the greatest heat a little above this point, where the iron and the cinder are melted, and where the former drops into the cavity D. The oxygen of the atmosphere, in making its way through the combustible matter, soon combines with it, so that none, or very little, escapes from E to A. This part of the furnace, which we have called the cementing part, contains the ore and coke mixed together, and these will be affected just as they would be in a close vessel, that is, the oxygen of the ore combines with the carbon of the coke, forming carbonic acid, or rather, perhaps, carbonic oxide, which is generally the case at this single temperature. This change will go on, in each of the masses of ore, to the very centre, when it consists of metallic iron and earthy matter only. As soon as the oxygen is separated from the iron, the combination of carbon with the metal commences, and continues till, from the reduction of the mass below, it is in its turn brought to the melting point, when the lime combines with the earthy part of the ore, and the liquid metal falls down. The vitreous cinder, thus separated, also becomes iron, and being specifically lighter than the liquid iron, floats on its surface.

The melted iron occupies the part D, Fig. 1. and 2. in the furnace, and the cinder floats above it, till it runs off over the part *d* which is called the *dam-stone*. As the metal accumulates, the cinder is raised, and runs over the dam-stone; and the metal itself ultimately would run over the same; but, previous to this, it is let out at the tap hole *v*, Fig. 5, which is on a level with the bottom of the cavity which contains it.

The quality of the metal, with respect to its quantity of carbon, will depend upon the quantity and quality of the coke with which the ore has been surrounded in the cementing part. The appearance of the metal, when it flows from the furnace, will indicate when the coke has been used in excess. A substance floats upon the surface of the metal, which, when cold, has a shining appearance resembling plumbago, and is known to the workmen by the name of *kish*. The presence of this substance shows that the metal is saturated with carbon, since it is found to consist principally of carbonaceous matter. If it is produced in any considerable quantity, it gives the iron master a hint to increase the burden of his furnace, by increasing the proportion of ore.

The appearance of the cinder is, also, a good criterion for showing the working order of the furnace, as well as the quality of the iron. When the ore is not sufficiently cemented, unchanged oxide, in some cases, and the defect of carbon, allows a considerable quantity of the oxide of iron to incorporate with the cinder; by which it assumes a greenish-yellow colour, which is not so favourable an appearance as the blue tint, or when it has the least colour.

In some instances, when the furnace is in very bad condition, the cinder becomes of so dark a green, as to appear almost black; this arises from a great excess of oxide of iron, which has escaped reduction in the furnace. This cinder is very fusible, from the presence of the oxide, and is considered a very unfavourable appearance. The cinder which has the least colour soon becomes solid after it flows from the furnace, from its containing less of the oxide of iron. This shows that the cementing process is carried on to a proper extent, by which the oxide has been converted into carburetted iron, in which state it no longer can combine with the earthy matter, and deserts it when the cemented masses are melted by the action of the blast. The blue tint in the cinder, which, in some instances, is almost as vivid as ultramarine, generally accompanies the more colourless cinder, and owes its colour, in all probability, to an oxide of iron, containing less oxygen than the black oxide. This may throw some light upon the mystery of the black and red oxide of iron being combined with quantities of oxygen, which are as 2 to 3, indicating the existence of a third oxide, which, in all probability, is that to which the cinder owes its blue colour. This idea is strengthened by the fact, that it is never produced but when there is the least oxide of iron in the rest of the cinder. Much light may be thrown on the subject of iron smelting, by a series of experiments upon the relative probability of different proportions of the earths. Previous to such a course of experiments, however, it might be advisable to make a correct analysis of the best cinder, which is that freest from colour, and at the same time fusing with the least heat.

We have generally stated, that the furnace above described is supplied with 25,000 cubic feet of air in one minute. This fact is obtained from the area of the blowing cylinder being 12.56 feet, and the capacity 100 cubic feet, which being discharged 25 times in one minute, gives 2500 cubic feet in the same time. The steam cylinder is 32 inches in diameter, and the piston moves through 200 feet in one minute, working, it is stated, with 10 lbs. upon an inch. Then, by multiplying 10, the pounds upon an inch of the steam cylinder, by 5.585, the area of the same, and dividing the product by 12.56, the area of the blowing cylinder, we get 4.44 lbs. for the force of the blast upon a square inch, which is about the average in practice, as shown by a measured gauge attached to the blowing machine. This pressure would give a velocity equal to 635 feet per second.

If, however, 2500 cubic feet of air be discharged through a circular aperture of 2¾ inches in diameter, in one minute, this would give a velocity equal to 1073 feet per second. This indicates a loss of air at the waste valve equal to 23 cubic feet at each stroke of the engine. If no air were forced out by the waste valve, and 2500 cubic feet had to be expelled in one minute through the above aperture, the pressure of the blast would require to be equal to 21 lbs. upon a square inch, and the area of the steam cylinder more than 17 feet, and its diameter about 4 feet 8 inches. If the present nose-pipe be used, and the blowing cylinder discharged 25 times in a minute, the area of the latter, supposing the piston still to move at the same rate, will be 7.25 feet, its diameter being a little more than 3 feet. If the steam cylinder, the blowing cylinder, and the speed and pressure, remain the same; then, to prevent any escape at the waste valve, the diameter of the nose-pipe must be a little less than 3½ inches instead of 2¾, its present diameter. In order to estimate the quantity of air which is blown into a furnace, it would be incorrect to take that which enters the blowing cylinder, as it will be frequently much less. Hence the quantity should be estimated by the velocity and the area of the nose-pipe, the velocity being first determined by experiment, by observing the pressure upon a column of mercury, since the velocity of air is as the square root of the pressure.

Let $V =$ the velocity of air into a vacuum, with the pressure P, which may be deemed 15 pounds upon a square inch.

Let p be any additional pressure, and v its velocity.

Then, since $P+p$ acts against P when the air is discharged into the atmosphere, we shall have p for the moving force. Hence, from the above fact we have

$$\frac{p}{p+P}=\frac{v^2}{V^2};\ v=V.\sqrt{\frac{p}{P+p}}\ \text{and}\ p=P.\frac{v^2}{V^2-v^2}.$$

Let $A =$ the area of the steam cylinder.
$S =$ the pressure of steam upon a square inch.
$a =$ the area of the blowing cylinder.
$p =$ the pressure of the air upon a square inch, the same as the above.
$b =$ the space the pistons pass through in 1 second.
$v =$ the velocity of the air's discharge through the nose-pipe.
$n =$ the area of the nose-pipe.

$$\text{Then } a\,p = SA.$$

$$p=\frac{SA}{a}.$$

Then from the above theorem

$$v=V.\sqrt{\frac{p}{P+p}}=V.\sqrt{\frac{SA}{Pa+SA}}=V.\sqrt{\frac{\frac{SA}{a}}{P+p}}$$

also when no air escapes at the waste valve.

The value of v may also be obtained from the following operation, $n\,v = a\,l$ and $v=\frac{a\,l}{n}$, but in this case no air must escape at the waste valve, it will then be more safe to get it from the theorem first given, in which p is obtained by experiment, or by the following equation, $pa = SA$, and $p = \frac{SA}{a}$. From these two equations all theorems may be obtained for calculating the different parts of the blowing apparatus, worked by a steam engine.

In the first $a = \frac{nv}{l}$ and in the second $a = \frac{SA}{p}$. Hence $\frac{nv}{l} = \frac{SA}{p}$.

$$ASl = pvn.$$

$$1\text{st}, \ A = \frac{pvn}{sl}.$$

$$2\text{d}, \ S = \frac{pvn}{Al}.$$

$$3\text{d}, \ l = \frac{pvn}{AS} = \frac{vn}{a}.$$

$$4\text{th}, \ p = \frac{ASl}{vn} = \frac{AS}{a}.$$

$$5\text{th}, \ n = \frac{ASl}{pv} = \frac{al}{v}.$$

$$6\text{th}, \ v = \frac{ASl}{pn} = \frac{al}{n}.$$

$$7\text{th}, \ a = \frac{nv}{l} = \frac{SA}{p}.$$

Hence, in common language, to find the area of the steam cylinder, multiply the pressure of the blast, the velocity, and the area of the nose-pipe together; and divide the product by the pressure of the steam upon an inch multiplied into the velocity of the piston; which is in most steam engines 200 feet in a minute, or 3 feet 8 inches per second. This will enable the reader, unacquainted with algebra, to get the value of the other 6 theorems.

It will be understood that the steam piston, and that of the blowing cylinder, are at opposite ends of the same beam, one ascending as the other descends; the area of the steam cylinder bearing the same proportion to that of the blowing cylinder, which the pressure upon an inch of the steam bears to the pressure of the blast upon an inch.

The air is not immediately discharged from the blowing cylinder into the furnace, but into an intermediate cylinder, of larger diameter, called a regulator. In this vessel is a loose piston, which is forced up by the air from the blowing cylinder, and being weighted, it descends during the returning stroke, and continues to press the air into the furnace, by which means a more steady and uniform blast is kept up than would be effected by the first cylinder alone.

Although this method of regulating the blast is in pretty general use, it is very far from being perfect. Another means has been employed for this purpose, consisting of an apparatus called a water regulator. This is composed of a large cistern, in which another of less area and capacity is inverted; the mouth of the latter is placed downwards, and the bottom upwards, which is air tight. Supposing this interior vessel filled with water, occupying at the same time the space between the inner and outer vessel; it is plain that, if air be forced into the inner vessel through a pipe inserted into its inverted bottom, the water will descend in the inner vessel, being displaced by the air; and it will rise up between the two vessels, till the column of water on the outside shall be equal to the required force of the blast. This column, in the furnace above mentioned, would be equal to producing 4lbs. upon an inch, and would be $\frac{4}{15}$ths of 34, or about 9 feet. Another pipe proceeds from the same cavity in the inner vessel to the furnace, communicating nearly a uniform blast, varying merely with the outer column of water, which will be less, as the outer surface of the water is greater.

This contrivance was for some time considered an important discovery, but unfortunately another circumstance has also rendered it very objectionable. A quantity of water is carried into the furnace, as well in the state of vapour as mechanically, the latter arising from the spray produced by the agitation. This water has been found to have an effect upon the furnace, affecting both the quantity and quality of the iron; and has been in many instances abandoned, to re-adopt the old regulations.

Another means has been employed to equalize the blast, by what is called an air-vault. This consisted in blowing the air into a very large cavity. The experiment was first tried at the Clyde iron works, by excavating a large cavity in a rock, into which the air was forced by the blowing machine. This capacity bore so great a ratio to the blowing cylinder, that the blast out of it was nearly uniform. This trial was not attended with success, partly from the vault not being air tight, and partly from the moisture which exuded from the rock mixing with the air.

A more successful experiment was made at the Carron iron works. An air-vault of wrought iron plate has been employed in one of the furnaces at Bradley in Staffordshire, which appears to answer very well. Its form is a cylinder, about ten or twelve feet diameter, and fifty or sixty feet long. Since the object of blowing air into the furnace is to produce heat, the heat being as the quantity; therefore the quantity which enters in a given time will be as the velocity and the density jointly. If, however, the density of the air depends upon the compression, the propelling force will be increased, and the air is drawn into the furnace with too great a velocity. The cementing portion of the furnace is less perfect from the oxygen being carried too high up before it combines with the carbon, and the materials would be apt to disunite before the proper change is produced.

Hence it will be evident, that when the density is caused by its being introduced at a lower temperature, the velocity remaining the same, and such as is found to be free from the objection above stated, the effect of such a blast must be calculated to produce the best iron, and the greatest quantity of it. This, in a great measure, explains the fact of more iron, and of better quality, being made in winter than in summer. The same difference is not less conspicuous in all fires, which always burn most vigorously in cold weather. Hence it will appear, that in blowing apparatus, all causes likely to increase the temperature of the air should be avoided, and every artificial means of cooling the air should be employed, particularly in the summer.

In the common blowing apparatus, in which the air is compressed by a close wadded piston, a great heat is produced in the operation. This is partly produced by the condensation of the air, and some heat must result from the friction of the piston. In some experiments made by Mr. David Mushett, it appears that when the outer air was from 63° to 68°, the air, immediately after its escape from the blowing cylinder into a receiving vessel, was increased from 63° to 90°, and from 68° to 99½°. In an average of 30 experiments, the air in the act of condensing was raised 30°. This would have the effect of increasing its volume not less than $\frac{1}{33}$ of the whole, and the increased pressure of the blast by this cause alone would be nearly ½lb upon an inch. Or, in other words, if the air were introduced into the furnace at 60°, the same quantity would be admitted with ½lb. less pressure upon an inch than if it were 90°. Hence any means of cooling the air after its condensation, in all seasons of the year, must be attended with beneficial consequences. If the air vault were made of wrought iron, and its surface constantly kept wet, the evaporation from so great a surface, if freely exposed on all sides to the air, would cool the air very considerably. Indeed, without the aid of the moisture, the effect would be such as to recommend its adoption. In the summer season there would be some advantage in bringing the air under ground for a considerable distance before it enters the blowing machine; the reason for this will be obvious, from the earth being colder than the air. In the winter season, when the earth is warmer than the air, the supply should be from the atmosphere.

The increased temperature of the atmosphere in the summer, is the cause of another evil besides the increased volume of the air. The moisture necessarily accompanying it is found to have a bad effect upon the furnace, which has been more especially ascertained by the use of the water-regulator, before alluded to. The quantity of water in the atmosphere at any time, depends upon the temperature, and the quantity of moisture prevailing on the earth's surface; so that the temperature does not always indicate the quantity of moisture which exists with the air. The most infallible method of finding the quantity of water in a cubic foot of space, is by taking the dew point, or that point of temperature when the dew ceases to form upon the surface of a body which has been allowed to remain exposed in it for that purpose. The temperature of this body, for instance a bottle of cold water, will be the dew point. When a given space is saturated with moisture, at 70°, every cubic foot contains 4.53 grains of water; and the same space at 50°, contains 2.36 grains. Hence, if the air at 70° could, by passing through a culvert in the earth, be reduced from 70° to 50°, 2.17 grains of water would be deposited from each cubic foot of air. This advantage, added to that arising from its diminished volume above mentioned, will, in a great measure, explain the difference in the quantity of iron made in winter and summer.

We shall conclude this department of iron manufacture, by a more particular reference to the plate exhibiting the different parts of the blast furnace.

Plate CCCXL. Fig. 1. is a section of the blast furnace, showing the interior of the furnace from the top to the bottom, and the part where the blast is introduced. The dark stripes which appear on the walls, are vent flues for the escape of moisture, which would not get off from such a massive building without injuring the walls, when the heat is applied to the interior. Fig. 3. is a plan at the level *a a*, Fig. 1. and 2, and PP, Fig. 1. a plan at the part to which it joins. The light-shaded squares are pillars of brick, constituting a false bottom, on which the hearth rests, the cavities underneath being for the escape of vapour, at the apertures *m* and *n* in Figs. 4. and 5. Figure 4. is a plan across the aperture where the blast is introduced, in which the blast-pipes are seen. Although we have not before alluded to two pipes, we now observe, that it is only sometimes resorted to, the single pipe being much more common. Fig. 2. is a section elevation, at right angles to the former one, Fig. 1. showing the same interior surface and the *dam-stone d*, over which the cinder flows, while the metal is retained by the dam, till it is let out at a hole *v* on a level with the bottom of the recess. T is called the *tymp-stones*, and forms a bridge over the cavity in which the liquid cinder rises. *t* is the *tymp-plate*, to give the stone greater firmness, as *e* is to the *dam-stone*, which is called the *dam-plate*. See the tymp-plate, and dam-plate, more particularly Figs. 6. 7. and 8. Fig. 5. is a plan at the bottom of the recess D, showing the vent flues in the piers, and the hole *v* for the outlet of the metal, seen also in the dam-stone, Figs. 9. and 10. Fig. 11. is a side view of the large crow, in which the blast-pipe is inserted. The end of this iron is defended from the immediate action of the fire, by covering it from time to time with stiff fire clay. Fig. 15, an end view of the same. Figs. 12, 13, 14, are different nose-pipes to fit the blast-pipe.

Manufacture of Bar Iron.

All the varieties of pig-iron contain more or less of carbon, to which they owe their fusibility, which, in all the varieties yet made, are fusible in proportion to the quantity of carbon which they contain. In the earlier stages of pig-iron manufacture, an opinion prevailed that some varieties contained oxygen. Nothing could be more absurd than this idea. Experience has shewn, that all varieties contain carbon, else they would not be fusible. And it will appear to any one acquainted with the laws of affinity, that carbon and oxygen are incompatible in a mass of liquid matter, as they must unite, and form an elastic fluid, till one or the other would be exhausted. It is this kind of pig-iron, containing the least carbon, which has been called oxygenated, and also forge-pig, because it has been found the best fitted for making bar or forge iron. It had long been suspected, that malleable iron was no other than the pig-iron divested of its carbon, but the idea was not fully confirmed, till malleable iron was directly formed by cementing the carburet, or pig iron, with a substance which carried off its carbon without changing its form. This can be effected in small castings of pig-iron by the following process: Stratify alternately in a crucible the cast metal articles with powdered iron-stone (which contains an oxide of iron) in a close vessel, and let the vessel be covered by a lid very nearly air tight. Expose the whole to a strong red heat for ten or twelve hours, proportionate to the thickness of the castings. When the mass is cold, take out the pieces. If the change is complete, the pieces will bend and work with the hammer when hot, possessing all the properties of malleable iron. If, instead of the castings, some cast iron borings be stratified with small masses of the Cumberland iron ore, about the size of small peas, and treated like the last, the bits of ore will be found to be malleable.

In both experiments, the oxygen of the oxide combines with the carbon of the carburet, which escapes in the form of carbonic oxide gas, leaving, if the oxygen and carbon be in proper proportions, pure iron behind.

Although this process appears the most direct and simple way of converting pig into malleable iron, the process at present employed is essentially different, and attended with very considerable waste. The method used by the ancients was still less scientific, and is still practised on the continent. It consists in laying the pigs of iron upon a hearth similar to a smith's forge, surrounding them with charcoal, and blowing the fire with bellows. The metal first melts, and is continually agitated with a rake, while it is exposed to the blast. The carbon becomes gradually dissipated at the expence of the oxygen, which is afforded by the blast, and its fusibility is gradually diminished. It then becomes pulpy, and ultimately is obtained in rude shapeless lumps. In this state they are taken with tongs from the fire, and placed under a large hammer, which is raised by machinery, called a stamping hammer. The anvil is broad, and is surrounded with tray-like sides, to keep the small fragments from falling off, which are apt to fly in all directions by the action of the hammer. The workman, with a rake, continues to push the pieces under the hammer so long as they keep their heat. These flatted and shapeless masses are called stampings. These pieces are then piled upon round pieces of fire-stone slabs, and placed in a reverberatory furnace, called a boiling furnace, and heated to a full welding heat. These balls are then placed under a forge-hammer, where they are drawn into bars about three inches square, and cut into lengths of half a yard in length. These pieces are called blooms. Each of these are heated a second time, and drawn by the forge-hammer into bars for sale. This is the old method of working, and is still practised by some, who have an idea that the iron is of better quality. It is attended with great waste; and, in the principal iron districts, is superseded by the puddling process, which we shall next describe.

The process of converting pig-iron into the malleable state, by the puddling method, is commenced by the operation called refining, which is performed in a furnace called a refining, and by some a run-out furnace: this is represented in Plate CCCXL. and Figs. 16. and 17. The recess, or trough A, is made of cast metal, the bottom consisting of fire-stone or brick. It is surrounded on three sides by a cavity, through which water is constantly passing from the cistern C. *p p* are two pipes from a blowing machine, inserted into the conical openings, and kept cool by water from the pipe *s*, which runs off at the pipe *n tt*. These are to blow the fire which occupies the recess A. The fire being made in the trough, and filled with cokes, the pigs of iron are thrown into the midst of it, and cokes heaped up around them, the blast being kept up, and the outsides of the trough being kept cool by the water. The metal first melts, and the blast, instantly acting upon it, separates a quantity of its carbon, but not nearly to the extent to which it is carried in the old method already described, as the metal still remains liquid. In this state it receives the action of the blast for three or four hours. It is now run out at the bottom of the trough through an opening *o*, temporarily stopped with sand. The melted mass is received into the shallow recess DE. A large quantity of the vitreous oxide of iron also runs on, which is formed by the blast, and floats on the surface of the melted metal. Indeed, it is through the medium of this vitreous oxide that the metal below is deprived of its carbon. The blast first destroys a portion of carbon on the surface, and then oxydates the iron thus deprived of its carbon. This forms the vitreous oxide which floats upon the carbonated mass. The oxygen, therefore, of the floating oxide is constantly in contact with the carbon of the metal below. The stratum immediately below gives its carbon to that deprived of its carbon above, and thus the change is effected to the bottom of the trough.

The cake of metal, as run out, is then broken into pieces. Its fracture is white, and apparently crystallized, very different from its original fracture. This arises from its loss of carbon. These pieces are now introduced into the puddling furnace, which is represented in Plate CCCXL. Figs. 18. and 19. A is the ash pit; G the grate; D the door for the fuel; C the hollow cavity where the prepared metal is laid. The flame passes over it, and then up the chimney F; H is a door for the introduction of the pieces of metal. It is a cast-iron shell lined with fire-brick. In the bottom of this door is a square hole *h*, for the introduction of the rake, and other tools used for working the metal. The workman, at the same time, can see the mass exposed, during the process, through the same aperture. Without this door the intense heat would prevent him from approaching the work, for the purpose of agitating it. Even with this guard against the heat, it is almost too great to be borne without great inconvenience. As soon as the metal is melted, the puddler begins to rake it about, occasionally throwing water upon it with a small iron dish. This water is decomposed by the iron and carbon; the hydrogen escaping, and the oxygen uniting with the iron, forming the vitreous oxide. This latter being constantly agitated with the melted metal, continues to dissipate the remaining carbon. The fusibility of the mass gradually diminishes, till at length it loses all cohesion, and appears a loose granulated mass. During the time of this change bubbles of gas are seen to burst from the melted mass with a blue flame. This is the carbonic oxide. Soon after the metal has assumed the granular form, and the heat is raised, the fragments begin to adhere, and the whole forms a number of balls of an irregular shape. These consist of the iron deprived of its carbon, mixed with the vitreous oxide. These balls are made as compact as possible by beating them on the hollow hearth, with a very heavy iron rod shaped like a club. In this state they are brought out of the furnace with a pair of large tongs, and passed through rollers similar to those represented in Plate CCCXL. Figs. 20. and 22. first passing through the widest gates, and then in succession till the pieces become about three feet long, six or seven inches broad, and a little more than half an inch thick. In the finishing gate of the rollers, there is a protuberant part crossing the gate, which makes indentures across the bar, at intervals of about one foot each. This is for the purpose of breaking the bars into pieces of regular lengths when cold. It has, in this stage of the process, a certain degree of malleability while hot, but when cold is very brittle.

When the bars above mentioned are broken into lengths, they are laid one upon another five or six in depth, and are bound together with bands of rod-iron. They are now heated in a reverberatory furnace similar to the puddling furnace, but having a flat hearth. As soon as these bundles are heated to a full welding heat, they are separately brought out and passed again through the successive gates of the rollers. If the iron is not intended to be of the best quality, this rolling would finish the bars for sale; but if it is to be of a superior kind, the second rolling is carried only to the extent of the first, and the bars broken up into bundles a second time. Every time this is repeated, the quality of the iron is improved, as well as its tenacity, as being freer from specks, which consist of the small bits of vitreous oxide worked up with the iron. It has been observed by some, that, in the rolling process, where the hammer is not used, the iron is liable to abound with more vitreous oxide, which, when polished, is very conspicuous in small specks. It is believed that the hammer expels the oxide more than is effected by the rollers. In some works, the balls, first drawn from the puddling furnace, are first subjected to the stamping hammer, as in the old method, the stampings being afterwards heated in a reverberatory furnace in piles or pyes, and passed through the rollers as in the first rolling above described.

The second pair of rollers are different merely in the form of the gates. The angular gates are for rolling square bars. The bar is turned a quarter round every time it passes through a gate, in order to reverse the position of the angles. And it passes through the last gate a second time, reversed, to take away the rhomboidal form of the bar which the first time through gives to it. The first rollers, which the balls are passed through, are generally confined to that part only, having no other gates than what are required to form the bars, which are afterwards broken up to form the bundles for the second rolling.

When the iron is intended to be rolled into sheets, it is first formed into flat bars, and these are cut by large shears into lengths suitable to the breadths of the intended sheets. These pieces are transversely passed through plain rollers.

differing from those described in nothing but the gates or grooves for the bars. Fig. 21. is an end-view of the rollers, shewing the iron shelf on which the heated masses are laid before they pass through, and a similar one on the other side to receive the same. *a a*, are nuts working on screws to regulate the distance of the rollers from each other.

For the particular combination of iron with carbon, called steel, see STEEL. For its chemical properties and respective combinations, see CHEMISTRY. (C. S.)

IROQUOIS See CANADA.

IRREGULAR DOUZEAVES, in music, are all such tempered systems of twelve notes in the octave, as have more than two magnitudes of fifths in their scale, whose single resulting, bearing, or wolf fifth, does not fall between ♯G and ♭E, which is the proper place of the wolf in REGULAR *Douzeaves*, which see. (ϱ)

IRREGULAR *Intervals* are such, whose expression in FAREY's *Notation* (see that Article) has one or more of its terms Σ, f, or m, larger or smaller than the regular and progressive increase of them, which obtains throughout an arranged table of *regular* intervals, expressed in this notation. (ϱ)

IRRIGATION. The improving of land by means of water, is an object of importance throughout the greater part of the globe. In various countries it is effected by nature on the great scale, occasionally or partially modified by human skill and labour. In others, nature applies this powerful mean of improvement in efforts more detached and confined. In some parts, irrigation, as a mode of improvement, is effected principally by the agency of man; and in all cases, this agency, skilfully applied, is more or less useful.

A just view of the fatal effects produced by destructive floods, compared with those which are the result of judicious irrigation, and of that sterility which is occasioned by excess or by want of water, compared with the fertile produce of lands properly irrigated, would set in a proper light the advantages resulting from this natural mode of improvement, by which water is turned to use, instead of being left to run to waste and ruin.

According to circumstances, it may be employed for meliorating soils of different characters, and for increasing the produce in many variegated forms in most of the populous districts of the globe. The tropical rivers convey to the plains over which they flow those annual and immense supplies of enriching deposit, which nourish the corn that sustains a considerable proportion of the population; or they tend to form and to enrich those vast savannahs, which occur in that extensive portion of the earth. In the warm but more temperate climates, there are considerable tracts of soil, which, if not irrigated, are almost wholly barren; and water is also employed there, for the purpose of enriching soils already fertile. It is a cheap and powerful manure for various crops of great value to man; and the use of it is extended, according to the views and circumstances of the husbandman, into the vineyard, the corn field, the garden, the orchard, or the meadow.

Instructed by nature, and improved by experience in the use of this element for meliorating the soil, mankind has already felt that it is of great value and importance from the equator nearly to the 60th degree of north latitude, and from the same extending on a more limited scale partly into the southern temperate zone! The periodical rains within the tropics could not be sufficient, in that burning climate, for nourishing the crops necessary to support the people, if nature itself had not employed them, and if art and labour were not also employed in fertilizing vast tracts of soil. Even in the milder climates of Italy and France, immense advantages are derived from the judicious application of this mode of improvement; and, though it may appear paradoxical, it is perhaps more productive still in the climate of England, notwithstanding its high northern latitude, and the moisture of its climate.

The truth is, that irrigation, when conducted on the right plan, is generally either preceded or accompanied by draining, embanking, or both; and that it has therefore a tendency at one time to improve the soil and the climate also, while the element of water, instead of being destructive, is directed to purposes the most useful to mankind.

It is chiefly in this view, that a proper general idea may be formed of irrigation. The advantages of this mode of improvement are greatest in populous districts, where the produce of land is of superior value, and the labour necessarily bestowed on it may be had at an inferior price; but in all situations water is valuable, when it can be safely directed to enrich the soil, and to improve and augment the produce. Every one admires that beautiful arrangement of nature, under which putrescent substances, instead of being useless or noxious, become valuable, by affording new supplies of nutriment for living vegetables, and of course for animals; but water either is, or may become one of the most valuable means known for improving the soil in every climate, excepting that where the cold is long continued and severe.

Though much has been done in many parts of the globe, in order to attain the proper advantages to be derived from irrigation, it is probable that few of these in proportion have yet been secured. The rains which inundate the Nile, the Ganges, and other great rivers, do not convey the full benefits to the rich plains which they fertilize, unless by embankments the management and distribution of the water be secured, and the culture of the soil duly attended to. The deadly swamp, which is occasioned by water permitted to go to waste by stagnation, may be converted in many instances, by industry and skill, into fertile soil. Even the most barren mossy flats have often been converted into meadows by natural irrigation. But in how many instances is this neglected, where it might by art and labour be done? England furnishes the most alluring specimens of what is possible artificially, by means of water, not only in the improvement of soils by irrigation, but in creating new soils by warping; yet we cannot extend our views without becoming sensible, that though much has been done in this field of improvement, a very great deal more still remains to be accomplished.

The truth is, that if draining and embanking were conducted on liberal principles, with a view to, and in connection with irrigation, there would be far more advantage resulting from their union, than can ever be secured by attending to them separately. It may also be remarked, that these arts, though greatly improved, are yet far from practical perfection. Errors equally frequent and gross are still committed in them all, and these have a tendency to bring unmerited reproach upon arts of great utility to man.

It is not an easy matter to convince mankind, how much is really within the power of human skill and industry. The first settlers in the American colonies would not have believed what improvement, even in the climate, was to follow the draining and cultivation of their lands after the forests disappeared. Many ages elapsed, before the people of Egypt were capable of duly appreciating the full swell of the Nile, and of turning its enriching floods to most advantage. The treatment and cultivation of soils enriched by flooding, and the due application of industry and skill in raising the most suitable crops, require time and patience; and can seldom or never be fully attained, unless the political state of a country be favourable to its improvement. In this view, irrigation fairly appears as a part of an extensive system of national economy, which ought to embrace the husbandry of every country to which this art can be of material use.

Immense additional supplies of grass have been raised in England within the present age by means of irrigation. These have contributed in a very large proportion to the support of live stock; and of course they have added not only to the general produce and value of the soils on which this art was employed, but also to that stock of manure which has been turned, with great effect, to the purposes of arable husbandry. An increasing population has furnished at once the labour necessary, and markets for the produce: and irrigation has thus, indirectly, but in a very considerable degree, increased the value and the produce of corn lands. This known and important fact ought to recommend the continuance of a system fraught with so much advantage, and to lead to farther improvement in its principles and progress.

On the other hand, it cannot be denied that errors have been committed in respect of this art. It has been tried in situations where nature did not favour the success of it; or it has been employed in order to force a produce for which there was not an adequate demand; or it has been attempted to such an extent as exceeded the proper supplies of labour within the district: and in all these and other similar cases, the failure has been most unjustly ascribed to the art itself, when in fact it arose from errors on the part of those who conducted it.

Notwithstanding the generally enriching qualities of the floods which are sent down by tropical rains, it requires both skill and attention to cultivate the soils to advantage, and to plant in every soil and situation the most suitable crops. A cold and moist climate also requires a similar portion of skill, in order to turn irrigation to most account; which answers in Britain much better for grass than for corn. Without this requisite skill and attention, it is evident that no art whatever can prosper: errors, therefore, which proceed from this want, ought in no degree to bring discredit on the art itself.

The art of irrigation, fully considered and improved by observation, in connection with that of draining and of embanking, has been so highly improved in some parts of the globe, as to approach towards a scientific character. Its features vary, indeed, so much, in different climates, as hardly to permit us to view them in a proper light. We contemplate in succession, the new established system of irrigating for grass in England; that of the south of France and of Lombardy for grass, vines, olives, mulberries, and other purposes; and though much ingenuity and considerable diversity appear, we hesitate not to pronounce the whole included in one art. But where nature takes the lead, and human agency is employed only to promote the utility of her operations, we hardly recognize the art of irrigation: yet it is really of great importance, not only on the lesser, but the larger scale; and the shepherd who properly directs the course of a mountain streamlet, or turns the collected waters of his drains, in order to prevent stagnation or waste, and of course to promote the health of his flock, at the same time directing these waters in such a manner as to fertilize barren spots of soil, and thus to furnish additional supplies of food, really belongs to the same class of artists, as those who by means of embankment, or otherwise, direct to the most useful ends the vast inundations of tropical rivers. The features of this art of irrigation appear very different, but the art itself is the same.

In what manner does water operate in fertilizing barren soils? As an element, it furnishes direct supplies of the food which is partly required for plants; as a medium for moderating the temperature of the climate, it lessens the rigour of cold in some regions, and of heat in others; as a destroyer of some noxious weeds, it extirpates, when under proper direction, many plants which are hurtful to agriculture, such as broom, heath, and moss; and it may be used in order to convey over the soil fertilizing and enriching substances. In each of these modes of operating there occur various features, and these must be well considered, in order to secure most of those beneficial effects which water is qualified to promote by irrigation.

It follows of course, that great attention ought to be given to the qualities of water intended for this purpose; and that, before incurring labour and expence in the application of it, these qualities ought first to be known. This may be done partly by analysis; but most certainly by experiment conducted on a moderate small scale. In general, spring waters are fertilizing, and possess also an equable temperature; but impregnations of iron are frequent and hurtful even in springs: petrifying springs, which hold lime in solution, are commonly fertilizing: mossy waters are generally poor; and such as convey enriching sediment, promise the most effectual and permanent improvement. These last ought not, however, to be confined in basins, otherwise they will deposit their sediment there, instead of conveying it directly over the lands; but in particular cases, when these basins are to be occasionally cleared out, this caution may not be applicable.

The natural produce for which irrigation is best adapted, in particular soils and climates, comes next under consideration. Here the mere operator is not always a competent judge, and it may require the combined lights of history and tradition, observation, and experience, to ascertain the fact; but there is no doubt that it may be ascertained with a considerable degree of assurance before expensive efforts are made.

The qualities of the water, and the natural produce which it nourishes most effectually, being discovered in the first place, it belongs to the farmer to consider the population and markets of the district, his own demands, and the nature and extent of the irrigated crops by which he may expect to derive most profit. A prudent man will be determined in a considerable degree by these considerations, before he embark deeply in the undertaking.

The water meadows of England present a fine view of irrigation for grass, a description of which belongs rather to other portions of this work, and will partly be found under the article AGRICULTURE, and in those works to which reference is there made. A similar account of French irrigation will be found under the article FRANCE of the present work; and that of Lombardy and other nations will fall to be introduced under other heads.

In Scotland there have been many successful essays in irrigation on a lesser scale; but the greatest attempt was made by the late Duke of Buccleuch on his pastoral estate on the rivers Esk, Ewes, Tiviot, Etterick, and Yarrow. Neither the water nor the climate in general, were favourable to this liberal effort on the great scale on which it was made; and the wants and population of the district hardly warranted that scale; besides, it was conducted mostly in that mode which requires most water and most expence; and it was necessary for this purpose to sacrifice too much of those level soils which are most valuable for other purposes in that alpine part of Scotland. The art of irrigation is best promoted when success as well as failure are properly recorded; and the failure of this great attempt is particularly accounted for in the Farmer's Magazine, 1815, page 42, &c. But many good specimens of irrigation occurred under this attempt, some of which are still preserved; and many other successful efforts have been made by watering for improving the meadows in all quarters throughout Scotland, the climate and richer waters of England being, however, generally preferable.

There, in favourable circumstances, it is common to obtain by irrigation three successive crops, viz. two of pasture grass, and one of grass cut for hay or soiling, all in one year. This fact leads us to consider the climate in connection with soil, and water, and other circumstances; and in applying this art to the agriculture of many foreign parts, a similar advantage is obtained by nourishing various crops in the same year.

The resources which may yet be opened to many nations by means of irrigation, fully understood and practised, appear to exceed all present calculations; and what is already known of this art is amply sufficient to attract towards it the notice of the legislator as well as that of the husbandman. Water may be made to furnish a rich and extensive supply of manure to the soil, merely by giving it a proper direction, which will have the further good effects of preventing that waste and ruin which frequently accompany this element when it is left without any direction. Even the drainage of wet soils may thus be rendered valuable for the improvement of other lands, and what naturally tends to do harm may be turned to advantage.

It has become, in most of the cultivated parts of the globe, a serious and expensive matter to preserve the soils in full bearing by regular and frequent manuring. The cost of lime, dung, and other fertilizing substances, is considerable, and the carriage and application add materially to it; nor is it always in the farmer's power to apply his manures in the proper season, and to the requisite extent.

Irrigation supplies manure in favourable circumstances, at less expence, and with more effect, than almost any other mode, on the soils to which it is applied; and the produce of it on these furnishes increasing means for the manure of other soils. The limits of this beneficial operation appear as unfixed as its advantages are liberal; and as the population increases, these limits extend by the simultaneous enlargement of the means and the returns. It naturally connects itself with draining and embankment, and is therefore capable of great extension, as the radical improvements of a country advance. In short, whatever occasional errors may be committed in irrigation, it is an art that will naturally and ought to advance, in any well governed country, along with the population and general improvement.

The proper modes of conducting the operations of this art must be varied greatly in respect of particular circumstances. A flat soil requires to be floated in ridges by means of a full supply of water, the feeders on the crowns, and the drains in the furrows; but this method is expensive in the forming as well as in the supply of water; it requires land suitable for the plough, and therefore valuable otherwise; and it succeeds fully only when the waters are rich and the climate good. All these circumstances, however, frequently concur in England to recommend it.

Catch-work is applied on dry barren slopes, where the operator sends the water in succession over different parts of the surface, accommodating his operations to the natural form of that surface. This method is attended with little expence, and may answer well in almost every case where water is not plentiful, and circumstances unfavourable to flat forming.

It is an error to think that very long continued watering is productive in proportion. On the contrary, irrigation must not be continued for too long a time at once on any grounds, otherwise the finer grasses and plants are thereby destroyed, and a set of coarse aquatics brought up in their place. Repeated waterings are necessary indeed; but the general practice does not seem to recommend above three weeks at one time in cold weather, half of that time in moderate weather, and one week when the season is warm; on the whole, about six weeks in the year.

In the particular works and operations of irrigation—the precautions necessary when sheep are to be fed on watered lands,—the plants most suitable,—and the value and application of the produce, we refer to those works already quoted, and others in which the peculiar practice of irrigating for grass in Britain is detailed; including among these last the treatises written by Mr. Wright. Mr. Boswell, and Arthur Young, and the Highland Society Transactions. (K. k.)

IRRITABILITY. See BOTANY and PHYSIOLOGY.

IRVINE, or IRWINE, is a sea-port town and royal burgh on the west coast of Scotland, in the county of Ayr. It is situated on a rising ground on the north side of the mouth of the river Irvine, which runs into the Firth of Clyde, and consists of a broad street, running from south-east to north-west, of a suburb on the south side of the river, inhabited by seafaring people, and connected with the town by a good bridge, and of another suburb on the road leading to Ayr. The principal public buildings in Irvine are, the church, which has an elegant spire, and stands on a rising ground between the town and the river, and the town-hall, which is situated in the middle of the street. The harbour of Irvine, formed by the estuary of the river, is commodious, but will in a great degree be superseded by the new harbour at Troon. There is from nine to eleven feet of water on the bar at spring tides, which is increased to 16 feet in high storms, with a wind from the south or south-west. Several busses for the herring fishery formerly belonged to this port, but the coal trade is now the principal one, and is carried on by a number of brigs, which export 24,000 tons of coals annually. The articles of import are, iron, hemp, flax, wood, and grain. Besides the grain brought coastwise from Galloway, about 10,000 quarters have been imported in one year from Ireland. Its principal manufactures were those of carpets, muslins, silks, lawns, which were exported in considerable quantities. There is also at Irvine a dockyard for shipbuilding, a large tannery, a rope-yard, and a bleachfield. A public library was established in 1795.

It is not known at what time Irvine was erected into a royal burgh, but a charter from Alexander II. is extant, confirming the grants of other sovereigns. The magistrates have a good revenue arising from the customs, and from a large tract of land, which was rented at 500*l.* per annum. In the town of Irvine are branches of the Old Paisley Bank and the Ayr Bank. Irvine is 15 miles east from the Isle of Arran, and 61 from Edinburgh.

The following is the population abstract of the town and parish for 1811:

Number of inhabited houses . .	694
Ditto of families	1414
Ditto employed in trade and manufactures	1333
Males	2470
Females	3280
Total population in 1811 . . .	5750

ISCHIA is an island of the Mediterranean, about 18 miles in circuit, situated at the eastern entrance of the Bay of Naples, which is supposed to have been produced from the sea by volcanic eruptions. This island is situated in an agreeable climate: the sky is seldom obscured by clouds; the summer is temperate, and the winter mild, Its aspect is greatly diversified, presenting a mountainous and irregular surface in general, interspersed with some portions of fertile soil, under good cultivation, and abounding with grain and fruit; while other parts consist of nothing but dark and arid rocks, marked by sterility. Ischia, however, is principally interesting to the mineralogist, from the various volcanic products dispersed in every spot, both of the island and surrounding rocks. Lava, of the hornstone base, and tufa, are the component parts of the Castle Rock, somewhat exceeding a quarter of a mile in circuit. The same appearances are exhibited by a neighbouring mountain, from which this rock is divided by a narrow channel, which has probably been made by the action of the waves. Other mountains consist of similar substances, as the Rotaro, between Casamicciola and the city of Ischia, formed of tufa, pumice, and enamels, which last are found in no other place. Monte Zaro has been produced by a stream of lava, a mile in length and two in breadth, the consequence of successive eruptions. Its base, on one side, is washed by the sea, and covered by a vitreous sand, which under the microscope seems to consist of particles of feldspar; and towards the land there is a spacious tract, almost entirely tufaceous, scattered with fragments of pumice. Besides the mountainous parts of the island, great rocks of lava protrude through the ground in different places. The various lavas are distinguished by colour and consistence, and by the proportion of feldspar, and other characteristics. In that of Monte Imperatore, feldspar seems to constitute its entire substance. At the Calce de Panza there are clusters of a yellowish white species, some of it two inches long; and many hundreds are grouped together, into roundish masses of half a foot or even two feet thick, having the lower extremity in the lava. Independent of these volcanic substances, ferruginous sand is found in many parts of the island, and in particular abundance on the sea shore. This at first sight apparently consists of very minute, irregularly shaped iron particles, but, with the aid of a powerful magnifier, each grain is discovered to be the fragment of a crystal, or a crystal complete; but of the latter there is not the proportion of above three or four in a hundred grains. These minute crystals are formed of two pyramids, united at the base; though for the most part they are only incomplete fragments, the defective parts having been destroyed by the action of the waves. Alum was formerly obtained for commercial purposes at Catrico, a place on the higher eminences of the Mount San Nicola; but some observers were subsequently unable to find any indications of it. The Abbé Spallanzani, however, collected numerous specimens of lava there, and in the environs. After remaining for months in his cabinet at Pavia, those which had been affected by acids were wholly encrusted by a whitish thin coating of alum, others exhibited none; whence he concluded there are two species of lava, and that the fabrication of this salt might be profitably renewed in Ischia.

M. Dolomieu affirms, that notwithstanding the remote period when the last eruption took place, namely in 1302, the lava of a tract called Arso still smokes in many places. Later naturalists have been unable to confirm this observation, nor does he say that he himself witnessed the fact. Nevertheless aqueous vapours are constantly escaping from fissures in the lava, which are converted to medicinal purposes, under the name of *stoves*. The vapour is collected and conveyed by tubes into apartments, whereby a steam bath is obtained, and the patient brought within its sphere is covered by profuse perspiration. Many such baths are seen here, and known by different names, some of which are relative to the disorders in which they are believed to be most efficacious. About a mile south of the town there are wells impregnated with saline and sulphureous matter, which are also resorted to for various distempers.

Notwithstanding the volcanic origin of this island, many parts are extremely fertile, and numerous plants flourish luxuriantly upon it. Various fruits attain great perfection. The inhabitants have pleasant gardens; and the level grounds abound in groves, which, however, are said to be frequently cut down, perhaps from the shallowness of the soil.

Ischia, the capital of the island, is situated on an insulated rock on the north coast, and connected to it by means of a bridge and a subterraneous passage, which was wont to be closed by an iron gate. It has a castle and an hospital, which latter was erected by a benevolent society of Naples, and it is an episcopal see. Some hundreds of invalids repair from the neighbouring continent to the hospital during the bathing season; and in their conveyance and return, several barks are always employed. Those who are cured leave votive offerings to the Virgin Mary, or to tutelar saints. Many neat villages are distributed along the coast, and detached habitations are scattered over the whole island, even at an elevation where vegetation almost entirely ceases. On the summit of San Nicola, a hermitage, consisting of a chapel and three cells, has been excavated from the volcanic rock, which are inhabited by three hermits. One of the hermits always traverses the island in quest of what is necessary for subsistence and the service of the altar, which is willingly bestowed by the inhabitants, who themselves perform an annual pilgrimage to the chapel. The island consists of three parishes, and contains a nunnery. It was formerly exempt from taxes, and the King of Naples was accustomed to come hither every year, on which occasion he allotted portions for indigent young females.

Ischia was called Onaria, Inarima, or Pythecusa, by the Greeks and Romans; according to some, from having abounded in monkeys; and according to others, with as little probability, from circumstances relative to Æneas. Strabo relates, that the first inhabitants were obliged to quit the island on account of its volcanic eruptions; and it remained deserted until 450 years before Christ. Hiero, King of Syracuse, fruitlessly endeavoured to settle a colony here; but one was established by the Romans, who retained it until the time of Augustus. A great eruption happened in the year 1302, by which many of the inhabitants and their cattle were destroyed. The survivors escaped to other islands, where they resided during the two months that it lasted. See Spallanzani's *Travels in the Two Sicilies*, vol. i. Pococke's *Travels*, vol. ii. part 2. (*c*)

ISERE is one of the eastern departments of France, and derives its name from the river Isere, with which it is traversed from east to west. It is bounded on the north by the department of the Ain; on the west, by the departments of the Rhone, the Loire, and the Drome; on the south, by the Drome and the Higher Alps; and on the east, by the departments of the Higher Alps and of Mont Blanc. The principal rivers are the Romanche, the Drac, and the Isere. It contains 453 square leagues, and contains four districts, 44 cantons, and 558 communes. This department is occupied principally with barren and marshy plains, deep vallies, and high mountains. Grain, hemp, wine, cheese, and pasturage are its principal productions. The woods of this department occupy about 270,000 acres. The forest called Chartreuse is remarkable for the beauty of its trees, owing to the scrupulous economy of its ancient proprietors. It has mines of iron, copper, lead, coal, quarries and mineral waters. Its annual contributions were 3,546,809 francs, and its population 441,208. The principal towns are,

	Population.
Grenoble . . .	23,500
Vienne	10,362
St Marcellin . . .	3,047
La Tour-du-Pin . . .	1,589

Grenoble is the capital of the department.

ISIAC TABLE, is the name given by antiquarians to an Egyptian monument, in the form of a plate of copper or brass, containing various figures in bas-relief. This piece of antiquity was discovered at Rome in the year 1525, when the Constable Bourbon took that city. It was purchased from a soldier by a locksmith, who sold it to Cardinal Bembo, after whose death it came into the possession of the Duke of Mantua. When Mantua was taken by the Imperialists in 1630, it appears to have been lost, as it has never since been heard of. It was, however, engraved in its full size by Æneas Vico of Parma. This plate was divided into three horizontal compartments, containing hieroglyphics and figures of gods. Antiquarians are not agreed respecting the object of this piece of antiquity, and there is some reason to believe that it was fabricated at Rome. See *Banier's Mythology*, vol. i. p. 567 ; Jablonski, *Pantheon Egyptiacum ;* Pignorius, *Characteres Egyptii ;* and Jablonski, *Miscellanea Berolinensia.*

ISINGLASS. See ICHTHYOLOGY.

ISIS. See MASONRY *Free*, and MYTHOLOGY.

ISLANDSHIRE. See DURHAM.

ISLAY is the name of one of the Hebrides, or Western Islands of Scotland. Its form is irregular. Its greatest length, from the Mull of Oe on the south, to Rumhail on the north, is nearly thirty-one English miles; and its breadth, from the point of Ardmore on the east, to the farm of Sanaig on the west, is about 24 miles. Its superficial extent is nearly 154,000 acres, of which one-seventh is in occasional or regular tillage; two sevenths are rugged mountains, rocks, or hills; three-sevenths hill pasture, coppice woods, plantations, and natural grassings impervious to the plough, and one-seventh unimproved, but improveable, moors, peat mosses, and unreclaimed wastes.

The island of Islay belongs to Argyllshire, is divided into three parishes, Killarow, Kilchoman, and Kildalton. Killarow, frequently called Bowmore, from the name of the village where the church is built, is about eighteen miles long and eight broad. It is watered by the river Luggan, which runs into a bay of the same name. Its population, including Kilmoy, was, in 1811, 4635. Kilchoman is about 20 miles long, and six broad, and is intersected by two arms of the sea, Lochgruinart and Lochindaal. Its population in 1811, was 3131. Kildalton is about 15 miles long and six broad. About two square miles of the parish are covered with natural wood, from which all the island is supplied. Its population in 1811, was 2269. Hence the population of Islay in 1811, was 10,035.

The coast of Islay is in general rugged, and is indented with numerous bays and harbours, the chief of which is at Lochindaal, where there is also a quay opposite the village of Bowmore. Lochgruinart and Lochindaal, two arms of the sea, seem to have been once united so as to divide Islay into two islands. The highest land between them is not more than 20 feet above high water mark, and the soil is a thin stratum of moss lying upon rounded schistus, mixed with great quantities of marine shells. Some of the mountains in the east and north of the island, are nearly 1800 feet high. The fresh water lakes, amounting to about 80 or 90, cover nearly 3000 acres. Lochguirn occupies about 700 acres, and Lochfinlagan, which is about three miles in circumference, has an islet of the same name in the middle, strongly fortified. Three or four streams, abounding in salmon, water the island.

In this island there are nearly 48 square miles of primitive limestone, without animal exuviæ, but containing lead ore mixed with copper, which has been wrought with success. Manganese and cobalt have been found, and specimens of the finest iron ore were found in 1808. The copper ore, when richest, yields 33 pounds per hundred, and 40 ounces of silver are obtained from a ton of the metal. Veins of emery, from one to three feet thick, have been found on the top of a hill near Portascaig, and a small quantity of quicksilver has been found in the moors, and at the bottom of wells. Inexhaustible pits of hard and soft marl occur in Killarow and Kildalton, and great quantities of sea weed are thrown ashore for the purposes of kelp and manure.

The principal crops in Islay are barley, oats, flax, potatoes, beans, peas ; and even hemp, wheat and every species of green crop are grown. The cultivation of wheat was introduced by the late Mr. Campbell of Shawfield, and considerable quantities are now raised annually by several of the more opulent tenants. Several thousand bolls of potatoes, and considerable quantities of barley are exported annually. Nearly 3034 acres are occupied by the potatoe crops, upon which about 60,680 bolls are raised at an average. There are no more sheep kept in Islay than what are necessary to supply the island with wool and mutton. It is necessary, indeed, to import considerable quantities of wool.

The principal wealth of the island consists of black cattle, of which the following numbers were exported from 1801 to 1807.

1801 . .	3498	1805 . .	2756
1802 . .	2574	1806 . .	2316
1803 . .	2420	1807 . .	2381
1804 . .	2339		

which gives an annual average of $2640\frac{4}{7}$, the value of which at 7*l.* per head, will be 18,484*l.* The best part of the saleable cattle are exported to Dumbarton, Falkirk, and the lowland markets. If we suppose the quantity of cattle exported to be only one-fourth, this will give 10,562 as the stock of Islay. The cattle exported are generally three-year old bullocks, and yield heifers and cows. The number of cattle in the possession of gentlemen farmers in Islay is about 6795, the remainder, viz. 3767, belonging to the tenants and cottars. In 1810, the number of milk cows was 1357.

Islay also exports considerable numbers of horses. The Irish dealers buy the refuse of them, amounting from one hundred and twenty to one hundred and eighty annually, at from 7*l.* to 12*l.* each. The number annually exported amounts to between 250 and 300.

The principal articles of manufacture in Islay are linen yarn and kelp. Besides the quantities manufactured and used in the island, about 5000*l.* worth of linen yarn has been exported annually during the years between 1797 and 1807. The manufacture and cultivation of flax was also encouraged by Mr. Campbell, who built flax mills for this purpose. As the extent of the coast of Islay is nearly 200 miles, it might have been expected that a great quantity of kelp would have been raised in the island. Owing, however, to the small height of the tides, and the rugged nature of the coast, only about 200 tons are manufactured annually. All the tenants were permitted to make kelp upon their farms, the proprietor restricting himself to the receipt of one third of the market price when it was sold.

A weekly packet, which is a sloop of 50 or 60 tons, sails from Portascaig to Tarbet in Kintyre, for letters, newspapers, and passengers; and two regular packets trade at all seasons between Bowmore and Greenock. The fishermen often carry over to the coast of Ireland cargoes of stenlock, which they sell under the name of wild salmon.

The late Mr. Campbell built the two thriving villages of Bowmore and Portnahaven; and, by his liberal policy, many hundred acres round these villages, which were merely peat mosses, are now regularly subdivided and enclosed, and covered with the finest crops. There is a market for horses at Bowmore, on the first week of August, which is chiefly frequented by Irish dealers. The population of Bowmore in 1808, was 305 males and 365 females, making in all 670. The number of scholars at the parish school was 124, who were taught Latin, English, arithmetic, book-keeping, navigation, &c. At Portnahaven, there are 26 families of fishermen.

About 40 years ago there was no carriage road, and only two or three carts on the whole island; but in 1808 there were 90 miles of carriage road in different directions, and above 500 carts.

The quadrupeds, according to Mr. Pennant, beside the domestic animals, are weasels, otters, and dark coloured hares. The birds are eagles, penguins, falcons, moor-fowl, ptarmigans, red breasted goosanders, wild geese, ducks, herons, &c. and the fish are plaise, smear-dab, large dabs, mullets, ballans, lump-fish, and sometimes the lepadogaster of M. Gouan.

From the dominion of the Danes, and Norwegians, Islay came into the possesion of the Lords of the Isles, who kept it till the reign of James III. When their powers were abolished, the Macdonalds, their descendants, became the proprietors of it. In consequence of an invasion of the island by the Macleans and Macleods, countenanced by James VI. Sir James Macdonald, the proprietor, was defeated. He escaped to Spain, and, having received a pardon, returned in 1620. The property of Islay was then transferred to Sir John Campbell of Calder, a great court favourite, on condition of his paying *L*500 per annum of feu-duty.

A great part of Islay, which was possessed from 1626 to 1717 by the family of Calder, was sold to Mr. Campbell of Shawfield in 1717 for *L*12,000, including a part of Jura; and in 1788, the late Mr. Campbell bought another part of the island for *L*10,000: so that deducting the sum which he received by selling the part of Jura, the purchase money of Islay may be stated at *L*15,000. The rents in 1779 were *L*2700, and in 1807 they exceeded *L*11,000. Mr. Campbell, the grandson of the late proprietor, possesses the whole island, excepting two farms, which belong to Mr. Campbell of Ballinaby.

Huge trunks of oak, sycamore, and birch, are found in the peat mosses, the remains no doubt of the "Maney woods" which, in 1540-9, Dean Monroe describes the island as possessing. See Macdonald's *General View of the Agriculture of the Hebrides, Appendix*, p. 612. Edin. 1811, to which we have been indebted for the principal information in this article.

ISLE of France. See Mauritius.

ISLE of Wight. See Wight.

ISLINGTON. See Middlesex.

ISMAIL, or Ismailen, is a town of European Turkey, in the province of Bessarabia. It is situated on the left bank of the Danube, and extends about half a mile along the river, and about a mile towards the land. It was fortified with eight bastions, the ramparts being from 18 to 25 feet in height, and the moat from 30 to 40 feet deep. Horizontal batteries and ramparts defend the side next the water, and near the town was a cavalier of stone work, capable of holding some thousand men. This town was taken by storm by the Russians under General Suwarrow, on the 22d December 1790, after having experienced several checks, and lost 10,000 men. The Turkish garrison, amounting to 30,000, were massacred in cold blood, and the city given over to the unbridled licentiousness of the soldiers. No fewer than 230 pieces of cannon were taken, 345 standards, 10,000 horses, and a great deal of other booty, to the value of ten millions of piasters.

ISON, in *Musick*, a term anciently used for the *Key-note*, or fundamental of a piece of music, called also the *Muse*.

ISOPERIMETRICAL PROBLEMS.

Isoperimetrical Problems, are problems in the higher geometry, in which it is required to determine the nature of a curve, from some property which it is supposed to possess in a greater degree than any other curve, either drawn between given points, having an equal length or *perimeter*, comprising the same area, or under other similar restrictions.

The first proposal of such problems forms a remarkable epoch in mathematical history, on account of their presenting difficulties of a peculiar kind, to the surmounting which the ordinary application of the differential calculus in questions of maxima and minima was at first supposed inadequate, and demanding more extensive views than had before been taken of the variations which magnitudes undergo by a change in the *manner* of their composition; thus giving rise to a succession of profound researches, which terminated at length in the invention of the calculus of variations, one of the greatest discoveries in the modern analytics, and tending remotely to the establishment of the differential calculus itself on principles purely analytical.

The property of a straight line, by which it measures the least distance between two given points, is too obvious to escape the notice of the most ordinary observer. That of the circle, by which it includes the greatest area under a given circumference, is demonstrated by Pappus, in the 5th book of his *Mathematical Collections*, with the greatest precision, (Prop. 10.) and though his mode of proceeding, founded on the inscription of regular polygons, will not apply to the sphere, on account of the impossibility of inscribing regular solids within it to an indefinite extent, yet that figure seems to have been generally regarded as the most capacious under a given surface. The first instance, however, of a problem of this kind resolved by direct investigation, was furnished by Newton, in the construction of a solid of revolution, which, when moving in a fluid in the direction of its axis, shall be less resisted than any other of the same base and altitude. The demonstration, however, of the property by which he has characterized the figure in the 2d book of the *Principia*, (and which is merely its differential equation geometrically enunciated,) is suppressed, and no trace of the method by which it was obtained appears. Nor does it appear (at least immediately,) to have excited the curiosity of others, since, after a lapse of nine years, and upon another occasion, the attention of the mathematical world was first fixed upon the subject; and from that period researches of this nature assumed a regular and definite character, and the method of conducting them began to be distinctly seen.

No sooner had the newly acquired power of the differential calculus enabled John Bernoulli to resolve the problem of the catenary, which Galileo had in vain attempted, than another, proposed by the same philosopher, and whose true solution had in like manner eluded his penetration, offered a farther occasion of proving the force of the new methods. It was the problem of the *Brachystochrone*, or curve, down which a body will descend in the least possible time from one given point to another, in a vertical plane. This was evidently a question of far greater difficulty than any ordinary problem of maxima or minima. In the latter, the form of the function which is to become a maximum or minimum is given, or at least may be determined by proper considerations, independent of the maximum or minimum property, while, in the former, it is this very property which determines the nature of the curve in question, and by consequence, of the function to be made a minimum. It was not, however, by any direct analysis, setting out from this property as his *datum*, and following it as his directing principle, that Bernoulli first resolved his problem. The minimum property of his curve appears to have struck him as a collateral view, in the course of investigation of a widely different nature; and a succinct account of the course pursued by him, and the progress of his thoughts, may materially assist us in our inquiry into the early history of these problems, and, at the same time, serve to illustrate their nature.

It is well known that Fermat had early signalized himself by the discovery of a method of maxima and minima, which has procured him, and with reason, the reputation of having invented this *application* of the *future* differential calculus. Of the various results afforded by his method, the following was not the least remarkable; that, on the Huygenian hypothesis of the refraction of light, where its velocity before refraction is to that after in the inverse proportion of the refractive densities of the media, its course is necessarily such, that in passing from a given point on one side of a refracting surface to one on the other, the *time occupied* is a minimum. This singular conclusion had, however, been anticipated upon a metaphysical principle, (if it deserve the name) that, as nature always operates in the most direct and simple way, *therefore*, by some necessity, the ray must shape its course so as to arrive at its destined object in the least time possible. The principle, at the instance of Clerselerius, and the preponderance of natural good sense, was given up by Fermat, as soon as he had learned to regard the fact as a *consequence* rather than a *cause* of the laws of refraction; but Leibnitz and Huygens strongly adhered to it, the former defending it from his peculiar views of final causes, while John Bernoulli professed himself convinced by their arguments, so that, without farther consideration, it became a received principle, that, under all circumstances, light performs its course, however interrupted, from point to point, however distant, in the least time that circumstances will permit; and in this form it was laid down by Leibnitz, in the Act. Eruditorum, 1682, as the foundation of optical science, and attributed by him to the immediate fiat of the Deity.

Bernoulli had proposed to himself to determine the path of a ray through a medium, whose refractive density (and consequently the velocity of the ray) varied according to a given law, in which investigation no difficulty occurred. Having (from the pre-established dependence of the sine of refraction upon the refractive density, and without any consideration of the velocity,) ascertained the curve described, and satisfied with the metaphysical principle above stated, he then abstracted altogether from optical considerations, and regarding the variation of velocity as produced by any cause, as, for instance, the force of gravity, he thus concluded the brachystochrone on any hypothesis of gravitation.

It is surprising to observe what ascendency these considerations of metaphysical propriety had, at that period, obtained over the mind of this singular man. No sooner had he identified the brachystochrone, on the supposition of uniform gravity, with the cycloid, which had previously been identified with the tautochrone, on the same hypothesis, than he celebrates it as a wise dispensation of Providence, or, at least, as a wonderful instance of the frugality of nature in her operations, thus to make one curve serve two purposes, observing, that this could not have happened, were not Galileo's hypothesis of uniform gravity agreeable to nature, although Newton's discoveries had long ago demonstrated its falsehood, and Bernoulli well knew the fact to be so.

It would not be difficult to clear Bernoulli's solution from any objection on the score of rigour; and, in fact, he speedily obtained a more direct one, upon which, in June 1696, he proposed his problem in the Leipsic acts, under the title, *Problema novum, ad cujus solutionem Mathematici invitantur*, allowing six months for the solution, which, however, at the request of Leibnitz, who, as well as his brother James Bernoulli, had resolved the problem, was prolonged to a year. At the expiration of this period, a multitude of the chief mathematicians of the age were found to have been successful, but the only direct analysis which appeared was that of James Bernoulli. The principle on which this analysis turns is of very extensive application, and it once reduces this, and other problems of the same nature, to questions of ordinary maxima. It is this, that *the maximum or minimum property, which belongs to the whole curve, belongs also to every elementary, or infinitely small portion of it*. It is true, this principle is not absolutely general, and therefore must be verified before it is applied in any particular case. In the present it is easily shewn to hold good.

Let ABCDE be the curve (Fig. 1.) required, BCD any element, and, if possible, let B c D be an arc of some other curve, the time of describing which is less than that of describing BCD. Since the velocity at D is the same, whether the body fall down AB c D or ABCD, the time through DE will be the same on either supposition, and therefore the whole time through AB c DE less than through ABCDE, contra hypothesin.

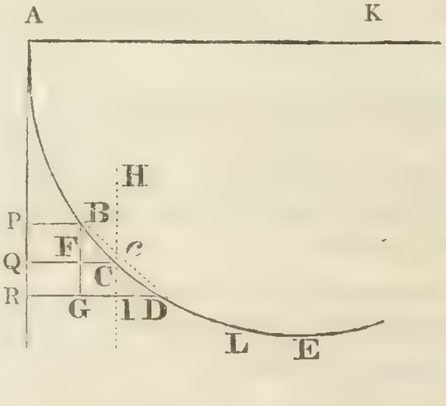

Fig. 1.

Suppose, now, the curve ABCDE, according to the spirit of the differential calculus, resolved into an infinite number of rectilinear elements, of which BC, CD, are two, corresponding to two elements PQ. QR. (equal to each other,) of the vertical abscissa AP (x), the arc AB being called s, and the ordinate PB, y. On this supposition, the velocity must be regarded as uniform through each of the elements BC, CD, and if we call v the velocity of describing BC, then $v + d v$ (or v') will be the consecutive velocity with which the arc $CD = d s + d^2 s$ ($= d s'$) is described. Now, to discover what function y is of x, we must endeavour to establish some relation between the differentials $d s$ and $d y$ or $d s$, by means of the proposed minimum property; and to this effect, regarding the points B, D, as fixed, and C moveable along the line QC, we must inquire what must be the position of C upon that line, (or what relation FC and BF must bear to each other,) that the time through BC, with the uniform velocity v, *plus* the time through CD, with the uniform velocity v', shall be a minimum. Now, this is evidently an ordinary question of maxima and minima; it is, in fact, identical with Fermat's problem concerning refraction above mentioned, and the solution is precisely similar; BCD will be described in a minimum of time, when the two lines BC, CD, make angles with the vertical, whose sines are to each other as the velocities v and v' with which they are described. This gives at once

$$\frac{v'}{v} = \frac{\text{sin. ICD}}{\text{sin. HCB}}, \text{ or } \frac{v'}{\text{sin. ICD}} = \frac{v}{\text{sin. HCB}};$$

that is, (since $\text{sin. HCB} = \frac{d y}{d s}$, and $\text{sin. ICD} = \frac{d y'}{d s'}$)

$$\frac{v' d s'}{d y'} - \frac{v d s}{d y} = 0; \quad . \quad . \quad . \quad . \quad . \quad . \quad (a)$$

or, since $\frac{v' d s'}{d y'}$ is the consecutive value of $\frac{v d s}{d y}$,

$$d \, . \frac{v d s}{d y} = 0;$$

whence we get

$$\frac{v d s}{d y} = \text{constant} = a.$$

This is the relation required between the differentials, or the differential equation of the curve, for v is given in functions of x. On the supposition of uniform gravity, we have $v = \sqrt{x}$, and writing $\sqrt{a}$ for a to make both sides homogenous,

$$\frac{d s}{d y} \sqrt{x} = \sqrt{a}, \text{ or } x \left(1 + \frac{d x^2}{d y^2}\right) = a,$$

$$d y = d x \frac{\sqrt{x}}{\sqrt{a - x}}$$

the equation of a cycloid, whose base is the horizontal line AK. Such is the solution of James Bernoulli, cleared of the geometrical form which embarrasses and obscures it, and expressed, as he probably would have expressed it, in the present state of symbolic reasoning.

There is one peculiarity, however, in the question of ordinary maxima and minima, to which the problem is here reduced, viz. that the quantity to be made a maximum or minimum is itself a differential expression, or infinitely small magnitude. This does not at all affect the truth of the conclusion, which is independent of the absolute magnitude of the lines and velocities concerned, but it does the manner of treating it. In problems of maxima and minima, the quantities concerned are supposed to vary by increments infinitely smaller than the quantities themselves. Now, the variation of the length of FC, or the differential of FC ($d y$), on the supposition that C changes its place on QC, cannot be expressed by $d d y$, because it would thus be confounded with the variation it undergoes, when (by the shifting of the ordinate QC to its consecutive position RD) FC attains its consecutive value $\text{ID} = d y + d d y$. There are two ways in which this difficulty may be avoided. The first is the one we have above taken, viz. resolving the question of the maximum or minimum, as a separate and independent problem, and then adapting the conclusion so obtained to the particular case in question; accordingly this is the course pursued at first by the Bernoullis; but, not to mention the want of analytical neatness in such a mode of proceeding, the questions of maxima and minima, which thus arise, would, in most cases, be found of extreme difficulty, and their *subsequent* adaptation to infinitely small quantities a matter of uncommon delicacy. The other method consists in looking on the difficulty (in its true light) as merely one of notation, and obviating it by a refinement in that point, viz. by employing a new characteristic δ for that hypothesis of differentiation, by which the point C shifts, as it were, from one curve, BCD, to another infinitely near it, along the fixed ordinate, and a new name *variation* for this peculiar change in the value of $d y$. We have here the origin of the calculus of variations; and the manner in which this simple artifice enables us to combine the question of the minimum, with the peculiar circumstances of the case where it arises, cannot be better shewn than by the very instance before us

It is, first of all, evident, that as δ means nothing more than differentiation, on another hypothesis, all the rules of the differential calculus must be attended to in the management of the new symbol, only making the variations of such quantities as do not change on this hypothesis, zero. Thus,

$$\delta d x = 0, \delta v = 0, \delta v' = 0,$$

because the length of BF is given, and the velocities through BF and CD are uniform. Again,

$$\delta (d y + d y') = 0, \text{ or } \delta d y' = - \delta d y,$$

because $\text{GD} = d y + d y'$ is invariable. 3dly,

$$\delta \left(\frac{d s}{v} + \frac{d s'}{v'}\right) = 0, \text{ or } \frac{\delta d s}{v} + \frac{\delta d s'}{v'} = 0; \quad . \quad . \quad . \quad . \quad (a)$$

by the condition of the minimum. Now,

$$\delta d s = \delta \sqrt{d x^2 + d y^2} = \frac{d y \delta d y}{\sqrt{d x^2 + d y^2}} = \frac{d y}{d s} \delta d y.$$

$$\text{and, } \delta d s' = \frac{d y'}{d s'} \delta d y' = - \frac{d y'}{d s'} \delta d y.$$

So that our equation (a) becomes

$$\frac{d y'}{v' d s'}, \delta d y - \frac{d y}{v d s} \delta d y = 0;$$

and here, as in all problems of maxima and minima, the variation $\delta d y$ divides off, and leaves

$$\frac{d y'}{v' d s'} - \frac{d y}{v d s} = 0,$$

the same equation as before.

By the aid of this principle of James Bernoulli, we are already in a condition to resolve a variety of problems. In the present instance, it is easy to see in what manner it supplies the place of the metaphysical principle of his brother's solution: but, without at present stopping to examine the farther cases to which it is applicable, we will continue to trace the history of the subject; and it fortunately happens (which can hardly be said of *any* other branch of mathematical science,) that in this the order of invention is precisely the one calculated to afford the most distinct and luminous view of it to one unacquainted with the subject, and to give him a radical knowledge of its principles.

James Bernoulli, having resolved his brother's problem, proposed, in his turn, the celebrated defiance, which at once concentered the attention of the mathematical world upon these researches, and which has imposed the name of *isoperimetrical problems* on all which depend on similar principles. In the Leipsic Acts, 1697, appeared, accompanied with the promise of a pecuniary reward to his brother, in case of a complete solution, a *programma* requiring the nature of a curve, in which a certain integral expression ($\int y^n dx$ or $\int s^n dx$, y being the ordinate, and s the arc) shall be greater or less than in any other curve *of the same length* between its fixed extremities. We have here the first instance of a question of what is called *relative maxima and minima*, that is, where the curve in which a certain integral (A) is to be made a maximum or minimum, is to be selected, not from among all curves whatever, but only from such as have at least one property in common expressed by some other integral (B,) which, in the present instance, is

$$\int ds = \int dx \sqrt{1 + \left(\frac{dy}{dx}\right)^2}.$$

The first attempts of John Bernoulli towards the solution of this question, although not destitute of ingenuity, fell short, it must be confessed, of what might have been expected from his great abilities. He supposed that the condition of equal length, and the maximum property, might universally be satisfied together, by making both the ordinate QC and abscissa AQ vary at once, two elements BC, CD, only being considered. It would indeed be so, were the quantities concerned finite; but, even then, were a third condition expressed by some other integral formula (C) superadded, the method must at last be abandoned. When, however, the elements of the curve are infinitely diminished, the final equation (at least in the case where $\int s^n dx$ is to be a maximum) is reduced by effacing all that part of it which is infinitely smaller than the rest, to a single term, and to a form altogether illusory; so that his analysis, which, even in this case, led him to a distinct conclusion, is positively erroneous, and offends against the principles of the infinitesimal calculus.

A different and legitimate view of the subject was taken by James, who was thus enabled to detect and expose the fallacy of his brother's solutions; but, although this was done with all possible forbearance and moderation, it is painful to observe, that the mortification thereby experienced by the latter, was productive of a deep and lasting rancour, which obliterated in his mind the candour of a philosopher, and in his language the decency of a gentleman; which assailed his brother's glory during the brief remainder of his life, and long after his death continued to asperse his memory.

James Bernoulli observes, that the variation of one ordinate is indeed sufficient, when but one condition is to be satisfied, but when two are concerned, it will be necessary to make the same number of ordinates vary. The principle of his solution, which became the foundation of all subsequent researches, until the invention of the calculus of variations, is as follows: The four equidistant and infinitely near ordinates PB, QC, RD, SE, (Fig. 2.) being drawn, let the extreme points BE

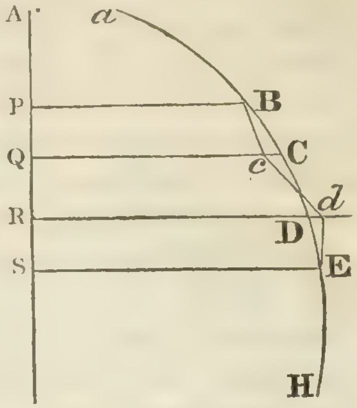

FIG. 2.

remain fixed, while C, D, vary along the lines QC, RD, by the infinitely small elements or variations C c, D d. Then, to determine their positions, or the relation between the differentials dy, dx, the first condition is, that

$$\text{BC} + \text{CD} + \text{DE} = \text{Constant},$$

and is therefore equal to its consecutive value,

$$\text{B}c + cd + d\text{E},$$

which, treated analytically, leads to one relation between the variables C c, D d, or to an equation of the form

$$\text{P}.\text{C}c + \text{Q}.\text{D}d = 0.$$

The maximum or minimum property affords another condition, by which the *sum of the elements* of the intergral $\int \text{V}\, dx$ expressing that property, is itself to be made a maximum or minimum. This must be treated so as to afford another relation of the same form

$$\text{R}.\text{C}c + \text{S}.\text{D}d = 0,$$

between which, and the foregoing, eliminating one of the variations Dd, we get

$$(\text{PS} - \text{QR}).\text{C}c = 0, \text{ or PS} - \text{QR} = 0,$$

Cc being arbitrary and independent. A similar reasoning was afterwards applied by Euler to the variation of three, or any number of ordinates, to satisfy as many conditions; but to such questions the Bernoullis did not extend their researches. Thus, in fig. 3. each of the three properties,

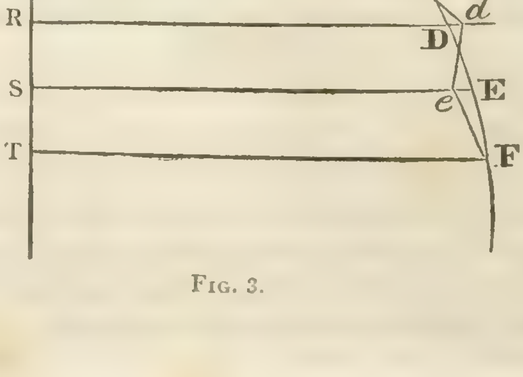

FIG. 3.

viz. (A) that of the maximum, and (B) and (C), the two commmon properties, affords an equation of the above form between the three variations $C\,c$, $D\,d$, $E\,e$; from which, eliminating any two of them, the co-efficient of the other, put equal to zero, gives the differential equation of the curve.

This is, in fact, the identical process by which an ordinary question of maxima and minima would be treated, in the case where a certain function P of two (or any number) of variables u and v is to be made a maximum, the variables being related to each other by a given equation $Q = 0$. The differentiation of the latter assigns one relation between their variations, viz.

$$\frac{d\,Q}{d\,u}\,\delta u + \frac{d\,Q}{d\,v}\,\delta v = 0,$$

while the condition of the maximum gives $\delta P = 0$, or

$$\frac{d\,P}{d\,u}\,\delta u + \frac{d\,P}{d\,v}\,\delta v = 0,$$

from which eliminating one of the arbitrary variations, the resulting equation will have the other for a divisor; and the remaining factor, put equal to zero, gives that equation which holds good between the variables *only* in the case of the maximum or minimum. These variables, in the present case, are the consecutive ordinates y', y'', &c. of the curve sought, and thus we see the reason why the final equation so obtained is a *differential* equation of the curve.

Such was the state, however rudely expressed in the symbolic language and mixed geometry of those days, in which the problem was left by James Bernoulli, (in his *Analysis magni problematis Isoperimetrici, Leipsic acts*, 1701); and although his brother, in a Memoir published by the French Academy in 1718, exhibited it in a more compact and elegant form, and thence took occasion most unfairly to arrogate to himself a large share of its merit, such was nearly the state in which it was found by Euler in 1733. It is true, that John Bernoulli, in this Memoir, had remarked a certain symmetry in the terms of his *fundamental* equations, which, pursued, would have led him to anticipate one of Euler's most elegant and general conclusions, but he appears (as well as some subsequent writers who have given an account of his labours,) to have confounded this with a thing of the same kind which obtains in his final, or *specific* equations, as he calls them, in virtue of which they are complete differentials, (of which we have an instance in the equation (a) of our first solution of the brachystochrone,) and which is not universal, or of any very extensive use in the theory of these problems. Our countryman Brook Taylor, too, in his *Methodus Incrementorum* (1715,) considered the subject, and though he added little to the stock of knowledge, and nothing to that of facility or distinctness, yet he there first employed a general mode of representing the maximum property, viz. by $\int V\,d\,x$, where he takes $d\,V = M\,d\,x + N\,d\,y + L\,d\,s$, and thus may be considered as having afforded the first handle to a general and systematic analysis.

The progress of invention had hitherto been tardy, and that of generalization next to nothing, when the subject was resumed by Euler, in a series of Memoirs in the Petropolitan Commentaries, and in a work expressly on the subject, entitled *Methodus inveniendi lineas curvas maximi minimive proprietate gaudentes*. (1744.) To whatever part of the mathematics this wonderful man turned his attention, obscurity seems to have fled his presence. It is impossible to exhibit a more luminous view of the principles of the subject than he has taken in this latter work. In his Memoirs (*Acad. Petropol.* tom. vi. vii. and viii.) the novelty of the course he was pursuing, as well as the superfluous difficulties which usually hang on the origin of invention, had betrayed him into some errors, arising chiefly from too extensive an application of the principle of James Bernoulli, which makes the maximum property common to the curve and its elementary portions; but these he speedily rectified: and a sketch of his method, while it will put the solution of all ordinary isoperimetrical problems in the reader's power, will serve as the best *practical* introduction to the calculus of variations, which (however closely connected with the subject in an historical point of view) we cannot help regarding as a great deal too abstract to be made the basis of an explanation of its principles without some preparation of the kind.

Isoperimetrical problems, then, are distributed by Euler into classes, according to the number of properties they involve, or of ordinates, which must be made to vary in their analysis. The first class consists of *absolute maxima and minima*, where one integral $\int V\,d\,x$ is to be made a maximum or minimum, between limits any how determined. The rest, where, besides this condition, others are superadded, viz. that certain other integrals $\int W\,d\,x$, $\int Z\,d\,x$, &c. are to be given, are called, in general, questions of *relative maxima or minima*. To begin with the former, to which, as we shall soon see, all the rest are reducible.

PROP.

If $\int V\,d\,x$ *be an absolute maximum or minimum for the whole curve, it will be so for every infinitely small part of it, provided V be some determinate function of* x, y, $p = \frac{d\,y}{d\,x}$, $q = \frac{d^2\,y}{d\,x^2}$, $r = \frac{d^3\,y}{d\,x^3}$, &c. *involving no integral expressions.*

Whatever be the order (n) of the highest differential coefficient contained in V, imagine twice that number of ordinates erected at equal distances (dx) from y, and from each other, so as to form a series of ordinates

$$y,\ y_1,\ y_2,\ y_3,\ \cdot\ \cdot\ \cdot\ \cdot\ \cdot\ \cdot\ y_n\ \cdot\ \cdot\ \cdot\ \cdot\ \cdot\ \cdot\ y_{2n},$$

of which let the *middle one* y_n vary by the quantity $n\nu = \delta y_n$ (Fig. 4.), all those on each side of it remaining invariable,

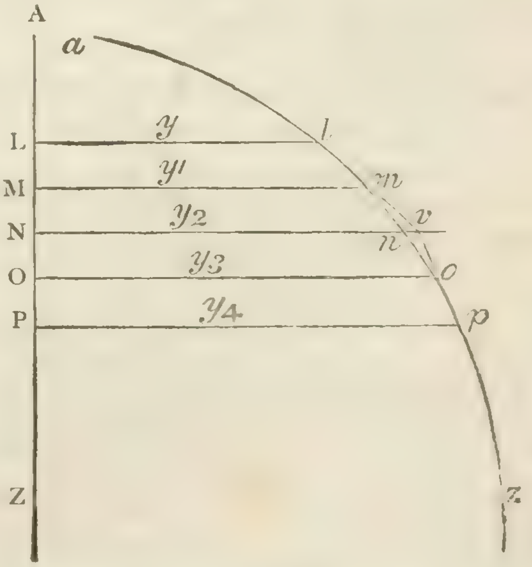

FIG. 4.

so as to make one element $m\,n\,o$ of the curve in the middle of the series vary, and become $m\,\nu\,o$. Let V_1, V_2, &c. p_1, &c. q_1, &c. be the consecutive corresponding values of V, p, q, &c. To fix our ideas, suppose $n = 2$. Our series of ordinates will then be

$$y,\ y_1,\ y_2,\ y_3,\ y_4;$$

and we may suppose

$$dV = M\,dx + N\,dy + P\,dp + Q\,dq.$$

If we now conceive the integral $\int V\,dx$ resolved into its elements, thus,

$$\int V\,dx = \&c. + V\,dx + V_1\,dx = V_2\,dx + V_3\,dx + \&c.$$

we must first inquire which of these elements are affected by the variation of the element $m\,n\,o$ of the curve. Now, we have,

1st, $\delta x = o$, $\delta y = o$, $\delta y_1 = o$. $\delta y_2 = n\,\nu\ (= \nu)$, $\delta y_3 = o$, &c.

2dly, $p = \frac{1}{dx}(y_1 - y)$, $p_1 = \frac{1}{dx}(y_2 - y_1)$, $p_2 = \frac{1}{dx}(y_3 - y_2)$, &c.

so that the only values of p, which are affected by the variation of y_2, (being those which contain y_2,) are p_1 and p_2; and these give

$$\delta p_1 = \frac{\delta y_2}{dx} = \frac{\nu}{dx},\ \delta p_2 = -\frac{\nu}{dx}.$$

In like manner, the only values of $q\left(= \frac{d^2 y}{dx^2}\right)$ which vary, are those whose expressions in terms of three consecutive ordinates, contain the variable one y_2, that is,

$$q = \frac{y_2 - 2y_1 + y}{dx^2},\ q_1 = \frac{y_3 - 2y_2 + y_1}{dx^2},\ q_2 = \frac{y_4 - 2y_3 + y_2}{dx^2},$$

which give

$$\delta q = \frac{\nu}{dx^2},\ \delta q_1 = -2\frac{\nu}{dx^2},\ \delta q_2 = \frac{\nu}{dx^2};$$

and in the same way, the variations of the higher differential co-efficients might be found, the numerical co-efficients being those of a binomial $1 - 1$ raised to the successive powers 1, 2, 3, &c.

Hence V, V_1, V_2, (or V_n), being the only values of V which contain these quantities, are the only ones affected by the variation ν of the ordinate y_2, so that the only portion of the integral $\int V\,dx$, which varies by the variation of $m\,n\,o$, is that consisting of the elements

$$V\,dx + V_1\,dx + V_2\,dx.$$

Representing then the whole integral by

$$A + \left\{V\,dx + V_1\,dx + V_2\,dx\right\} + B,$$

A and B are invariable, and the condition of the maximum cannot therefore be satisfied, unless the nature of the curve be such as to render this elementary portion a maximum.

A train of reasoning precisely similar, only longer in its details, is applicable to the higher values of n. When, however, V involves an integral, as, for instance, the arc $s = \int dx\sqrt{1 + p^2}$, since every succeeding value of this is affected by a variation in any part of its extent, it will thus affect every succeeding value of V; and the rest of the integral represented above by B, not being invariable, the principle of James Bernoulli ceases to be true in this case. Still less can it be extended to cases where V involves a quantity not given, but implicitly, by an unintegrable differential equation, as in the problem *to find the curve of swiftest descent in a resisting medium*, to which Euler [illegible] correctly applied it, (in tom. vii. *Comm. Petrop.* and in his *Mechanics*.) In relative maxima and minima, however, it may happen, that the integral involved in V may be the very one which is supposed the same in all the curves; and its succeeding values remaining in consequence unchanged, the foregoing reasoning will still apply. Thus, if the condition of equal length be superadded, the part BCDE (Fig. 2.) being equal to B *c d* E, any succeeding arc *a* H will be the same, whether it consist of *a* BCDEH, or *a* B *c d* E H; and the succeeding value of *s* being unaffected by the variation of the element BE, B is now invariable, so that here Bernoulli's principle holds good, even when V is a function of *s*, as in the second case of his own programma.

Prop.

The same supposition respecting V *being made, to determine the relation between y and x, which renders* $\int V\,dx$ *a maximum or minimum.*

We have here to make the element of the integral a maximum; or, which comes to the same thing, the variation of the whole integral due to that of one ordinate equal to zero; that is, (in the case we have been considering,)

$$\delta\left\{V\,dx + V_1\,dx + V_2\,dx\right\} = o;$$

or,

$$\delta V + \delta V_1 + \delta V_2 = o.$$

Now, we have

$$\delta V = M\,\delta x + N\,\delta y + P\,\delta p + Q\,\delta q,$$

whatever be the variations of x, y, p, q, (being infinitely small.) Substituting then, for δx, δy, δp, δq, and their consecutive values, the expressions before found, we get

$$\delta V = \qquad\qquad + Q\,\frac{\nu}{dx^2}$$

$$\delta V_1 = \qquad + P_1\frac{\nu}{dx} - Q_1\frac{\nu}{dx^2}$$

$$\delta V_2 = N_2\,\nu - P_2\frac{\nu}{dx} + Q_2\frac{\nu}{dx^2};$$

and the sum of these put equal to zero gives

$$\left\{N_2 - \frac{P_2 - P_1}{dx} + \frac{Q_2 - 2Q_1 + Q}{dx^2}\right\}.\,\nu = o;$$

or, dividing off the arbitrary variation δy_2 or ν, and observing that $P_2 - P_1 = d\,P_1$, $Q_2 - 2Q_1 + Q = d^2 Q$,

$$N_2 - \frac{1}{dx}\,d\,P \quad + \frac{1}{dx^2}\,d^2 Q = o.$$

In this equation, we may now write N and P for N_2 and P_1, from which they differ only by infinitesimals, when we obtain

$$o = N - \frac{1}{dx}\,d\,P + \frac{1}{dx^2}\,d^2 Q.$$

Had we considered differential co-efficients of a higher order, by varying y_3, or y_4, &c. or at once analysed the general case, the process would have been precisely similar, and we should have arrived at the equation

$$o = N - \frac{1}{dx}\,d\,P + \frac{1}{dx^2}\,d^2 Q - \frac{1}{dx^3}\,d^3 R + \&c.; \ldots.(A)$$

which is the general formula of Euler. It enables us to resolve any problem of absolute maxima, however complicated, where V involves no integral sign. As an example of the manner of its application, we will take the solid of least resistance of Newton.

The resistance being represented by

$$\int \frac{y\, d y^3}{d x^2 + d y^2} \text{ or } \int \frac{y p^3}{1 + p^2}\, d x, \text{ here, then,}$$

$V = \frac{y p^3}{1 + p^2}$, $d V = \frac{p^3}{1 + p^2} d y + \frac{(3 p^2 + p^4) y}{(1 + p^2)^2}$, $d p = N\, d y + P\, d y$.

Consequently, $M = 0$, $N = \frac{p^3}{1 + p^2}$, $P = \frac{(3 p^2 + p^4)y}{(1 + p^2)^2}$,

Now, the equation of the minimum (A) gives

$$0 = N - \frac{d P}{d x}, \text{ or } 0 = N\, d y - p\, d P\,;$$

which, combined with $d V = N\, d y + P\, d p$, gives, by eliminating $N\, d y$, $d V = P\, d p + p\, d P = d (P p)$, whence,

$$V = P p + c \qquad (B)$$

that is, by substituting for V and P their values, and reducing

$$y = -\frac{c}{2 p^3} - \frac{c}{p} - \frac{c p}{2}.$$

Hence, since $d x = \frac{d y}{p}$, or $x = \int \frac{d y}{p}$, we find

$$x = \frac{-3 c}{8 p^4} - \frac{c}{2 p^2} - \frac{c}{2} \log. p + c',$$

and the equation between x and y results from the elimination of p between these two. The equation (B) is of considerable use in ordinary problems of this kind, and is generally applicable when V is a function only of y and p, affording immediately one integral of the equation (A.)

Prop.

Required the nature of a curve, which shall give $\int V\, d x$ *a greater or less value than any other curve in which that of* $\int W\, d x$ *is the same.*

Here two ordinates must be made to vary: but their variations being independent, and infinitely small, the variations they cause in the two integrals may be computed separately, and their sum taken for the joint effect. Now, let ν and ω be the variations of the two consecutive ordinates (δy and δy_1), and let $P\, \delta y$ or $P\, \nu$ be the variation produced in $\int V\, d x$ by the variation of y, then by reason of the uniformity which must subsist between all operations which relate to the consecutive points of the same curve, $P_1 . \delta y_1$, or $P_1 . \omega$ will be the variation produced in it by the variation of the consecutive ordinate, and therefore $P . \nu + P_1 . \omega$ will be the whole variation of $\int V\, d x$, owing to the simultaneous change of both ordinates. In like manner, if $Q . \nu$ be the variation of $\int W\, d x$, caused by that of y, $Q\, \nu + Q_1\, \omega$ will be the joint effect of those of y and y_1. The condition of maximum then gives

$$P . \nu + P_1 . \omega = 0, \text{ or } P\, \nu + (P + d P)\, \omega = 0.$$

And the invariability of $\int W\, d x$ affords another equation, of precisely the same form.

$$Q . \nu + Q_1 . \omega = 0, \text{ or } Q . \nu + (Q + d Q)\, \omega = 0.$$

Eliminating, then, one of the variations, and dividing by the other,

$$Q\, d P - P\, d Q = 0, \text{ or } \frac{d P}{P} - \frac{d Q}{Q} = 0.$$

whose complete integral is

$$P + a Q = 0, \quad . \; . \; . \; . \; . \; . \quad (a)$$

a being arbitrary and constant. Now, $P . \nu$ is the variation of $\int V\, d x$, on the supposition of one ordinate y only varying, and $Q . \nu$, that of $\int W\, d x$; hence, $(P + a\, Q)\, \nu$ is that of $\int V\, d x + a . \int W\, d x$, so that the equation ($a$) which satisfies the *relative* maximum, is the very same to which the treatment of $\int V\, d x + a . \int W\, d x$ as an *absolute* maximum would have led.

A reasoning precisely similar applies, whatever be the number of properties concerned. Suppose them, $\int V\, d x$, $\int W\, d x$, $\int Z\, d x$, &c. and ν, ω, π, &c. being the variations of the same number of consecutive ordinates, each of the conditions indiscriminately gives an equation of the same form.

$$P . \nu + P_1 . \omega + P_2 . \pi + \&c. = 0$$
$$Q . \nu + Q_1 . \omega + Q_2 . \pi + \&c. = 0$$
$$R . \nu + R_1 . \omega + R_2 . \pi + \&c. = 0, \&c.$$

And it is evident that the equation

$$P + a\, Q + b\, R + \&c. = 0,$$

where a, b, c, &c. are arbitrary constants, will be the complete integral of the differential equation resulting from these by the elimination of ν, ω, π, &c. because it gives

$$P_1 + a\, Q_1\, b\, R_1 + \&c. = 0$$
$$P_2 + a\, Q_2\, b\, R_2 + \&c. = 0, \&c.$$

and multiplying these equations in succesion by ν, ω, π, &c. and adding them together, their sum will vanish, as is readily perceived, by reason of the former system of equations.

The problem of relative maxima and minima is thus reduced at once, and in all its generality to that of absolute; for the preceding demonstration applies to all cases. We need only add to any one of the properties, the others, multiplied each by an arbitrary constant, and then make the sum an absolute maximum or minimum. As a single instance, let us inquire what curve, under a given circumference, contains the greatest area, or in which $\int d x \sqrt{1 + p^2}$ being given, $\int y\, d x$ shall be a maximum. Here the quantity to be made an absolute maximum is $\int (y + a \sqrt{1 + p^2})\, d x$; and V in this case being a function of y and p only, the equation (B) holds good, and gives

$$y + a \sqrt{1 + p^2} = \frac{a p^2}{\sqrt{1 + p^2}} + c$$

which reduced, affords

$$p \left(= \frac{d y}{d x} \right) = \frac{\sqrt{a^2 - (y - c)^2}}{y - c}$$

and integrating,

$$(x - b)^2 + (y - c)^2 = a^2$$

the general equation of a circle.

In the work above cited, Euler extended his researches successfully and correctly to the case where the quantity V, under the integral sign, involves one or more indeterminate integrals, or expressions given by an unintegrable differential equation, as well as where the function to be made a maximum is not merely a single integral, but a function of one or more combined; as, for example, where $\frac{\int x\, d s}{\int d s}$ is to be a maximum, $\int d s$ being given; but of these the necessary limits of this article preclude any thing beyond this historical notice. It now only remained to discover some general method of treating isoperimetrical problems, which should dispense with the resolution of integrals into their elementary portions, and reduce their treatment to a regular series of purely analytical processes. This desideratum was supplied by Lagrange (in two memoirs, published in the *Melanges de Turin*, tomes ii. and iv. 1760, 1770) by one of his first and greatest discoveries, the calculus of variations, and with such complete success, that nothing beyond it can be expected in future. Euler, with a memorable candour, of which, perhaps, no parallel instance can be produced in the annals of science, and which forms a striking contrast with the passages we have had occasion to notice in the early history of the subject, was the first to acknowledge its superiority over his own methods; and, disdaining those feelings of jealous rivalry the circumstances of the case were so peculiarly calculated to excite, hastened to become the commentator of the new method, and to substitute it in the place of his own. The principle of the calculus of variations, and its connection with the present subject, has been purposely kept in view in the preceding pages, and will have been already made sufficiently evident. For the detail of its processes, and an account of its successive improvements, as well as for the demonstration of the theorem we shall require, the reader is referred to the article *Calculus of* VARIATIONS.

The essential distinction between this mode of treating isoperimetrical problems and Euler's is this, that the latter estimates the change produced in an integral $\int V\,dx$ by the variation of one, or, at most, a limited number of ordinates; whereas the former considers the change effected in it by the continuous variation of the ordinate along the whole extent of the curve, infinitely small indeed in *quantity*, but regulated by a perfectly arbitrary *law*. The variation of $\int V\,dx$ is determined, which it undergoes, not by the change of one element only of the curve, but by *the whole curve* ABCD (Fig. 5.) undergoing an infinitely slight change in its nature, and passing into another *a b c d*, infinitely near it, but whose deviation from it in the different parts of its course is in all other respects perfectly indeterminate and arbitrary. It is demonstrated in the article referred to, that (supposing $\delta x = 0$) the whole variation so produced ($\delta \int V\,dx$) is reducible to the form,

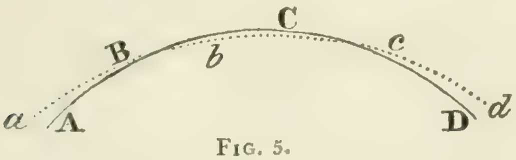

FIG. 5.

$$A_1 - A_0 + \int B\,\delta y . dx;$$

where A_1, and A_0, are the values assumed by a function A, (in which $\delta y, d\,\delta y$, &c. are not included under any integral sign,) at the limits between which the integral is taken. Now since the law, according to which δy varies, is arbitrary, we may suppose $\delta y = i . \varphi(x)$, i being an infinitely small given quantity, and $\varphi(x)$ a function of x of a form absolutely arbitrary, and which may even be subject to no analytical law. If we suppose x_0, x_1 y_0, y_1, to represent the values of x, y, at the respective limits, and $\varphi'(x)$, $\varphi''(x)$, &c. the differential co-efficients of $\varphi(x)$, the part $A_1 - A_0$, will be of the form,

$$\left\{ \begin{array}{l} \alpha_1 \varphi(x_1) + \beta_1 \varphi'(x_1) + \gamma_1 \varphi''(x_1) + \&c. \\ -\alpha_0 \varphi(x_0) - \beta_0 \varphi'(x_0) - \gamma_0 \varphi''(x_0) - \&c. \end{array} \right\} i.$$

This, therefore, is a determinate quantity, when the extreme values of $\varphi(x)$, and its differential co-efficients, are any how determined; but the other part, $\int B\,\delta y\,dx$, or $i . \int B . \varphi(x)\,dx$, being dependent on the whole extent of the function $\varphi(x)$, from one limit to the other, is not determined by those extreme values, because the assigning any number of particular values of an arbitrary function, and its differential co-efficients, is not sufficient to determine its form. The condition of the maximum, however, requires that the aggregate of these two parts should vanish; which is therefore impossible, unless the nature of the curve be such, that this indeterminate integral shall disappear from the variation, that is, unless $B = 0$. This equation determines, therefore, the *nature* of the curve in general; but there remains to be satisfied the equation $A^1 - A_0 = 0$, in which no quantities are involved but those which relate to the limits of the integral, and which, therefore, determines those conditions to which the limits must be subject, that among all the curves which have their general nature represented by $B = 0$, the particular species and individual shall be selected, which renders the proposed integral the greatest or least possible; in other words, the equation at the limits determines the arbitrary constants which enter into the integral of $B = 0$.

The quantity B, when V is a function of x, y, p, q, &c. such that

$$dV = M\,dx + N\,dy + P\,dp + \&c.$$

is no other than

$$N - \frac{1}{dx} d\,P + \frac{1}{dx^2} d^2\,Q - \&c.$$

from which Euler's general equation results at once; and in the more complicated cases, where V contains indeterminate integrals, &c. the value of B, deduced by the process for finding the variation of $\int V\,dx$ in such cases, and put equal to zero, will, in like manner, afford the general equation expressive of the nature of the curve sought.

The processes of Euler and the Bernoullis enabled them merely to discover, in a general way, the nature of the curve possessed of a given property of maxima or minima; as, for instance, that it is a cycloid, or an ellipse. But the question immediately and naturally arose, of all such curves, what particular position of the cycloid, or what position and eccentricity of the ellipse, will give the integral in question a greater or less value than it will have for any other cycloid or ellipse, &c. however drawn? To determine this, a separate and independent process, of the nature of an ordinary question of maxima and minima, may be instituted, and would be found sufficient; but no general formulæ for the purpose had been given, nor was it even suspected that the two problems might be resolved together by one analysis, till Lagrange, by means of the definite part of his formulæ, effected it at once, and indeed rendered it an indispensable part of the solution. The discussion of this point belongs, however, more properly to the calculus of variations, and can scarcely be separated from it. Indeed, since the discovery of that calculus, isoperimetrical problems can no longer be regarded as forming a separate branch of mathematical investigation; though, as a point of scientific history, they must ever continue to maintain a degree of interest proportional to the importance of the discovery to which they gave rise. Like the theory of the tangents, evolutes, &c. of curves, they take their place in our elementary treatises, on account of the geometrical illustration and relief they give to the abstract theory; but much of their intrinsic importance is lost, when all they can afford is exhausted, and they have ceased to present a field of unexplored research.

For further information, we must refer to the memoirs,

&c. above cited; to a treatise, by Mr. Woodhouse, on isoperimetrical problems; to the various expositions which have appeared of the calculus of variations; and to the article VARIATIONS in the present work. (J. F. W. HERSCHEL.)

ISOTONIC SYSTEM OF TEMPERAMENT, or the equal temperament of the musical scale, consists of 12 equal semitones, of the value $1 \div \sqrt[12]{2}, = 51\Sigma + f + 4\frac{5}{12}m$. This system derives its chief consequence from the great number of writers, and the respectability of several of those who have appeared as its advocates; among those who have fallen under our notice, we remember the names of D'Alembert, Broadwood, Cevallo, Chladni, Couperin, Crotch, Davis, Des Cartes, Emerson, Euler, Kirnberger, Kollmann, Marpurg, Merrick, Mersennus, Rameau, Riccio, Scrogs, Sorge, Sulzer, Vogler, &c.

It is plain from the account given by most of the writers alluded to, that they had neither submitted this system to the test of experiment, or thoroughly calculated and considered the harmonic effects of its grossly tempered chords, the thirds and the sixths especially; while many of them were utterly unacquainted with the true nature and limits of the musical scale, as appears from their statements, and as to what could or could not be done, owing to the immutable relations which any one of the tempered chords has with several others, and of the whole combined, in a regular douzeave.

In page 7 of our ninth volume, we have inserted a Table of the full particulars of a system, very carefully and minutely calculated, which Mr. Farey discovered in 1807, and first announced in the *Philosophical Magazine*, vol. xxviii. p. 65, not for the purpose of recommending or advocating the isotonic system, of which we are now treating, as being adapted to use; but for the purpose of showing a practicable mode of exhibiting a new system, so indefinitely near to the true isotonic, that all its merits and defects might thereby be shewn, and the controversy so long subsisting regarding this system, ended by an appeal to actual and indisputable experiment.

In pursuing the same object, Mr. Farey has very recently recommended, in the periodical work above quoted, vol xlix. p. 447, the undertaking of an *experimental euharmonic organ*, on a scale sufficiently extended to admit of exhibiting two or more octaves of the great scale of intervals, 612 in the octave, which is given under our article INTERVAL, so contrived, that the merits of the isotonic, in common with a great number of other systems which have been proposed, may be put to the test of sufficient trial in musical performance, by the use of those 12 Listonian notes, which approach nearest to the true isotonic notes respectively, or those of any other system, which may be submitted to this trial.

The Table of the true isotonic system, which we are now about to present to our readers, is exactly similar in its arrangement, and was calculated for the purpose of comparison with that of Mr. Farey's system, approximating to it, which has already been referred to in our ninth volume, p. 7, except that the third column there, which exclusively pertains to Mr. Farey's first system, now contains those 12 notes of his enlarged Listonian scale, which he has recently recommended to be tried in performance, as substitutes for the strict isotonic notes, which all the following columns of the Table, now given, are occupied with.

Before we arrive at the printing of TEMPERAMENT, in our work, we may hope to be able to announce that the experiments above alluded to have been made, and their results, and to give all the further particulars, in a tabular form, regarding the system of 12 notes, which are now contained in our third column below.

Isotonic Table.

1	2	3			4	5	6	7	8	9	10	11
C	612	612	12	53	.5000000	480.00000	0.	0.	0.	0.	0.	0.
B	561	561	10	49	.5297315	453.05974	24.44974	17.97882	2.04734	1.53418	28.54072	20.55892
B♭	510	510	11	44	.5612310	427.63137	23.0766.	16.97011	1.93266	1.44803	26 9 .836	19 40547
A	459	459	8	40	.5946035	403.63032	21.78192	16.01768	1.82394	1.36676	25 42736	18.31596
G♯	408	408	9	35	.6299605	380.97627	20.55892	15.11865	1.72188	1 29005	23 99966	17.28777
G	357	357	7	31	.6674199	359.59372	19.40547	14.27036	1 62512	1 21768	22.65286	16 31770
F♯	306	306	5	27	.7071068	339.41126	18.31596	13.46918	1 53418	1.14914	21 38138	15 40184
F	255	255	5	22	.7491536	320.36152	17.28777	12.71368	1.44803	1.08456	20 18 56	14.53762
E	204	204	3	18	.7937005	302 38105	16.31770	11.99983	1.36676	1.02367	19 04840	13 72171
E♭	153	153	4	13	8408964	285 40969	15 40184	11.32643	1 29005	.96633	17.97882	12.95155
D	102	102	1	9	.8908987	269.39087	14.53762	10 69069	1.21768	.91197	16.97011	12 22487
C♯	51	51	2	4	.9438744	254.27116	13 72171	10 09028	1.14914	.86094	16.01768	11.5 831
C	0	0	0	0	1.0000000	240.00000	12.95155	9.52420	1.08456	8.256	15.11865	10 89096
Notes	Artif. Commas.	Σ	f	m	Length of Strings.	Vibrations in 1″ of Time.	Flat 3ds.	Sharp IIIds.	Sharp 4ths.	Flat Vths.	Flat 6ths.	Sharp VIths.
		Approximate Listonian notes.					Beats in 1″ of Time.					

In pages 7 and 8 of our volume, which has been quoted, the sums of the beats in each of the six latter columns of the above Table will be found, compared with similar sums of the beats of Mr. Farey's equal temperament; and several other comparisons and averages, by which the very near co-incidence of these two systems are shewn: the total number of beats in the two Tables differ only .0063 of a beat, out of more than 847 beats! (ρ)

ISPAHAN, ISFAHAN, or SFAHAN, a city of Persia, in the province of Irak, situated towards the south part of a very extensive plain, on the north bank of the river Zaynderoud, which is not fordable in spring, and is crossed by several fine bridges. This city, which during centuries was the capital of the empire, and yet remains pre-eminent in population and commerce, enjoys a delightful climate, of which the Persians have always boasted. The air is so pure, that metal bearing the highest polish does not contract rust; and it is said to possess powerful antiseptic principles. Except during a few weeks of the year, the sky is serene and unclouded, the rains are never heavy, and snow seldom lies long on the ground. The seasons are so regular, that it is considered a point of indifference whether the market places be covered or open.

Ispahan, in its most prosperous days, was surrounded by a wall 20 miles in circuit; but the inhabited part of the city is now restricted to a space of between two and three miles in diameter. Every where it is surrounded by ruins, extending to a great distance. Some of its most extensive suburbs have entirely disappeared, and the most populous quarters are deserted. Beheld from the top of the highest edifices, all the buildings exhibit a light yellow colour; and, were it not for the intermixture of trees, the view would be monotonous. The domes of the numerous mosques are a field of green, or sometimes blue lacquered tiles, with ornaments in blue, yellow, and red, and they are crowned by golden balls and a crescent. When visited by Chardin, the walls were so completely covered by houses as scarcely to be discernible. He observes, that he did not take a plan of the city, neither did he give any view of it except in a vignette, "because, from whatever side the city is beheld, it resembles a wood, where only domes are to be seen, with lofty slender towers attached to them, serving the Mahometans for belfries." Ispahan consists of the city properly so called, and the suburb of Julfa, with some others of inferior note, all surrounded by beautiful gardens. The former is in general ill built, the streets narrow, irregular, badly paved and very dirty, full of mud in rain, and of dust during great part of the year. The better quarters and market places are watered in warm weather, which was wont be done twice daily throughout the city. The houses, though sufficiently handsome and convenient within, make no external show. Those inhabited by the governor, public officers, and opulent merchants, may almost vie with palaces, but nearly the whole consist of bricks dried in the sun, for none, except the public edifices, are constructed of burnt bricks. They present high dead walls without windows, and have terraces, whereon the inhabitants sleep during several months. The only access is usually by one door or gate. In the interior there is a court, which, if large, is laid out in walks, planted on the sides with flowers, and ornamented with fountains. Almost every dwelling of consequence has a garden belonging to it, which, while promoting the beauty and salubrity of the city, greatly increases its extent.

Chardin relates, that in his time, namely, between the years 1666 and 1676, there were within the walls 162 mosques, 48 colleges, 1802 caravanseras, 273 baths, 12 cemeteries, and the number of houses was computed at 38,000. But the city has since undergone so many dilapidations, that, in addition to the total destruction of the walls, many of the most celebrated edifices have perished. But the Shah Maidan, or royal square, is still the finest and largest in the universe, and its bazars and religious edifices rival any to be seen in eastern kingdoms. It is 440 paces in length, by 160 in breadth. At the distance of 25 feet from the houses it was surrounded by a canal, bordered by lofty trees, both of which are now destroyed. On the south side stands the royal mosque, a magnificent building, which was constructed by Shah Abbas in the sixteenth century. Every part of it exhibits a style of architectural ornament quite unknown in Europe. It is entered by a gate about twelve feet wide, closed by two leaves, covered with plates of solid silver, partly gilt and sculptured, which were added by Shah Sefi the First. An iron chain hangs across the outside towards the square. Within these, are fountains flowing into jasper basins, spacious courts, and extensive porticos, of which that in the centre is surmounted by a vast dome and gilt crescent, visible at the distance of four leagues on the road from Casan. All this edifice is constructed of massy stone, covered with highly varnished bricks and tiles, upon which are inscribed sentences of the Koran. Though the royal mosque has lofty minarets, they are not used for calling the people to prayers, from their overlooking the neighbouring houses, which excites the jealousy of the inhabitants. On another side of the Maidan there is a Mahometan college, called the *Medresse Shah Sultan Hossein.* Its entrance is gained by a lofty portico, enriched with twisted pillars of beautiful Tabriz marble, which leads through two brazen gates, the extremities of which are of silver, and their whole surface highly sculptured, and embossed with flowers and verses from the Koran. They open into a court, on the right side of which is a mosque, with a great cupola covered with lacquered tiles, and adorned externally with ornaments of pure gold. It is faced by two minarets; but they can no longer be ascended, as the stairs are destroyed, and the dome itself is falling to decay, but its interior is richly spread with variegated tiles, bearing a profusion of inscriptions. The other sides of the square are occupied, one by a high and beautiful portico, and the remaining two by small square cells with carpets, as rooms for the students, twelve in each front, disposed in two stories. Here there are thirty professors, who not only instruct the youth in reading and writing, but in the languages, belles lettres, geometry, astronomy, and astrology. M. Olivier was informed, that in 1796 there were 300 or 400 pupils; but formerly, as many thousands had attended it.

The city contains few hospitals, nor are they well endowed. One stands beside an extensive caravansera, built by Shah Abbas the Great, who erected both at the same time, that the revenue of the latter might support the proper officers of the hospital.

The palaces of the kings are enclosed in a fort of lofty walls, which are about three miles in circuit, and to which there is nothing at all comparable in Europe, whether in appearance or extent, or in the number and beauty of the edifices, dispersed over spacious gardens. In general, the front room or hall is very open, and supported by pillars exquisitely carved and gilded; while the large glass windows, through which it receives a mellow light, are curiously stained with a variety of colours. Each has a fountain in front. The palace *Chehel Sitoon*, or *forty pillars*, stands in the middle of an immense square, intersected by various canals, and planted with trees. Towards the garden there is an open saloon supported by eighteen pillars, all inlaid with mirrors, and appearing from a distance to consist entirely of glass. The base of each pillar is marble, sculptured into the figures of four lions, so disposed that the shaft rests on the whole. Mirrors are likewise profusely arranged over the walls; and the ceiling is decorated with flowers in gilding. An arched recess, embellished in the same manner with glass, and portraits, leads into a spacious and splendid hall. The roof is formed in a variety of domes and figures, and is tastefully painted and gilded. Part of the walls consists of white marble, and part is covered with mirrors: they are besides ornamented with six large paintings, chiefly of Shah Ismael, and Shah Abbas the Great, in battles and in royal fêtes, which are all of considerable age, yet the colours are perfectly fresh, and the gilding surprisingly brilliant. No furniture remains here except carpets. Those of the time of Abbas, two centuries old, are superior to the fabric of the present day. Adjoining to this palace is the harem, which was erected by the second minister a few years ago, and presented to the king. The apartments are alike elegant as those of the other: the walls painted with birds, ravenous animals, and bouquets of flowers; besides which, they are resplendent with mirrors and gildings. Here are seen the portraits of several sovereigns, particularly of the present king, for whom an establishment, complete in all its parts, is always kept in readiness, though he resides at Teheran, many miles distant. The windows of this palace display some beautiful specimens of stained glass and enamelling, disposed in couplets, in honour of the monarch, together with quotations from the Koran. It appears from Chardin, that the kings of Persia have always had a number of palaces, arising from confiscations. But he observes, that, of 137 which belonged to him in Ispahan, the greater part were uninhabited, and many falling to ruin.

Most of the caravanseras and bazars are very fine. Some of the former are large, and appropriated for travellers from their respective provinces; so that no difficulty occurs in finding a stranger. Short and expressive sentences are frequently inscribed on the outside, such as, "Two companions are indispensable for a traveller, a long purse and a good sword;" or, "Ask for nothing more than others have previously had;" and the like.

The bazars are highly celebrated, consisting of large wide streets, arched and lighted from above. Several are covered with domes, and painted, especially in the interior, with the portraits of the heroes of the country, with combats, the figures of beasts, and similar subjects. The most extensive bazar was formerly 600 geometrical paces in length, very broad and lofty, but we do not know that any are now so large. By means of successive communications, a passenger could traverse the whole city sheltered from the elements. A new one has been built, and those of older date repaired, by the patriotic minister Hajee Mahomet Hussein Khan.

The suburb of Julfa stands on the south side of the river Zainderoud, which is crossed by several fine bridges, the principal consisting of thirty-three arches, each surmounted by three of smaller size, with a covered gallery on each side for pedestrians. It originally stretched three miles along the banks of the river, having five main streets, the longest, intersected by others, extending 1200 paces. Now it is restricted to nearly a mile from north to south, by half a mile from east to west; the streets are wide, containing elegant and commodious houses, with fertile gardens producing much fruit. This suburb was founded by a colony of Armenians, brought hither by Shah Abbas from Julfa, a town on the banks of the Araxes. The Armenians being an industrious people, the colony flourished surprisingly, and at length consisted of 12,000 souls. But its members, having become the subject of vexatious exactions, gradually diminished in number. M. Olivier found them reduced to 800 in 1796. There are still nine churches, where weekly service is performed, with a considerable body of clergy, and an archbishop at their head.

Formerly, 500 Roman Catholics constituted part of the population of Ispahan. M. Olivier found but two families, who occupied the convent of the Jesuits. Government had long before seized on those of the Dominicans and Carmelites; and he did not learn any particulars regarding that of the Capuchins.

Numerous and important manufactures, highly prized in the east, are carried on in this city. That of gold brocade is unrivalled. All the articles employed in common life are fabricated, both for home consumption, and for exportation. Several glass manufactories produce what would do credit to European artists. The bazars are much more extensive, and exhibit greater variety of goods than are seen in any other part of the empire, and each is appropriated for those of a particular kind. The finest muslins from the western coast of the Indian peninsula are sold at a wonderfully moderate rate; and the price of pearls, diamonds, and other precious stones of the east, is lower than in Europe. Ispahan is the first commercial city of the Persian dominions, and the emporium of foreign trade between them and India, Turkey, and Cabul. Several European nations had factories here; but the commotions in the eighteenth century occasioned them to be successively withdrawn. Its relations with Russia continued later than those of the rest, and, we believe, were lately renewed.

The population of this city was once very great. In the time of Chardin, the only author who has preserved a detailed account of it, those who calculated largely computed the number of inhabitants at 1,100,000; while others estimated them at 600,000. In 1472, according to Barbaro, they amounted to 150,000; but its splendour arose, on the transference of the seat of government hither by Shah Abbas the Great from Casbin, in the sixteenth century. Chardin was here for a large portion of ten years in the seventeenth. There is considerable discrepancy in the most modern calculations. According to Olivier, the number had fallen to 50,000 in 1796; but the restoration of confidence and tranquillity raised it to 100,000 about the year 1800, and at present it is supposed to exceed 200,000. Mr. Morier, indeed, rates the inhabitants at twice as many, because the second minister, a native of the city, and long its governor, informed him that there were 80,000 families; but he adds, that much is to be allowed for the exaggeration of a Persian. A few of the ancient fire-worshippers, or Guebres, remain, who are kept in a state of degradation.

A grand causeway or avenue, called the Char-bagh, or four gardens, extending 3000 paces in length by 70 in breadth, leads to the principal bridge across the river. The gardens surrounding Ispahan, and their fruits, are highly celebrated for variety and excellence. They are copiously watered by numerous channels, and contain fine fountains and pavilions; though many of both have been destroyed. The garden of Azar Gerib has always been appropriated to the culture of the fruits most esteemed in Persia. It extends a mile in length, and being formed on a declivity, is disposed in twelve terraces, supported by walls, each divided into a great number of squares, which are planted with fruit-trees, all of the same species, arranged in quincunxes. The whole district environing Ispahan and its gardens, is one of the richest in Persia; every species of grain, and all edible herbs grow luxuriantly; cotton, tobacco, sesanum, madder, and saffron, are abundant. Many of the villages, however, which enlivened the scene, and contributed to the wealth of former ages, have now disappeared.

The eastern authors are not agreed regarding the origin and antiquity of Ispahan. It is affirmed by some, that its earliest name was *Jayy* or *Cherestan;* others think that it was founded by Alexander the Great. Artaxerxes captured the city in the course of the third century, after which its history is obscured during several ages. It surrendered to the great warrior Tamerlane, in the year 1386, immediately on his appearing before the walls; but in consequence of an insurrection, almost its whole inhabitants were devoted to destruction. "I conquered the city of Ispahan," says that sovereign, in his Institutes, "and trusting in the people, I delivered the castle into their hands, and the darogah, whom I placed over them, they slew, with

3000 of the soldiers: and I also commanded that a general slaughter should be made of the people of Ispahan." An account was taken of 70,000 heads that were piled up in pyramids, as a testimony of the cruel victor's resentment. When the Afghans, a race from the countries to the north-east of Persia, invaded the empire, an army of 20,000 men took the suburbs of Julfa, and invested Ispahan. Mahmoud, their commander, having made an unsuccessful assault on the city, commenced a strict blockade. All supplies were interrupted, and a terrible famine ensued. The people, however, willing for a time to submit to privations, became impatient under their distresses; and surrounding the harem, wherein the sovereign had secured himself, demanded, but in vain, to be led against the enemy. It is recorded, that horses and mules soon rose to so high a price, that none excepting the king and the wealthiest citizens could afford to purchase them for subsistence: and the animals, hitherto deemed unclean by the principles of the Mahometan religion, became welcome food. As these were exhausted, leather and the bark of trees were substituted, and at length the famished inhabitants had recourse to human flesh; many of them killed each other, many were seen cutting pieces from the dead bodies of those who had just expired; parents destroyed their children; and some, to terminate their calamities, became their own executioners. The streets, the squares, and the royal gardens, were covered with carcases; and the river Zainderoud was so corrupted, that its waters were hardly fit for use. At length the king, to avert farther evils, resolved to abdicate the throne, and advancing to the camp of Mahmoud, laid the ensigns of royalty at his feet. When the Afghans took possession of the city, a large portion of it seems to have been destroyed; and so much injury was suffered on the whole, that it never recovered its ancient splendour. Some time afterwards, the Persians revolted, when Mahmoud invited all the ministers and chief men to a feast. But each, at the moment of arrival, was assassinated, and 300 dead bodies were soon exposed in the royal square to intimidate the inhabitants. Not content with this sanguinary vengeance, he commanded the destruction of all who had been previously in the service of government. The massacre lasted fifteen days, so that from the loss of those who perished, of those who were banished, and of those who fled in terror from the scene, Ispahan was almost totally depopulated. Mahmoud, to repeople it, invited several Kurdish tribes to occupy the deserted houses. But a short time subsequent to these events, he himself died miserably; and Nadir, the celebrated usurper, having taken the city, many of the Afghans were put to death, while the empire was regained from their government. From the period of Nadir's assassination in 1747, Ispahan became the object of ambition to all the different competitors for the throne, who have deluged Persia with blood during the preceding century. It was captured by the late sovereign Aga Mahomet Khan in 1785, and was threatened by a new candidate for the empire, Lootf Ali Khan, in 1791. Some years later, the king ordered all the fortifications to be dismantled, and transferred the seat of government to Teheran, in the same province, where it still remains. Lat. 32° 24′ 34″ N.; Long. 51° 50′ 15″ E. See Chardin *Voyages, edit. de Langles*, tom. vii. viii.; Tavernier's *Voyages*; Olivier, *Voyages*, tom. iii. p. 182; Morier's *Travels*, p. 162; Malcolm's *History of Persia*, vol. ii.; M'Donald Kinneir's *Geographical Memoir*, p. 111. (*c*)

ISTESSO *in Music*, is a term sometimes applied to the unison, or *Minor* FIRST; which see.

ISTRIA, is a country of Europe, forming a triangular peninsula in the northern part of the Adriatic Sea. It is bounded on the north by the duchy of Carniola, and on the other parts by the Gulf of Trieste, the Gulf of Carnero, or more properly the Channel of Farisina, by which it is separated from the island of Cheso, and by the Adriatic. That portion forming the base of the triangle extends between 80 and 90 miles in length, from east to west; it stretches between 70 and 80 from north to south; and probably the superficial area may amount to nearly 3500 square miles.

Istria is divided into two districts, the Venetian to the west, and the Austrian to the east; the latter, also called the *Littoral* district, had pertained, during a long time, to the circle of Austria; the former was annexed to it also by the treaty of Campo Formio. Several pleasant islands are dispersed along the coast, as the two islands of St. Nicholas, one of which is covered with olives, and the other, nearly five miles in circuit, is full of shrubs, but inhabited only by quarriers, working a coarse grey marble, which is sent to Venice. The island Brioni is likewise celebrated for the same substance.

The surface of Istria is extremely unequal; part of it towards the sea is low and marshy, part, especially to the north-west, consists of precipitous mountains, from which the projection of enormous pointed rocks, seems to threaten destruction to the beholder. Their sides are penetrated by caverns and grottos, incrusted within by stalactites of fantastic shapes, and numerous torrents pour down the deep ravines. The mountains are either capped with snows, bare and barren, or covered by beautiful forests, from which the marine of Venice is chiefly supplied. Hence a great diversity of climate ensues; and when one part of Istria is congealed with cold, the heat of the level ground is almost insupportable, and, as we shall afterwards illustrate, is attended with a fatal insalubrity.

The vallies are of extraordinary fertility. They afford two crops annually of the ordinary kinds of grain, which is of excellent quality, and some of it exported to Hamburgh. Harvests are obtained almost without the operations of agriculture. Oil and wine are abundant, and the price of the latter, which possesses remarkable strength and flavour, is so moderate as to render it attainable by every class of the people. Profitable fisheries of the tunny and anchovy are carried on in the Adriatic, where the fisherman scarcely needs to leave the shore for procuring a plentiful supply.

The inhabitants of civilized countries present fewer prominent characters than those emerging from a savage condition. Probably the natives of Istria are a mixed race, and it appears to us that the Morlachians, who are copiously disseminated in the neighbouring regions, form part of the number. Nevertheless, a considerable difference is to be observed in their morals and pursuits, according to the places where they dwell. In the district of Trieste, their physical constitution bears more resemblance to that of the inhabitants of Carniola, to which they are annexed by some geographers. They are alike indifferent to the piercing cold of the mountains and the enervating heat of the vallies, and, with their breasts bare, and feet naked, they brave the ice, and the asperity of the rocks. They are robust and active. In Venetian Istria, on the other hand, they are slothful and indifferent. The fertility of the soil, and the stores of the sea, summon forth so little exertion, that in many places they are sunk in a state of apathy. Abusing the facility of procuring liquors by drinking to excess, many are afflicted by gout at an early period of life. Numerous lame persons are seen among them, which some have ascribed to the immoderate use of intoxicating draughts, and some to an original vicious personal conformation. It is probable, however, that much of the inactivity of the Istrians may be owing to the nature of their country and its climate. The presence of forests, and of low and marshy grounds, are alike pernicious to health; and it has been remarked, both in Europe and elsewhere, that, on their eradication, a sensible amelioration follows. It is affirmed, that the climate is not equally fatal to native Istrians as to strangers, for many aged persons are seen here. It has also been maintained, that if their strength were developed by labour; if agriculture were in greater repute, and procured more healthful nutriment for them; if they abstained from strong liquors, and if a watchful police promoted cleanliness, which is of such vital importance; their endemial maladies would gradually disappear.

Istria contains several towns of considerable importance, of which, according to some geographers, the principal is Trieste. But as others incline to detach it from this country, and annex it, along with its territory, to another, we shall briefly remark, that it is situated at the bottom of a gulf of the same name, occupying the place of the ancient Tergeste, a Roman station; that it is a city of great trade and numerous population, which chiefly began to flourish under the celebrated Empress Maria Theresa, somewhat after the middle of the preceding century. See Trieste. Capo d'Istria, one of the largest in the Venetian part, is usually considered the capital. See Capo and Istria. The town of Pola, now an inconsiderable place, is, as remarked by the learned Dr. Pococke, "in relation to its antiquities, to be regarded among the greatest." It stands towards the south-west extremity of Istria, but the approach to it from the sea is dangerous on account of rocks and shoals. It has a fine road, spacious and convenient, forming a basin which is completely sheltered from every wind. Pola is surrounded by walls, and defended by a citadel, a poor edifice of four bastions, wherein the Venetians kept a garrison of 15 or 20 men, and a governor, who was always a nobleman, and whose monthly allowances cost more than the whole annual pay of the military. All maritime visitors undergo the strictest examination, to guard against infection of the plague from the Levant. Nevertheless, it sometimes breaks out and makes considerable ravages. The occurrence of this calamity is attributed to the negligence of a police not sufficiently vigilant in preventing the surreptitious introduction of contraband goods, the fruits of piracies and robbery, by profligate persons dwelling on some of the neighbouring islands. The inhabitants of Pola do not exceed 600 or 700 dispersed within the walls. Here are the remains of one of the noblest amphitheatres now extant. Its exterior walls are almost entire, consisting of very large hewn stones, bound together with cramps of iron. They rise in three stories, each penetrated by 72 arcades, or 216 in whole, and are capable of containing several thousand persons. This amphitheatre, like others, is of an elliptical form, the largest diameter extending 400 feet; and in the interior is a wide subterraneous channel, supposed to have been for the purpose of carrying off water. Pola possesses other interesting antiquities; as the ruins of a temple, dedicated to Rome and Augustus, an emperor who long resisted that tribute of adulation. Its architecture exhibits the most delicate proportions of the Corinthian order; and an inscription, testifying its original object, is still legible between the architrave and the cornice over the portico. The inhabitants of the city, however, believe that the temple was built for the worship of Pallas: and popular names are, besides, given to different antiquities, which tend to involve their foundation and uses in much perplexity. Such are the ruins called the Palace of Julia, and the Tower of Orlando. A beautiful monumental arch, simply a memorial of conjugal affection by a surviving widow, appears here in good preservation. Pola is supposed to have become a Roman colony in the time of Augustus: it was destroyed first by Attila, and afterwards by the Venetians. One of the more flourishing towns of Istria is the seaport Rovigno, occupying a peninsula on the west coast, which is handsome and well built. The materials of the various edifices are taken from neighbouring quarries, the same that supply what are required for the structures of Venice. The cathedral is a spacious and elegant edifice, of Gothic architecture, occupying the highest part of the city, with a lofty tower. Rovigno contains about 10,000 inhabitants. The ancient Parentium, now Parenzo, was famous for a temple dedicated to Neptune, the foundations and basement of which are still visible. Otho, emperor of Germany, is said to have taken its materials for building the cathedral, which contains many curious pieces of Mosaic. A small town, called Pirano, stands in a picturesque situation, on a peninsula between the Gulf of Lagona and that of Trieste, and which is conjectured to belong to the age of Attila. In the church is an ancient vase, converted to a font, which is sculptured with a cupidan or dolphin. There are several other towns in Istria besides what are now mentioned. Most of those on the sea-coast are unhealthy, and, long ago, that of Citta Nova was represented as almost quite desolate from so disastrous a cause.

The principal exports of this country are marble, timber, fish, salt, oil, and wine.

Formerly, the population of Istria was computed at 100,000 souls; but this seems to have been only the Venetian part, and it is not unlikely that the inhabitants of the whole at present exceed double that number.

The history of Istria, which can be obtained only from meagre materials, ascends to a very early date. It is considered to have been one of the Illyrian provinces, but its ancient dimensions are not clearly ascertained. The Colchians, on returning from their celebrated expedition, are supposed to have established themselves here; and when the country was conquered by the Romans, they found the worship of Isis established in it. Istria, when united to the empire, shared in its diversified fortunes, but its history is so much interwoven with that of the neighbouring regions, that the same observation may be applied to both. We learn that Crispus, the son of the Emperor Constantine, having been banished to Pola on an accusation of an incestuous passion for his step-mother Fausta, was compelled to swallow poison. The inhabitants, believing him innocent, decreed magnificent obsequies to his memory, and Fausta soon became the victim of her own dissolute conduct. The monuments yet seen in Istria testify the advanced state of the arts; but the decline of the empire admitted new and more barbarous invaders. This country at length fell under the dominion of the Venetians, and more recently it has had some participation in the troubles which agitated Europe towards the close of the preceding century. Lat. 44° 45'—45° 50' N. Long. 13° 35'—14° 20' E. (*c*)

ITALY.

The early history of Italy, like that of most other nations, is rendered obscure and uncertain by the want of authentic records of its ancient inhabitants ; and the fabulous legends invented by the vanity of their more distinguished descendants. Hence the fictions of the voyages of Æneas, Antenor, and Diomede, which, though probably contrived by the Grecians, in order to impress the world with the idea that the arts and policy of the Etruscans and other Italian nations were derived from their early colonies, were eagerly adopted by the Romans themselves, desirous to throw the splendid veil of fable over the comparative meanness and obscurity of their origin. From whatever source, however, the original population of Italy was derived, the earliest accounts of its inhabitants present us with a picture but little differing in its features from that of human nature in its savage state among other nations of ancient or modern times. But while the surface of Italy exhibits almost every degree of physical variety, a similar diversity seems, from the most remote period, to have prevailed among its natives. So striking, indeed, was the difference between the rude and simple, yet bold and warlike tribes, who inhabited the vallies of the Appennines, and the feeble and luxurious cultivators of the marshes of Verona, or the plains of Campania, that it does not appear at all surprizing that the natives themselves should have been led to believe, that characters so dissimilar could not be descended from the same common ancestors. But so entirely does this diversity seem to have been owing to the influence of climate, that when the warlike Umbrians themselves became by conquest masters of the plains, we find them infected by the same degeneracy, and obliged to submit to the Etrurians, who, in their turn, suffered no less in their national character by this pernicious acquisition.

The form of government which most prevailed, seems to have been a sort of federal republic, or defensive league, by which all the tribes of the same original stock were bound together. And as the colonies, which, some from convenience, and others, in consequence of a religious observance, frequently sent out, were often removed to a great distance, this family compact had the effect of connecting nations otherwise remote from each other. Thus, from the ancient stock of the Osci or Aurunci, were derived the Sabines, and from them, in consequence of a religious vow, the Samnites and the Lucanians.

The limits prescribed in a work of this nature, prevent us from entering at large into the ancient history of the Italian nations, a field of research far from uninteresting : there is, however, one state which has left behind it so many memorials of its grandeur and advancement in the arts of civilized life, that it requires from us a more particular attention.

The people called by the Romans, Etrurians or Tuscans, and by the Greeks Tirrheni, a corruption of the word Traseni, which probably was their original appellation, inhabited the district lying betwixt the Arno and the Tiber. By their victories over the Umbri, Osci, and Veneti, they extended their power to the other side of Italy, and there founded the flourishing colonies of Adria and Bologna. Having, however, at an early period of their history, had the wisdom to renounce all wars of conquest, they devoted their chief attention to commerce and the arts of peace. The result of their commerce was a decided naval superiority, in consequence of which they became masters, by means of their colonies, of the islands of Sardinia, Corsica, and Elba. The last acquisition, by its inexhaustible mines of iron, for the manufacture of which the Tuscan forests afforded ample materials, was of immense importance, not only in constructing a navy, but also as an article of commerce. By the possession of these mines, and the art of fabricating tools of iron, the Tuscans were enabled to construct those prodigious citadels and fortifications, which have acquired for them the reputation of being the inventors of military architecture, and the ruins of many of which remain at this day the splendid and indestructible monuments of the greatness of their founders. And though many succeeding ages of war and slavery and oppression, have converted into pestilential deserts much of the once highly cultivated territory of Etruria, yet even there the ruins of harbours and cities, and the consequently numerous population which must have been maintained, attest their progress in the science of agriculture.

The form of government was that of a federal republic, divided into twelve states, over each of which presided a civil magistrate, called Lucumon. In times of war, the office of commander in chief was conferred on one of the Lucumones, with the title of king, and very considerable powers. This authority, however, was by no means absolute, as it appears that he was subject to the controul of the general assembly of the deputies of the twelve states held in the temple of Voltumna, and liable even to capital punishment, if found guilty of the crimes laid to his charge. That their system of laws was just and equitable, and admirably adapted to the form of their society, appears from the concurring testimony of historians, and the abridgment of its principles itself, the foundation of the jurisprudence of the Romans; for which, as well as their religious establishment, they were indebted to their Etrurian neighbours.

Their manners were in no small degree humanized; domestic slavery, which at that period prevailed in almost every other nation in the world, did not exist among them; and their progress in the arts of polished life, is attested by those exquisite remains, which even in our own times, have been considèred as models worthy of imitation.*

These new arts, however, and the foreign ideas introduced by abundance and wealth, against which the most virtuous education can make but a feeble opposition, were among the nation of Etruscans, the seeds of that relaxation of morals which marks inevitably the epoch of its decay. The seducing influence of corruption, damped by degrees the ardour of liberty. The colonies lost their affection for the mother country, and degenerated into cold and uninterested allies, and the republic itself, divided by domestic contentions, fell, one state after another, under the dominion of the Romans. The history of that nation becomes, from this period, that of Italy ; and for an account of its various revolutions, while under its power, we must refer to the article Rome.

Towards the close of the 5th century, when the empire of the west, surrounded by numberless hordes of barbarians impelled by ambition and famine, was every day deprived by their conquests of some valuable province or territory, Italy alone for some time preserved the appearance and name of the Roman empire. Under the feeble sway, however, of the later emperors, and the tyrannical misrule of their favourites, such was the miserable situation of the country, that the circumstances even of the provinces conquered by the barbarians, were envied by the wretched Italians. Civil liberty was almost annihilated, the laws were disregarded, the nobles harassed and impoverished by the exactions of the imperial tax-gatherers, and the poor, exposed to the oppression of the soldiery, and reduced to a state of famine by the bands of robbers which overran the country, were indifferent into the hands of what master they fell, and were rather willing to enjoy personal freedom under the name of slaves to the Goths, than remain in a state of actual slavery with the semblance of Roman liberty. At this period, the army of the emperor consisted of three tribes of barbarians, the Heruli, the Rugæ, and the Turcilingi. These soldiers having for some time received no pay, demanded that in lieu of it a certain portion of land should be assigned them. This request being refused by Orestes, the guardian of the Emperor Augustulus, they offered to transfer their allegiance to Odoacer, his principal general; and, on his promising to accede to their demands, deposed the emperor, and acknowledged him as their king. The new monarch wisely abstained from making any change in the laws, and in order to conciliate the eastern emperor, assumed only the title of patrician of Rome, and pretended to acknowledge his authority. Having expelled from Noricum, Frederic, king of the Rugæ, a German tribe, the latter took refuge with Theodoric, king of the Goths, who then resided at Nova in Maesia, and implored his assistance against Odoacer. This prince, endowed by nature with superior talents and courage, was descended from the most illustrious family of the Goths, and had enjoyed the advantage of being educated at the court of the Byzantine emperor. Zeno, who had several times distinguished him with peculiar marks of favour, and as often, moved by fickleness or jealousy, attempted to deprive him of the possessions with which he himself had invested him. At this period, (A. D. 486.) Theodoric, justly wearied with his duplicity and perfidy, had taken up arms against him, and extended his ravages till within a short distance from Constantinople. Zeno, alarmed at his approach, hastened to appease the wrath of Theodoric; and to remove to a distance so formidable a neighbour, proposed to him the invasion of Italy, and on his consenting, invested him with the title of his lieutenant. The government of Odoacer, although in general just and politic, had now become extremely unpopular; and a division of one-third of the lands among the soldiery, in consequence of his promise, had wounded the pride, and excited the indignation of the Italians. They were therefore inclined to submit to Theodoric, who, arriving in Italy at the head of his whole nation, fought several battles with Odoacer, with various success. Being, however, deserted by several of his allies, he was besieged in Pavia by Odoacer, and obliged to have recourse to the assistance of the Western or Visi-Goths, a branch of his nation settled in Gaul. With this reinforcement, he obliged Odoacer to raise the siege of Pavia and retire to Ravenna, where, having surrendered himself, he was put to death a few days after his capitulation. Theodoric now assumed the title of king of Italy, but, like his predecessor Odoacer, made no alteration in the laws, and declared himself not the enemy, but the deliverer of the Romans, and the vassal of the emperor. He nevertheless allotted to his Goths a third part of the lands, but, whether from the moderation of the conquerors, or the peculiar mode in which this partition was executed, it appears neither to have excited complaint nor dissatisfaction; and on the contrary, to have united more closely the interests of the two nations. This is said to have been chiefly effected by the wisdom of Liberius, the first prætorian prefect, in the choice of whom and of his other ministers, Theodoric appears to have been equally prudent and fortunate; and under their administration, Italy not only recovered from the state of misery in which it had been so long involved, but was restored to her former power, opulence, and splendour. Agriculture, commerce, and the arts, the most unequivocal signs of prosperity, revived and flourished: and notwithstanding the frequent wars in which he was engaged, the king appears never to have lost sight of the real and substantial interests of his people. In the later years of his reign, however, Theodoric became suspicious and cruel, and the execution of the virtuous Boethius and Symmachus will for ever tarnish the lustre of his early greatness. The king himself did not long survive, and his death is said to have been accelerated by feelings of remorse for the injustice of which he had been guilty.

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* Those of our readers who may wish for farther information regarding this remarkable nation, are referred to Micale's "*L'Italia avanti il dominio dei Romani;*" a work equally worthy of the attention of the philosopher and the antiquarian.

He was succeeded by his grandson Athalaric, under the guardianship of his mother Amalasuntha, a woman of talents and virtue, who was desirous that her son should enjoy the advantages of a literary education: but in this wish she was thwarted by the prejudices of her Gothic counsellors, and the young prince, left to himself, became profligate and debauched. The prosperity of the state began in consequence to decline, and the dissatisfaction of the Italians with the government began to excite in the breast of the Emperor Justinian the hope of again regaining possession of the ancient seat of the Roman empire.

The excesses of Athalaric having injured his constitution, the succession to the throne, in the event of his decease, was contested between his mother Amalasuntha, and Theodotus, the nephew of Theodoric; both of whom distrusting their own powers, secretly applied for the assistance of Justinian. In order to secure this, Theodotus even promised to give up to the emperor the province of Tuscany, in which he was posssessed of extensive estates. On the death of Athalaric, however, the Gothic nation associated Theodotus with Amalasuntha in the sovereignty, but the former contrived to make the situation of the Queen so uncomfortable, that she was on the point of leaving Italy and seeking an asylum at Constantinople, when she was murdered by order of Theodotus, who is said to have been instigated to this crime by the empress Theodora, who dreaded the influence of Amalasuntha's charms and accomplishments on the heart of Justinian. This atrocious action rendered Theodotus detestable in the eyes of his subjects, and afforded the Grecian emperor an additional pretext for the invasion of Italy. Alarmed by his preparations, the Gothic prince hastened to make submissions, and declared himself willing to become the vassal of the empire, and even promised to the Grecian ambassador to resign the kingdom, on condition of receiving an annual allowance. But these promises he soon retracted, on hearing of a defeat of the imperial forces in Dalmatia; and the troops of Justinian, under the command of Belisarius, landed in Italy, took the city of Naples by assault, and having with a very small body of men defeated the Gothic army, entered Rome, deposed the worthless Theodotus, and shortly after put him to death. The Goths elected as his successor Vitiges, an officer of distinguished valour, who married the niece of Theodoric, and under whose command they attempted to recover Rome, but were repulsed, and their new king obliged to take refuge in Ravenna, in which he was closely besieged by Belisarius. In the mean time, Theodebert, king of the Franks, entered Italy with a considerable army, but without joining any party, and at first attacking both Greeks and Goths. On perceiving the distressed state of the latter, however, he offered his assistance to Vitiges, on condition of his ceding to him one half of the kingdom of Italy. On this Belisarius redoubled his efforts to take Ravenna, and having succeeded by the treachery of some of the inhabitants, took Vitiges prisoner. But this great general being shortly after, by court intrigues, recalled to Constantinople, the Grecian interests in Italy began to languish, and the Goths, having chosen as a successor to Vitiges, Totila, a prince no less distinguished for his political than his military talents, soon recovered their former ascendancy. Alarmed at their victories, Justinian again sent Belisarius into Italy, but with an army by no means adequate for the service. The result was, as might have been expected: the Grecian army, feeble in itself, and led on by a general who distrusted it, and desponded of success, was unable to make any effective opposition to the victorious Totila; and although Belisarius recovered the city of Rome, almost all the rest of Italy again fell under the dominion of the Goths. In this situation of affairs, Belisarius was again recalled, and the machinations of his enemies succeeded in banishing him from the court. (See **Belisarius.**) The management of the Gothic war was committed to Narses, one of the eunuchs of the palace, whose vigorous understanding and enterprizing genius had already raised him to important situations in the court of Justinian. Aware, however, of the causes of the failure of the last expedition, Narses would not accept of the command without an army and resources sufficient for the enterprize. In obtaining these, he succeeded; and led to Italy not only the flower of the Grecian army, but an immense number of young noblemen in the character of volunteers, who were desirous of making court to the Emperor, by serving their first campaign under his favourite. The most complete success attended the arms of Narses, for, notwithstanding the most valiant and obstinate resistance of Totila, he was defeated and slain; and the same fate having overtaken his successor Teia, the great body of the Goths surrendered to the Imperial army, and Italy was again, for a short time, re-annexed as a province to the empire. Narses continued for 14 years to govern Italy with wisdom equal to the bravery with which he had conquered it; but, on the death of Justinian, he was recalled from his situation by the Emperor Justin II., or rather by the Empress Sophia, who governed her husband and the empire; and only survived his master two years.

The death of Narses, whose name alone had intimidated the barbarians, left Italy again exposed to their invasions.

In the year 568, the Lombards, a nation of German or Scandinavian origin, first established themselves on the banks of the Po, and occupied that part of the north of Italy which still bears their name. They were then governed by Alboinus, a chief who had already distinguished himself in his wars with Gepidæ, whose king, Cunemund, he had defeated and slain. This prince having made himself master of Milan, was then crowned king of Italy with the usual solemnities; it was not, however, till three years after, that he made himself master of Pavia, at that time considered the principal seat of the monarchy. This important acquisition was the last victory of Alboinus, who was murdered at a festival by his wife Rosamund, whom he had brutally compelled to drink from a cup made of the skull of her father Cunemund, king of the Gepidæ. Alboinus was succeeded by Clephis, who continued to lead the Lombards to victory, but whose cruelty and other vices were the cause of his murder after a reign of three years. The death of Clephis was followed by an interregnum of 10 years, which might rather be termed an anarchy, as the government was in the hands of no less than 36 dukes or military governors of the provinces, who acted as regents during the minority of the children of the late king. The terror of a threatened invasion by Childebert, king of the Franks, at length determined the Lombards to raise Autharis (the son of Clephis) to the throne, who, by his prudence and valour, soon restored tranquillity to the kingdom, and frustrated the attempts of the Franks to gain a footing in Italy. The dynasty of the Lombard princes continued to reign in the northern provinces of Italy for the space of 160 years, still prosecuting with various success their schemes of conquest, but without ever attaining to the principal object of their ambition, the entire subjection of Italy. To enter particularly into the history of these monarchs seems unnecessary in this work, especially as the annals are peculiarly perplexed by the constant internal commotions which the feudal government of the Lombards naturally gave rise to.

The situation of those provinces, which, under the name of the exarchate of Ravenna, still retained their allegiance to the Grecian empire, was still more deplorable than that of the subjects of the Lombards. Continually exposed to the vexatious exactions of the rapacious exarchs of Ravenna, from which their spiritual fathers, the bishops of Rome, had alone power to protect them, their affections were gradually transferred to them, and every tie which connected them with the empire became loosened. The people were sunk in profound ignorance; their spirit was broken by oppression; and it was only in a few trading towns, where, fostered by the spirit of commerce, a few sparks of liberty still remained. At length, however, the exarchs, having exhausted the resources of the people, made an attempt to extend their depredations to the property of the church; and the pontiffs, exasperated by this sacrilege, and weary of a government at once tyrannical and feeble, began to look out for a more powerful protection against the daily increasing power of the Lombards.

Charles, king of the Franks, better known by the appellation of Charlemagne, excited by the intrigues of Pope Adrian, whose territories had been invaded by Desiderius, king of the Lombards, prepared to pass the Alps at the head of a formidable army. A. D, 584. On his approach, the Lombard troops, though advantageously posted, were seized with a sudden panic, and fled; and although Desiderius and Adelchis his son continued their resistance for a few months, the capture of the former in Pavia put an end to the struggle; and with him ceased the power and monarchy of the Lombards. The pontiff and his successor received a grant from Charlemagne of the territories formerly governed by the exarch of Ravenna, and Pepin, the second son of the conqueror, was crowned king of Italy, the administration during his minority being left to the Pope. The remains of the Lombards still, however, kept their ground in the south, under the Duke of Benevento, but were at length obliged to submit to the superior force of Charlemagne. The prudent administration of this prince had, not less than his military glory, attached to him the affections of the Italians; and when hailed by the Pope Leo III. as Emperor of the West, his election was sanctioned by the united assent of all orders of the people. The reign of Pepin over Italy was short, and he died before his father, in his 34th year, at a time when the highest expectations were entertained from his prudence and wisdom. He was succeeded by his son Bernard; but this young prince having become an object of jealousy to his uncle Louis, king of France and emperor of the West, was tempted to join in a rebellion against him; and being defeated, and after his defeat persuaded to throw himself on the emperor's mercy, was by him sentenced to lose his eyes. The sentence was executed in so cruel a manner, that he died in consequence of the operation; and the kingdom of Italy, with the title of king, was conferred upon Lothaire, the emperor's eldest son. The reign of this prince was consumed in unsuccessful wars with his brothers, the kings of France and Aquitaine; and at his death, having bestowed on his second son Lothaire the territory now denominated after him, Lotharingia, or Lorraine, there remained nothing to Louis II. his eldest, but the title of emperor, and the kingdom of Italy.

During these family discords of the successors of Charlemagne, the feudatories of the empire in Italy had made rapid advances towards independence; and over most of them the emperor rather maintained an influence than an authority. Of these the most powerful were the Dukes of Benevento, a race of Lombard princes, who had, as we have already seen, even defied the power of Charlemagne himself. At this period, the succession was contended between two competitors, one of whom, distrusting his own resources, called in to his aid a body of African Saracens. This measure for a time proved successful, until his antagonist, following his example, obtained the assistance of the Saracens of Spain. The Beneventan princes were soon weary of these barbarous auxiliaries; and at length, finding their cities destroyed, and country pillaged by the ferocity of their allies, were obliged to apply for assistance to the emperor. The valour of Louis soon succeeded in defeating the barbarians, and the contending princes having submitted to him their claims, the duchy was divided into the principalities of Benevento and Salerno, and their sovereigns reduced to their former situation of vassals of the empire. For a more particular account of these and the succeeding revolutions of the south of Italy, see the articles NAPLES and SICILY.

The reign of Louis II. lasted twenty years, during which Italy regained that peace and prosperity which it had lost during the struggles of his ancestors; and for a short period knew the advantages of a mild and well-regulated government. On the death of Louis, without issue, the succession was again contested by his uncles Charles the Bald, King of France, and Louis King of Germany. By the assistance of Pope John VIII. the former was successful, and was crowned at Rome Emperor and King of Italy. Louis of Germany and his son Carloman still, however, continued to carry on war against him; and four of the Dukes of Italy, Lambert of Spoleto, Berenger of Friouli, Bezon of Provence and Lombardy, and Aripert of Tuscany, took advantage of this contest to add to their territories, and establish their independence. The Pope also was able not only to confirm his temporal and spiritual dominion over the Roman states, but considerably to extend his influence over the French church.

Charles the Bald did not long survive his elevation, being poisoned on his return over the Mount Cenis from an unsuccessful expedition into Italy. He was succeeded by Carloman, who only reigned two years; and had for his successor his brother Charles the Fat. The weakness and unpopular conduct of this prince consummated the ruin of the French dynasty. The Italian barons every where asserted their independence; and the unfortunate descendant of Charlemagne, having in vain attempted to secure the succession to his natural son Bernard, was himself expelled from the throne, and during the short remainder of his life reduced to actual beggary. On his demise, the principal competitors for the crown were Berenger of Friouli, and Guido of Spoleto. The latter was at first successful, and Berenger was obliged to fly to Germany, and throw himself under the protection of King Arnulph, the natural son of Carloman, King of Italy, and who himself aspired to that crown.

It was no difficult task to persuade Arnulph to undertake the conquest of Italy. The death of Guido, who was succeeded as emperor by his son Lambert, a very young man, favoured his designs; and after a series of victories, he succeeded in making himself master of Rome, where he was crowned emperor by Pope Formosus. He then marched against the Empress Angeltrude, widow of Guido, who is said to have contrived to administer to Arnulph a slow poison, which so injured his health that he was obliged to return to Germany. Italy was for a short time divided between Lambert, Berenger, and Adelbert, Marquess of Tuscany; but the ambition of the last soon occasioned his ruin, and Lambert having been murdered by one of his courtiers, the chief authority devolved to Berenger, who was also at this period freed from another rival, by the death of Arnulph. A formidable invasion by the Hungarians, however, in repelling which Berenger was unsuccessful, together with his despotic and insolent behaviour, induced several Italian princes to offer the kingdom of Italy to Louis, King of Provence. This prince made several attempts to gain possession of it; and having in one of his invasions reached Rome, was crowned Emperor by Pope Benedict IV.; but being surprised in Verona by Berenger, was by him deprived of his eyes, and sent back to Provence. The latter having at length made himself sole master of Italy, continued to reign undisturbed for 20 years. Having assisted the Pope John X. against the Saracens, he was by him crowned Emperor.

A very formidable conspiracy soon was formed against Berenger, headed by the Marquess of Yvrée. Italy was again invaded by the Hungarians, who destroyed Pavia, and most of the principal cities; and Rodolph, King of Burgundy, was elected King of Italy by the conspirators, in which the treacherous murder of Berenger soon left him without a rival. The intriguing spirit of Hermengarde, Marchioness of Yvrée, who had been the author of the last revolution, did not leave Rodolph long in quiet, and her artifices soon succeeded in expelling him from Italy, and substituting in his room Hugh, Count of Provence, who was crowned at Pavia, A. D. 927. Having married Marozia, a Roman lady of infamous character, but great influence over her countrymen, he, for some time, enjoyed the sovereignty of that city; but having insulted Alberie, the son of Marozia by a Roman marquess, the latter persuaded the Romans to re-assert their liberty, and was elected by them consul. Hugh, however, obtained some victories over his foreign opponents, regained the friendship of Alberie, by giving him his daughter in marriage. Hugh's reign lasted twenty years, in part of which his son, Lothaire II. was associated with him in the government. But his name never appears to have been popular; and, in 947, Berenger, Marquess of Yrvée, succeeded in expelling both father and son from the throne. Hugh retired into Burgundy, and on the death of Lothaire, in 950, Berenger II. was acknowledged King of Italy. The commencement of the new reign was marked by calamities. Italy was first invaded by Henry Duke of Bavaria, who took and plundered Aquileia, but retired without making farther progress. After him the Hungarians overran the greatest part of Italy, and were only persuaded to depart by an enormous bribe, which was raised as a tax from the people. To add to their misfortunes, Berenger was oppressive and tyrannical. Having made himself master of Pavia, in which Adelaide, the widow of Lothaire, resided, he imprisoned her in a dungeon, and treated her with the greatest cruelty. From this confinement, however, she contrived, in the most extraordinary manner, to make her escape, and take refuge in the strong fortress of Canossa, from whence she sent to implore the protection of Otho of Saxony, King of Germany.

Otho, interested by the misfortunes of Adelaide, invaded Italy with a powerful army, and having accepted of Berenger's homage, delivered the empress, and was soon after married to her. The tyranny of Berenger soon alienated the affections of his subjects; and being again invaded by Otho, whose kindness he had returned with ingratitude, he was deserted by his soldiers, and obliged to abdicate the throne. In 961, Otho was crowned king of Italy at Milan, and the year following emperor, by the Pope. On this occasion a treaty was concluded, by which, while the supremacy in ecclesiastical affairs was allowed to the Pope, the emperor's temporal sovereignty was distinctly recognized. Although this acknowledgement of the power of the emperor was extremely disagreeable to the popes, (and they frequently contrived to stir up rebellion,) yet, on the appearance of a German army, the principle was always acknowledged; and, for 300 years after Otho the Great, Italy was considered a fief of the German empire. At the time of the death of this excellent prince, in 973, Italy was divided into the provinces of Apulia and Calabria, still claimed by the Greeks; the dukedoms of Benevento, Capua, Naples, and Salerno; the Roman territory, which, with the marquisate of Ancona, exarchate of Ravenna, constituted the patrimony of the church; the dukedom of Spoleto and Tuscany, which were considered as fiefs of the church; and Lombardy, with the marquisates of Verona, Friouli, Treviso, and Genoa, constituted the kingdom of Italy, properly so called. But the authority of the successors of Otho, even in the kingdom of Italy, was of a very precarious nature. Over the hereditary fiefs the sovereign jurisdiction was merely nominal, and only acknowledged during the presence of the emperor and his army. The lesser barons found it more for their interest to bestow their homage upon, and look for protection from a powerful neighbour than their distant sovereign; while in the privileged cities, in which the spirit of liberty was already beginning to manifest itself, the show of adherence to the emperor was maintained by those only which were most independent, while many were obliged to place themselves under the protection of some powerful Italian prince, or baron, who, under the title of "Podesta," exercised a species of sovereign jurisdiction. The effect of the death of Otho the Great on a kingdom thus constituted may be easily imagined; and, during the reigns of Otho II. and III., Henry of Bavaria, Conrad, and Henry III., Italy presented but a scene of anarchy and confusion, of contests between rival popes, between the pope and the citizens of Rome, and the emperor and his Italian vassals.

On the accession of Henry III. A. D. 1039, there were no less than three popes at once, and all of them obnoxious, from the immorality of their character. The emperor having deposed the various competitors, himself nominated Pope Clement II., and bound the Romans, by an oath, never in future to elect a pope without the emperor's approbation. In this he was unsuccessful; for the next pope, Leo IX., persuaded by the celebrated Hildebrand, declined assuming the pontifical honours until authorised by the cardinals; and Nicholas II., who was pope during the minority of Henry IV., passed a decree, that the power of electing future popes should reside with the sacred college alone. The jealousy of the Emperor Henry III. was also excited by the rising power of Godfrey, Duke of Spoleto, who, having married Matilda, heiress of Tuscany and Mantua, the emperor's niece, and having succeeded in getting his brother elected pope, by the name of Stephen IX., exercised an authority in Italy almost equal to that of Henry. On the death of that prince, Godfrey entertained great hopes of being elected king of Italy; these ambitious expectations were, however, blasted by the death of the pope; but Godfrey still continued one of the most powerful princes in Italy till his death in 1076, when his widow, Matilda, was left sole mistress of his influence and authority.

The reign of Henry III. is also remarkable for the first appearance in history, of the Norman princes in Apulia, who were afterwards the founders of the kingdoms of Naples and Sicily; and for the first alliance of the emperor with the republic of Venice; which had now ceased to pay its former homage to the Grecian emperor, and had already risen to a great degree of wealth and power, having, with its rivals the Pisans, Genoese, and the republic of Amalphi, engrossed all the commerce of Europe.

The reign of Henry IV. is distinguished by his long and violent contests with the pontiffs. During a long minority, in which the young emperor was entrusted to the guardianship of the popes, their power and ambition so much increased, that they openly aimed at universal dominion, and, from the subjects, became the masters of the secular princes; and, for 70 years, the history of Italy presents little else but a series of struggles between weak and vicious monarchs, and ambitious and unprincipled priests. The history of the humiliating submission of Henry IV. to Pope Gregory VII. the haughty Hildebrand, is well known; and the unnatural wars which the pope occasioned, by exciting Henry's sons to rebel against their father, excite more disgust than interest.

About this period a new cause of disagreement arose between the emperors and the papal see. The Countess Matilda, widow of Guelph, duke of Bavaria, having died, bequeathed all her immense possessions to the see of Rome. These consisted of the greater part of Tuscany, of Mantua, Parma, Placentia, Ferrara, Modena, Verona, Viterbo, and Orvieto, part of Umbria, Spoleto, and the marquisate of Ancona. As it was not considered lawful for a female to alienate the fiefs of the empire, the Emperor Henry V. disregarding this bequest, seized on the succession; and, although by the convention at Worms a temporary agreement was entered into by the Pope Pascal; yet, as we shall see afterwards, the validity of the bequest was long maintained by the church and its supporters, which occasioned much jealousy and contention between the emperor and his Italian vassals.

During the reigns of the emperors of the house of Saxony, the political state of Italy had undergone a remarkable change. About a century before Otho I. had allowed to most of the Italian cities a regular municipal government, and had left to themselves the choice of a particular form. In the exercise of this power they seem generally to have selected as a model the Roman republic or its colonies, as far at least as their limited acquaintance with history would permit. At the head of their administration were placed two consuls, elected annually by the suffrages of the people. These magistrates, as judges, were entrusted with the care of administering justice to their fellow citizens; and, as generals, they commanded the military force of the city, when called out by order of the emperor. A third duty of the consuls was to preside in the councils of the city. Of these there were commonly two, besides the general assembly of the people. The first was called the council "de credenza," or privy-council. It consisted of few persons, and was entrusted with the administration of the finances, and all the foreign relations of the community. The other council, consisting of 100 hundred or more members, was styeled the senate, or special council; and in it were aranged the resolutions or measures, which were afterwards submitted to the deliberations of the people in their general assembly, held in the market place, or public square, which was termed a parliament. This assembly was sovereign; but in most cities there was a law, which allowed no subject to be laid before the parliament until it had first been considered by the council "de credenza" and the senate. Each city was divided into four or six divisions, each provided with different organized military bodies, with different standards.

The imperfection of the general administration of justice under the feudal system, rendered this regular military organization more necessary, and afforded constant occasion for keeping alive a warlike spirit. As each member of the empire was supposed to be entitled to refuse a partial judge, and appeal to his sword, the first wars of the Italian cities with each other, or against the powerful nobles in their vicinity, were not considered as acts of rebellion, but merely as those measures for self-defence, which it was competent for them to adopt in common with the other vassals of the empire. The cities of Milan and Pavia were the first whose private wars attract attention. Their first open rupture arose from their espousing opposite sides, on the double election of Henry II. and Ardoin.

At a subsequent period, the city of Milan ventured, in defence of the church, to declare war on the emperor Conrad, who, in an attack on that city was repulsed with loss. . It was during this war that Eribert, archbishop of Milan, invented the "carroccio," a device which was immediately adopted by all the Italian cities. This was a kind of four-wheeled waggon painted red, and drawn by four pair of oxen, completely covered with housings of red cloth. In the middle of the car there was a very long red pole, surmounted with a gilded globe, under which was displayed the banner of the city, and still lower an image of Christ on the cross, with its hands extended, appearing to bless the army. Behind, was a stage occupied by a band of musicians, and before another, where some chosen soldiers were placed to defend the sacred car. As the loss of the "carroccio," like the ark of the covenant of the Israelites, was regarded most fatal and disgraceful, no expedient could have been better devised for giving to the half-trained infantry of the cities, that solidity which alone could enable them to withstand the shock of the heavy armed cavalry of that age. Crowded around the palladium of their liberties, they presented on every side an impenetrable mass to their assailants; and, if obliged to retreat, the slow motion of the "carroccio" prevented that movement from degenerating into a disorderly flight.

Under a constitution, that thus at once kept alive the flame of civil liberty and military glory, the cities of Lombardy had gradually attained to independence. Those nobles who had formerly exercised over them no small degree of authority, and to whom they had been accustomed to look up as their defenders, now in their turn began to consider it not only honourable, but prudent to be enrolled among their citizens.

The already flourishing commerce of the commercial cities of Pisa, Venice, and Genoa, afforded a ready market for the products of the soil; and even this species of traffic was the mean of diffusing a considerable degree of wealth among the inland cities.

The long continued struggles between the Saxon princes and the popes, confirmed the independence of the Lombard cities; as the former, in order to secure their attachment, added considerably to their privileges, while the latter inculcated the spirit of resistance against a foreign ruler. Accustomed, too, during this period of anarchy, to trust to their own resources alone, the ties which connected them with the empire were insensibly weakened, and the Italian citizen's feelings of patriotism were confined within those walls which afforded him the protection which his German sovereign could not now secure.

During the years that intervened between the peace of Worms and the death of Henry V. little occurred to interrupt the tranquillity of Italy; and the only warlike events recorded, are the conquest of Lodi and Como by the Milanese, and their long contest with the city of Cremona.

The death of the emperor without issue, however, gave rise to a contest of greater general interest, and more lasting effects. The partizans of the four last emperors in Germany had been denominated Ghibelines, from Gueibelinga, or Waiblenga, a castle among the mountains of Hertfeld, which had been the ancient seat of their family. Their opponents received the name of Guelphs, from the appellation of the Dukes of Bavaria, the most powerful rival of the reigning family. As, however, the Bavarian family had always protected the popes during their contests with the two last emperors in Italy, the names Guelph and Ghibeline soon came to denote the different parties of the pope and the emperor. On the death of the emperor Henry V. his nephew Frederic, duke of Suabia, aspired to the crown. The diet, however, influenced by the archbishop of Mentz, the enemy of the Ghibelines, elected Lothaire duke of Saxony, who was intimately connected with the Guelphs. Frederic immediately took up arms; and his brother, Conrad, duke of Franconia, having returned from the Holy Land, assumed the title of king, with the consent of his brother, and immediately proceeded to Milan, where he was crowned king of Italy.

But the Pope Honorius having declared in favour of Lothaire, and having engaged the cities of Pavia and Cremona, with their allies, in his cause, the Milanese and Parmesans, on whom Conrad depended for assistance, were obliged to defend themselves; and on the arrival of Lothaire with a very small army in Italy, he was forced to retire into Germany.

The emperor having proceeded to Rome, was crowned in the church of the Lateran by Pope Innocent II. A. D. 1133. As the Vatican, however, was occupied by the troops of Roger I. king of Sicily, who espoused the cause of the antipope Anacletus and the family of the Fraysipani, in Rome, Lothaire was soon obliged to leave that city, and return to his own country, where, having defeated his two rivals, Conrad resigned his pretensions to the crown, and was appointed commander of an army, sent into Italy to assist the Pope against Roger king of Sicily. These troops were at first successful, with the help of the Pisan fleet, in forcing Roger to raise the siege of Naples; but, on their departure, Innocent having fallen into Roger's hands, was compelled to acknowledge his right to the kingdom of Sicily, and to grant him (what he had no power to give) the city and territories of Naples. The Neapolitans, perceiving that resistance was vain, surrendered to the Norman prince; and their republic, which had existed for several centuries, was incorporated with the kingdom of Sicily. These schisms in the church and the empire tended still more to strengthen the cause of the Lombard republics; and even the inhabitants of Rome, weary of the crimes of rival popes, and incited by the preaching of Arnold of Brescia, a monk, who inculcated the principles of liberty, elected a senate, and placed the executive power, formerly belonging to the pope's prefect, in the hands of an officer styled the patrician; and even put to death Pope Lucius II. who ventured to resist the authority of the senate. On the death of the Emperor Lothaire, in 1137, his former competitor, Conrad III. was elected his successor. His reign lasted fourteen years; but during the early part of it, he had to contend with the Guelph princes of Bavaria and Saxony; and in 1147, he had with Lewis VII. of France, been persuaded by St. Bernard to lead a powerful army of crusaders into the East. The expedition was unsuccessful; and, on his return, he died while meditating a visit to Italy to receive the imperial crown.

By the election of his nephew, Frederic of Suabia, surnamed Barbarossa, who was equally related to the Guelph and Gibbeline families, the animosity of these factions was for a time laid to rest; and the whole military forces of Germany, rendered more formidable by the civil wars in which they had been so long engaged, were united under the standard of a prince, not more distinguished for his valour, than for the high and unbending severity of his character. The new emperor was immediately solicited to march into Italy, by Robert, prince of Capua, who had been deprived of his states by Roger, king of Naples and Sicily; by Pope Eugene IV. whose authority he promised to re-establish in Rome; and by the Lodesans, whose city and territory had been conquerred by the Milanese. In answer to the complaints of the citizens of Lodi, Frederic dispatched without delay a special messenger to Milan, commanding peremptorily the immediate restitution of the rights of the Lodesans. This message, when communicated by the consuls to the people of Milan, was received with universal indignation, and treated with contempt, while the envoy of the emperor with difficulty escaped from the fury of the multitude.

They, however, transmitted to their new sovereign the usual presents; but prepared, by their arms, to take vengeance on the cities of Pavia and Cremona, who had joined with the Lodesans in arraigning their conduct before Barbarossa.

In 1154, Frederic entered Italy at the head of a very powerful army, and encamping on the plains of Roncaglia, convoked there a meeting of his Italian feudatories.

Already prepossessed against the free cities of Lombardy, he appears to have willingly listened to the complaints made against them. To the Marquess of Montferrat, and the Bishop of Asti, who accused the inhabitants of Asti and Chieri, he promised to exercise exemplary vengeance on those republics.

Having heard the complaint of Pavia and its allies against the Milanese, he ordered the contending parties to cease their hostilities, and await his decision at Novara, whither he commanded the Milanese consuls to conduct him. The route by which he marched had however been already laid waste in the war between Milan and Pavia, and Frederic, enraged at not finding the necessary supplies for his army, dismissed the consuls, and began to lay waste the Milanese territory. The citizens of that republic having in vain attempted to appease his wrath by the offer of a tribute, proceeded to repair their fortifications, and put them in a posture of defence, sending at the same time embassies to solicit earnestly the assistance of their ancient allies. In the mean time, Frederic put in execution his threat against Chieri and Asti; which, being deserted by the inhabitants on his approach, were pillaged and burnt by his soldiery. The city of Tortona having refused to renounce its league with Milan, was put under the ban of the empire; and, after sustaining a siege of two months with the greatest valour and fortitude, its citizens were obliged to capitulate, on the condition of evacuating the town immediately, being allowed to take away only what they could carry on their shoulders. The fate of Tortona only filled the Milanese with admiration for its brave defenders, and animated them to resistance. Frederic having been crowned king of Italy at Pavia, now proceeded to Rome, in order to receive from the pope the imperial diadem. Before approaching that city, he was met by three cardinals, sent by Pope Adrian IV. requesting his assistance in subduing the Romans. To show his willingness to comply with the pope's desires, Frederic, having got possession of the person of Arnold of Brescia, delivered him up to Adrian, by whom he was cruelly put to death. To the deputies of the senate Frederic paid no attention, nor did he enter the city but on the day of coronation; and even on that day, there was a skirmish of some consequence between his soldiers and the citizens. The emperor next marched into the duchy of Spoleto; and the inhabitants of the city of that name having had the misfortune to excite his indignation, the town was given up to pillage. Frederic next proposed to enter Apulia, where Robert of Capua had succeeded in raising an insurrection in his favour against William the Bad, son of Roger I.; but his troops were impatient to return home, and their ranks were already thinned by fatigue and disease. He was, therefore, obliged to disband his army at Ancona, and return to Germany. The unfortunate prince of Capua was betrayed by one of his adherents into the hands of William, who put out his eyes; and he shortly afterwards died in prison at Palermo. Scarcely had the army of Frederic quitted Italy, when the Milanese proceeded to rebuild the walls of Tortona at the public expence; and so general was the desire to testify their gratitude to allies who had suffered on their behalf, that for three weeks half of the citizens of Milan, of every rank and profession, was employed either in personally labouring at the houses and fortifications of Tortona, or in repelling the assaults of the Pavisans, who took every opportunity of interrupting the work.

Not content with re-establishing Tortona, the Milanese turned their arms against the allies of the emperor, and were successful. Pavia was forced to accept of a dishonourable peace, the Marquess of Montferrat defeated, and the inhabitants of Lodi again reduced to submission.

The example of Milan was imitated by her allies, and all Lombardy appeared in hostilities against Frederic. The pope, too, alarmed by the success of William, had granted him the kingdom of Sicily and Naples; and in his letters to the emperor, had assumed a degree of haughtiness, which offended him so much, that he ordered the legates to depart from Germany. Perceiving the necessity of returning to Italy, he convoked a meeting of the princes of the empire with their vassals, at Ulm, for the express purpose of punishing the defection of the Milanese. The army, which now entered Italy, was still greater and better organized than the former one. After having obliged the Brescians to atone for their short opposition to his arms by a heavy fine, Frederic summoned a sort of diet in his camp, where some military regulations were enacted, and the deputies from Milan were heard in their defence. Their proffered tribute, and excuses for their conduct, however, were not accepted; the diet declared Milan under the ban of the empire; and the army was ordered to prepare for the siege of that city.

Having accepted of the submission of most of the Italian nobility, and of the smaller towns, Frederic proceeded to lay waste the Milanese territory; and having raised entrenchments round the city, attempted to reduce it by famine. The distress occasioned by this measure, soon induced the majority of the people to listen to the advice of the Count de Blandrata, to submit to the emperor. A treaty was accordingly concluded, by which Frederic engaged to evacuate the Milanese territory, and that of their allies of Tortona and Crema, on condition of their restoring their liberty to the towns of Como and Lodi, and renouncing the other sovereign rights they had assumed; and besides building the emperor a palace, it was stipulated, that a considerable annual tribute should be paid to him.

Soon after concluding this treaty, a general diet of the kingdom of Italy was held at Roncaglia. Its resolutions evidently mark the terror which the success of the German army had inspired. The ancient feudal prerogatives of the emperor were acknowledged, and his exactions submitted to; and the right of appointing consuls and judges declared to reside in his person. A new measure was also approved of, which, in its consequences, proved most fatal to the liberties of the Italian cities. This was the appointment of a new magistrate in each town for the administration of justice, who was styled a podesta. The right of nomination was vested in the emperor; but it was enacted, that the podesta should in no case be a native of the city over which he presided. Another enactment, no less inimical to the privileges of the cities, was that which deprived them, together with the independent nobles, of the right of making war and peace, which they had so long enjoyed. Having inquired, also, into the cause of the dispute between Cremona and Placentia, Frederic decided against the latter, which was allied to Milan, and commanded its fortifications to be demolished. Encouraged by the general obedience of the diet, Barbarossa did not deem it necessary to adhere to his agreement with the Milanese, and not only seized on part of their territory, but ordered the fortifications of Crema, their ally, to be destroyed. The indignation of the people, already excited by these insults, at length burst into open insurrection, on the attempt to substitute the podesta for the consuls; and the inhabitants of Milan and Crema once more set the emperor at defiance.

Frederic having again laid waste the Milanese territory, proceeded to lay siege to Crema, whose hostages he caused to be executed in sight of the walls. The citizens, however, undismayed, continued for six months to defend themselves with persevering valour, till at length worn out with famine, they were forced to surrender, and leave their city, which was razed to the ground.

The death of Pope Adrian IV., which took place a few months before, occasioned a change in the affairs of Italy by no means favourable to the emperor. The college of cardinals, unable to agree in their choice of a successor, had nominated two popes: the one, Alexander III. was generally recognized by the church; while the other, Victor III. had on his side the senate and people of Rome, with whom Frederic, having lately concluded a treaty, was inclined to concur. He, however, summoned a council at Pavia, where he ordered the rival popes to await his decision. Alexander refused to obey, asserting that the pope was neither subject to emperors or councils. The decision was accordingly in favour of Victor, who excommunicated his rival; who, in return, excommunicated Frederic, and discharged his subjects from their oath of allegiance.

In the mean time, being obliged to send back to Germany the greater part of his army, he was obliged to carry on his hostilities with Milan on a small scale; and at Cassano, was defeated by the forces of the republic. The Milanese had the same advantage at Bulchignano; but an army of 100,000 Germans having, in the course of the summer, joined the emperor, their city was again invested, and all supplies of provisions completely cut off from the besieged. The people at length, unable any longer to sustain their privations, compelled the consuls to surrender at discretion. The keys of the city, and the carrocci, were, at the emperor's command, reluctantly delivered up to him; and, after ten days of painful suspence, the whole inhabitants were ordered to quit the city. The unfortunate exiles having taken refuge in the neighbouring towns and villages, the army of the emperor, assisted by the inhabitants of Lodi, Cremona, and Pavia, and other enemies of the Milanese, proceeded to put in execution the sentence of destruction; and, in six days, the city of Milan was completely demolished.

This act of severity spread an universal terror through the Italian states; the authority of Frederic was every where acknowledged; and even the more independent maritime republics of Pisa and Genoa submitted to his sovereign decision their mutual disputes. Having disbanded his army, he took up his residence with his court at Pavia; while his ministers and podestas exercised, without controul, the most tyrannical authority, and, by their cruelty and extortions, rendered the imperial sway as much detested as it was dreaded.

The inhabitants of Verona, and other cities which had as yet sided with the emperor, attempted at first to represent these grievances to him; but receiving no redress, and finding their complaints overlooked, they determined to recover their rights by force, and to confine the power of Barbarossa within the same bounds as that of his predecessors. The league at first consisted of Verona, Vicenza, Padua, and Treviso; and being joined by the Venetians, who had long been jealous of the power of Frederic, they proceeded to open hostilities, and expelled his German officers from their territories. On hearing of this revolt, the emperor collected the troops of his Lombard dependants, and marched against the Veronese. He soon, however, perceived that his troops were not to be trusted; and was obliged to leave his camp in a precipitate manner, and shortly after to depart from Italy, where he found it was now unsafe for him to remain without a German army. On his return home, finding that a civil war had arisen, he was compelled to remain in Germany for two years, and thus allow the Lombard cities time to prepare for a vigorous resistance. In the mean time, the antipope Victor died, and his party appointed as his successor Pascal III. who, being acknowledged by none of the European princes, began to be despised even by his own adherents in Rome. The friends of Alexander in Rome, took advantage of this to propose his return; and it was at length determined in the senate, to invite him to leave France, and take up his residence among them. He was accordingly received with great joy, notwithstanding the opposition of the emperor's lieutenant, Christian, archbishop of Mentz, whose attempts against Rome were frustrated by the troops of William, king of Naples. This prince died soon after, leaving a son in his minority, afterwards called William the Good. In the end of this year, the emperor again crossed the Alps, and, without taking any decisive step against the Veronese, marched into the south of Italy. The confederates, however, lost no time in preparing for defence. Having called a general council at Puntido, near Milan, they were joined by the deputies from Cremona, Bergamo, Brescia, Mantua, and Ferrara; a general plan of resistance was organized, and an oath agreed on, to be taken by all the members of the confederation, which now assumed the title of the League of Lombardy. Their first measure was to rebuild the walls of Milan; for which purpose, each city of the League sent a large body of men, and so eager were the Milanese to secure their independence, that, till the fortifications were completed, no attempt was made to repair their ruined habitations. The city of Lodi was forced into the confederacy, which was soon after joined by Placentia, Parma, Modena, and Bologna, and now consisted of fifteen of the principal cities in Italy. Frederic having in vain assaulted Ancona, which was garrisoned by the troops of the Grecian emperor, Manuel Commenus, proceeded to besiege Rome, which soon yielded to him; and the pope was obliged to retire for safety to Benevento. In the mean time, the German troops were attacked by the pestilential fever of the "Maremma," which, in less than two months, carried off all his principal officers, more than 2000 gentlemen, and a proportionate number of common soldiers. Such was the weakness of the German army after this loss, that Frederic, finding himself unable to make any attack on the Lombards, privately recrossed the Alps. On his departure all those states whom the terror of his arms had formerly kept back, hastened to join the League, which now consisted of all Lombardy, except the city of Pavia, and William, Marquess of Montferrat. To prevent any junction between these allies, the League determined to build a city between them, and having fixed on a spot at the confluence of the rivers Tanaro and Bormida, whose situation rendered it almost impregnable, the whole armies of the League laboured at the work with such assiduity, that, in a few months, the walls, and a competent number of houses, were finished, and the inhabitants of five neighbouring villages transported to it, and authorised to constitute a free and republican government. This city, destined to be a monument of their alliance, and of their zeal for liberty and the church, was named Alexandria, after the pope, the head of the League; and so rapid was the increase of its population, that in the course of one year after its foundation, the inhabitants of Alexandria were able to send to the field a body of 15,000 armed troops.

In the mean time, the emperor attempted, by all the means in his power, to throw the seeds of disunion among the confederates; sometimes endeavouring to treat with the pope, with the king of Sicily, or with the cities singly; but without effect. He then sent the archbishop of Mentz, with a considerable body of troops, into Tuscany; who, taking advantage of the war between Pisa, and its allies the Florentines, with the Genoese, for the sovereignty of Sardinia, pretended to observe a neutrality, and was chosen arbiter by the contending parties. No sooner, however, had the magistrates of Pisa and Florence appeared at the place appointed, than the archbishop, irritated at their having concluded an alliance with the Grecian emperor, ordered them to be thrown into a dungeon. Putting himself, then, at the head of the armies of Sienna, Pistoia, and Lucca, with the nobility of Tuscany, Umbria, and Romagna, he proceeded to invade the Florentine territory. But the Pisans having succeeded in making a diversion by attacking Lucca, Christian was twice defeated, and obliged to give up his designs against Florence. He now, notwithstanding, had contrived to collect a considerable army, with which, early in the following year, he began to lay siege against Ancona. In this he was assisted by the fleet of the Venetians, who were jealous of the inhabitants of that city becoming their rivals in the commerce of the Levant. The situation of Ancona is naturally strong; and the attempts to assault it by land or sea were unavailable. The wooden towers of the archbishop were burnt by the citizens, led on by a courageous and patriotic female; and of the Venetian squadron, seven vessels were destroyed and stranded, by divers cutting their cables under water, during a violent gale. The town, however, contained 12,000 inhabitants; and the preceding harvest having been bad, and all supplies completely cut off, it soon began to suffer all the miseries of famine. An offer to capitulate being refused by the archbishop, they still continued, with unparalelled fortitude, their resistance, although their remaining stock of provisions consisted only of 15 sacks of corn, and one dozen of eggs; and the poorer part of the inhabitants were reduced to feed on the most nauseous and unwholesome substances. At length, the Guelph nobles of Ferrara contrived, by an ingenious stratagem, to raise the siege. Having collected a few hundred cavalry, they contrived to pass through the imperial rear-guard; and, led on by William Marcheselli, who commanded the vassals of the Countess Bertinoro, the zealous friend of Ancona, they encamped on the top of the mountain of Falcognara. At midnight, each horseman fastening several torches to the end of his lance, the whole body proceeded down the mountain, in line, to attack the imperial camp. Christian, alarmed by the formidable appearance, gave orders to retreat; and the provisions of his camp were carried to the famishing inhabitants of Ancona by the Ferrarese troops. The retreat of the archbishop was followed, next day, by the departure of the Venetian fleet. It is satisfactory to add, that the conduct of Marcheselli was magnificently rewarded by the eastern emperor.

In the end of the year, Frederic again entered Italy by the way of Mount Cenis. Having accepted the surrender of Asti, whose citizens were alarmed at the strength of his army, he sat down before Alexandria, which, after some ineffectual attempts to storm, he determined to reduce by blockade. In this he persevered for four months, in the very depth of winter, notwithstanding the sufferings of his soldiers from the cold and scarcity, and the inundations of the rivers. The diet of the League, however, immediately dispatched their troops with a supply of provisions, for the relief of the Alexandrians. A truce during Passion-week had, in the mean time, been concluded; but the emperor, apprised of the approach of the Lombard troops, determined treacherously to break his agreement, and attempted to assault the town during the night. Fortunately his design was discovered, and the Germans repulsed with loss. Frederic the next day marched to Pavia; the Lombard army, from a remaining respect for the imperial dignity, not impeding his retreat. His repulse had made him readily listen to the negociation for a peace; and it was agreed that both armies should be disbanded, and six commissioners appointed to arrange their differences. At the conferences for this purpose, held at Pavia, three legates from the pope attended, but their attempts to promote a reconciliation were unavailing; and the emperor, having ordered another army to be raised in Germany, was apprized of their arrival at Como early in the following spring.

Putting himself at the head of the troops of Como, Pavia, and Montferrat, he joined the main army, and proceeded to attack the castle of Lignano, 15 miles from Milan. The Milanese immediately prepared for a vigorous resistance; and, with their own troops and those of Placentia, and a few battalions of light infantry from Verona, Brescia, and Novara, marched to meet the emperor. The battle began by a skirmish between the cavalry of the advanced guards; but the whole German horse, having charged the Lombards, were repulsed, and fell back in confusion on the main body, pursued by the emperor. But the troops entrusted with the care of the carroccio, perceiving the danger to which it was exposed, at this moment charged the imperialists with such fury, that Frederic was obliged to save himself by flight, and a total rout ensued. The Germans were pursued for eight miles, and completely dispersed; the troops of Como almost all cut to pieces; and Frederic, after wandering in disguise for several days, arrived alone at Pavia. He now began seriously to think of peace; and a congress for that purpose was agreed to be held at Venice. He, however, succeeded previously in negociating a separate peace with Cremona and Tortona.

The pope having arrived at Venice, after much difficulty, a truce was agreed on; the duration of which was to be fifteen years with the king of Naples, and six with the Lombard League. The years of the truce were spent by the emperor in endeavouring to disunite the League: but in this he was unsuccessful; and the only towns that joined him were Tortona and Alexandria, to the latter of which, the name of Cesarea was given. In the year 1183, a general diet of the empire was held at Constance, where the emperor's son, Henry VI. was associated with him in the government; and the deputies of the Lombard cities having attended it, a definitive treaty was at length concluded, in which the emperor acknowledged and restored the rights of the free states; and Italy at length enjoyed peace. The calm which followed the treaty of Constance was not of long duration. The tranquillity of the free Italian states was soon disturbed by petty wars with their neighbours and the nobility, or by the usurpation of ambitious individuals or families, and the fury of contending factions among themselves. To enter particularly into the history of these, would be impracticable in a work of this nature; and besides, not very interesting to the generality of readers. We must, therefore, content ourselves with taking occasionally a general review of their effects in the respective states; or slightly entering into their details, when productive of any lasting or general results.

In the year following the peace of Constance, Frederic visited Italy for the last time. His object was to negotiate a marriage between his son Henry, and Constance, daughter of Roger I. king of Sicily and Naples, the aunt of William II. the present king; and, from his want of family, considered the heiress presumptive of the crown. The emperor was, on this occasion, received with general respect by the Lombard cities; and, desirous to secure their support in the event of the Sicilian succession being contested, his efforts were directed to maintain their union, and promote their prosperity.

An event which took place soon after tended still more to continue this good understanding, and for a time to occasion a general cessation of hostilities throughout Europe. This was the capture of Jerusalem by Saladin, from King Guy of Lusignan, and the crusade undertaken for its recovery, in consequence of the exertions of the popes Gregory VIII. and Clement III. The Italian states obeyed with zeal the mandates of their pontiffs; and the aged emperor himself, with his son Frederic, took the cross, and, at the head of an army of 90,000 men, marching through Hungary and Bulgaria, crossed at Gallipoli into Asia, and having taken Iconium, advanced into Armenia, where he died, having, while bathing in the little river Salef, 10th June, 1190, been either drowned, or struck with apoplexy, from the coldness of the water.

The death of Frederic was deplored, even by those very cities whose liberties he had invaded; and the Milanese themselves acknowledged his magnanimity and fortitude. Their knowledge of his successor increased their regrets; as, without possessing his father's talents, Henry's character was infamous in war for brutal ferocity, and in peace for his perfidy and breach of his promises. William II. King of Sicily, died a few months before Frederic; and Henry now prepared to take possession of his wife's inheritance. But the Sicilians, averse to a foreign sway, had chosen for their king, Tancred, grandson of King Roger, being the illegitimate offspring of his eldest son; and the emperor was obliged to assert his rights by force of arms. For this purpose, he solicited the assistance of the Italians, especially the maritime republics. To the Genoese he even promised to cede the city of Syracuse and its dependencies. Having, in consequence, obtained a considerable fleet from them and the Pisans, he proceeded to invade Sicily. But his expedition was unfortunate; he himself escaped with difficulty; and his empress fell into the hands of Tancred, by whom, however, she was immediately sent back without ransom.

This prince survived a short time only after this generous action; his death being occasioned by grief for the loss of his eldest son. The Sicilians then submitted to the emperor; but were treated by him in the most cruel and tyrannical manner, and he became the object of general detestation. He incurred, likewise, the resentment of the Genoese, by not performing his promises to them; and even depriving them of the privileges which they had formerly enjoyed in the Neapolitan ports. His subjects were soon enfranchised, however, by his sudden death; which was followed, the year after, by that of his wife Constance; and Frederic II., a child of four years old, was left heir of the crowns of Sicily and Naples. Pope Innocent III. who had succeeded Celestine III. a few months before, was, on her death-bed, appointed by the empress guardian to the young king.

The imperial dignity was at this time disputed for in Germany, between Philip, duke of Suabia, brother of the late emperor, and Otho, duke of Aquitaine, son of Henry the Lion, formerly duke of Bavaria and Saxony, and chief of the Guelphs. The interests of the latter were embraced by the pope; but the former, assisted by Philip Augustus, king of France, was successful; and Otho was obliged to take refuge in England, where he obtained the powerful protection and alliance of Richard Cœur de Lion. In the mean time, the rights of the emperor in Italy were left without a defender. Innocent perceived all the advantages of his situation, and lost no time in exerting himself to establish the temporal power of the church. His first attempt was the abolition of the senate of Rome, in which he succeeded without difficulty, from the fickleness of the people themselves, who were not unwilling to try a new form of government. In the room of the senate, the pope substituted a military magistrate, who resided in the capitol, and enjoyed all the powers of that body, with the title of senator of Rome. Like the podestas, this magistrate was to be a foreigner.

At this time the cities of Verona, Padua, Ferrara, and Bologna, were engaged in wars, occasioned by the animosity of the Guelph and Ghibeline nobles. The former party was headed by the Marquis Obizzo of Esté, ancestor of the dukes of Ferrara, Modena, and Brunswick, and the royal family of Great Britain. On the other side was Eccelino Romano, father of the cruel tyrant of that name; and at Ferrara, the family of Salinguerra. These wars in Milan, and some other of the cities north of the Po, ended in the expulsion of the nobility. But in Verona, Vicenza, and Bologna, their power was increased; and at Ferrara, the Marquess of Esté, having married Marchesella, daughter and heiress of William Marcheselli, the deliverer of Ancona, had already acquired almost sovereign power and influence.

The next attempt was to reclaim the long-contested legacy of the Countess Matilda. For this purpose, he sent an army to expel the German nobles who possessed these fiefs. His pretensions were immediately acknowledged by the cities; and Ancona, Perugia, and several other towns, opened their gates, and submitted to the legates of the pontiff. To the Tuscan cities, the pope addressed himself as the patron of their liberties; and only asked their assistance, as the friends of liberty and the church. The cardinals Pandolpho and Bernard succeeded in their mission; an assembly of the deputies from the Tuscan cities met at a village near San Mincato, and there formed themselves into the Guelph or Tuscan League, by which they bound themselves to acknowledge no prince without the express consent of the Roman church; to defend each other, and the church, when required; and to assist in recovering all parts of its patrimony, and all the territory over which it had any rights, except what was actually occupied by any of the allies. The city of Pisa alone, grateful for former favours received from the emperors, would not join in this league, and continued at the head of the few cities and nobles who constituted the Ghibeline faction in Tuscany. In the administration of the Sicilian kingdoms, the pope was less successful; and two expeditions against Marcovald, high steward of the empire, who, at the head of the German troops, with the assistance of the Saracens settled in Sicily, maintained the Ghibeline party there, were equally unfortunate. But it was in Italy alone that Innocent met with opposition; in Hungary, Denmark, France, Portugal, Arragon, and Poland, his rescripts were implicitly obeyed; and in England, his excommunication of King John, and that prince's surrender of his crown, are familiar to every British reader. In the mean time, a new pretender to the crown of Naples appeared, Walter, count of Brienne, the son-in-law of the late King Tancred; but this nobleman, who, (it is supposed) at the instigation of Innocent, invaded Naples with a small army, soon fell in a skirmish with the German troops of Marcovald. Soon after this, a period was put to the German dissensions, by the death of Philip of Suabia, who was murdered by a private enemy; and Otho, having married his daughter, and thus united the rival families. was unanimously acknowledged king of Germany and the Romans at Alberstadt.

Early in the following year, Otho entered Italy to receive the imperial crown, with which Innocent had promised to invest him. His first task was to reconcile Azzo of Esté (now acknowledged lord of Ferrara) with Eccelino Romano. This was at first difficult, the marquess having challenged his rival in Otho's presence; but he at last succeeded in effecting a temporary agreement. To secure them both, he confirmed to Azzo his title of marquess of Ancona, which had been conferred on him by the pope, reserving, however, the rights of the empire; while to Eccelino he gave the office of podesta of Vicenza, imposing on it, at the same time, a very considerable fine, as having been guilty of rebellion.

Otho then proceeded to Rome, where he was crowned emperor by the pope, 4th October 1209; but as the latter soon found that the Guelph prince was not so obedient as he could wish, and especially refused to resign his claims to the inheritance of the Countess Matilda, they soon parted equally discontented with each other, to seek allies in their approaching warfare. The emperor secured in his interest the Pisans, the German army in Naples, the Milanese, Parmarans, and Bolognese, Eccelino, and Salinguerra. On the other side, the party of the pope was warmly embraced by Azzo of Esté, the cities of Genoa, Pavia, and Cremona, and the Marquess of Montferrat. Innocent having likewise negotiated a marriage between the young Frederic of Naples and Constance, daughter of the king of Arragon, entered into a treaty with the king of France and several German princes, to elect him to the crown of Germany, of which he represented him unjustly dispossessed.

On hearing of this, Otho immediately declared war against Frederic; and, marching into his kingdom, made himself master of Capua, Salerno, and Naples; but was interrupted in the midst of his victories by the intelligence, that he had been excommunicated by Siffredi, archbishop of Mentz, and the imperial dignity declared vacant, and that the league against him had been joined by the king of Bohemia, the duke of Bavaria, and many others of the princes of the empire.

He therefore quitted Italy without delay, and proceeded into Germany, whither he was soon followed by Frederic. This prince, setting out from Genoa, marched through Lombardy, where many attempts were made by the Geulph states to intercept him, which he escaped by the assistance of the Marquess of Esté, and arrived in safety at Chur, in the country of the Grisons, where he was met by his German allies, who conveyed him to Aix-la-chapelle, and there crowned him king of the Romans. Otho, in the mean time, had been defeated by the king of France at Bouvines, with a loss of 30,000 men; by which his power was so much weakened, that he never afterwards was able to make head against his competitor.

It was about this period that the dissentions of the Boundelmonti and the Uberti first broke out in Florence; which kept that city in a state of civil war for more than 30 years, and prepared its citizens for taking the distinguished part which they afterwards did in the wars of Italy. (See FLORENCE.)

The following year is marked by the death of Innocent III., whose intrigues had so much raised the papal authority, and occasioned so many wars in Europe. Besides his unprincipled political conduct, his character is stained by his cruel persecutions of the Albigenses, and the encouragement for that purpose given to the Spaniard Dominic and his followers, so distinguished in after times for their hostility against religious liberty. Innocent died at Perugia, 1216, on his way to Tuscany, for the purpose of restoring peace between the Pisans and Genoese, in order to combine their forces for the defence of Palestine.

Our attention should now naturally be directed to the magnificent conquests of the Venetians and Genoese during the 4th crusade; but as these transactions, and the naval victories of these two republics, deserve to be narrated in a more connected manner, their history will fall more properly to be considered under the article VENICE.

The contest between Otho and Frederic armed the cities of Italy against each other. The Milanese remained constant in their attachment to the cause of Otho; and were joined by Thomas, count of Savoy, and Crema, Placentia, Alexandria, &c. On the other side, Pavia, Cremona, Parma, Modena, &c. embraced the cause of Frederic, and were styled the Ghibeline League. The city of Pavia, however, after several defeats, was forced to join the opposite party. Notwithstanding these wars, the wealth of the Lombard cities was daily increasing; and, even at this early period, the opulent among them had begun to lend money on interest to their foreign neighbours—a trade which they afterwards monopolized to such a degree, that, in most European countries, the name Lombard became synonymous with that of banker. The progress of science, too, such as it existed in these ages, attested their prosperity. The university of Bologna, originally dedicated to the study of the civil and canon laws, now possessed teachers of every branch of liberal science; and the number of students, and the many rival establishments in other cities, demonstrated the zeal of the Italians for those acquirements, which had been unknown to their ancestors.

The death of Otho having now put an end to the competition for the empire, the Pope Honorius III. agreed to invest the king of Naples with the imperial dignity, upon condition of his immediately taking the cross, and proceeding to the Holy Land. Frederic, whose education at the papal court had taught dissimulation to a character otherwise resembling his ancestors, readily accepted the condition. He, however, remained in Germany for two years, until he had obtained the coronation of his son Henry (then only ten years old) as king of the Romans. He then entered Italy at the head of a considerable army, and proceeding directly to Rome, received from Honorius the imperial crown, renewing at the same time his promise of proceeding to Palestine. But the affairs of his hereditary kingdoms first demanded his attention; and he found them in such a state of anarchy and insubordination, that for several years they continued his sole object of attention, notwithstanding the entreaties and menaces of the pontiff. His zeal in the cause of the crusaders was at length roused, by his second marriage with Yolanta, the heiress of the kingdom of Jerusalem. He sent some reinforcements to the East, and began to make preparations for embarking at Brindisi, where he collected his army. A pestilential fever, which raged among the troops, and attacked the emperor himself, obliged him, for another year, to defer his voyage. But on the death of Pope Honorius, Gregory IX. who succeeded him, excommunicated the emperor for not performing his promise, accusing him at the same time of feigning disease, for the purpose of evading it. Frederic, however, ordering his bishops to disregard the papal sentence, and appealing to the European princes, determined by his actions to prove his sincerity, and embarked the following autumn for the Holy Land. But this measure did not appease the indignation of the pope; and not contented with exciting his subjects to rebellion, and sending an army of crusaders, headed by Frederic's own father-in-law, to lay waste his territories, he even interdicted the Christains in Palestine from giving obedience to his orders. Notwithstanding these difficulties, the emperor succeeded in making an honourable peace with the sultan of Egypt, and Jerusalem was restored to the Christains; though such was the veneration of the patriarch for the papal mandates, that he refused to assist at Frederic's coronation; and the new king of Jerusalem was obliged, with his own hands, to invest himself with the ensigns of royalty. His rapid return to Italy, soon disconcerted the plans of his enemies; the army, which had invaded Naples, was dispersed; and the pope, alarmed for his safety, hastened to conclude a treaty.

In this peace, the cities of the League of Lombardy were included, at the desire of Gregory, who knew the value of their assistance; and their independence was thus for the second time publicly recognized.

The emperor had now to contend with a new enemy in his own family. His son Henry, king of the Romans, whose ambition, it is said, was excited by the secret intrigues of the pope, appeared in Germany in open rebellion against his father; and the Milanese had promised to crown him king of Italy, an honour which they had constantly refused to Frederic. In public, however, Gregory affected the utmost horror at this rebellion, and exhorted the German prelates not to lend their aid in so disgraceful a course. But on the approach of the emperor, the young prince was deserted by all his partisans, and obliged to throw himself on the mercy of his father. Frederic having deprived him of the crown of Germany, sent him into Apulia, where, after a confinement for many years, he died a prisoner. He now returned into Lombardy to punish the defection of the Milanese. To this he was incited by Eccelino III., (commonly called the cruel) who had for 10 years governed Verona, as podesta, with absolute authority, and who, also, as chief of the Ghibeline faction, had considerable influence in Cremona, Parma, and Modena, which were zealously attached to that party.

Frederic's first exploit was the surprise of Vicenza, which having been taken by storm, was pillaged by the Germans. Padua, the defence of which had been committed to 16 of the principal inhabitants, was treacherously surrendered by them to Azzo, 7th Marquis of Esté, who, in his turn, was obliged to deliver it up to Eccelino.

The emperor having collected an army near Verona, marched into the territory of Brescia; and having come up with the Milanese army at "Corté Nuova," completely defeated it, and carried off the carroccio as a trophy of his victory. After the battle many of the fugitives were cut to pieces by the inhabitants of Bergamo, but the greater number were protected by Pagano della Torre, lord of Valsasina, whose family afterwards acquired so much power in Milan. The imperial army then marched into Piedmont, where the terror it occasioned detached, for a time, the cities from the Guelph league; and Milan, Brescia, Placentia, and Bologna, were left alone in their resistance to Frederic. The latter laid siege to Brescia, and continued for some months before it, but with so little success, that he was obliged to raise the siege.

The long dissembled enmity of the pope at length forth in a regular sentence of excommunication against Frederic; his subjects were released from their allegiance, and every place that received him was placed under an interdict. The first effects produced by this was the defection of Azzo of Esté, and Alberico Romano, brother of Eccelino. The emperor retired to winter at Pisa, where he still had a powerful party, who were called Conti. in opposition to the Visconti, a noble Pisan family of the Guelph faction. Henzius, the natural son of the emperor, having married the widow of Ubaldo Visconti, chief of the Pisan colony in Sardinia, was invested by his father, with consent of the republic, with the title of king of Sardinia. The barbarous Eccelino was, in the meantime, exercising the most dreadful cruelties on the unhappy Guelphs and friends of the house of Esté at Padua, and every day adding to the unpopularity of the Ghibelines. Frederic now marched towards Rome; but a crusade was preached against him by Gregory, the people every where took up arms, and he was forced to abandon his design and retire into Apulia. The Guelphs then besieged and took Ferrara, from whence Salinguerra had expelled the Marquess of Esté, and imprisoned the former nobleman at Venice, where, after a confinement of five years, he died at the age of 80. But the papal party received a check by the defeat and capture of the Genoese fleet, by the Pisans and Neapolitans; and two cardinals, and several French prelates, who were in the former squadron, fell into the hands of Frederic.

The aged pope, overwhelmed by this disaster, died a few months after; and his death was followed, in three weeks, by that of Celestine IV. his successor. The conclave, after very long discussions, came to the resolution of electing Cardinal Sinibald Fiesco, of the Lavagna family at Genoa, who had always been friendly to the emperor. But the new pontiff, who assumed the name of Innocent IV. soon shewed that his former attachments were lost in the interests of his new office. Frederic having in vain attempted to gain him over by negotiations, determined to seize on his person; but Innocent, being apprized of this, secretly left Rome, and, embarking on board the Genoese fleet at Civita Vecchia, arrived in safety at Genoa, where he was received with enthusiasm by his countrymen. He then travelled to Alexandria and Asti, which cities were persuaded again to join the Guelph league, and from thence to Lyons; where, under the protection of Louis IX. king of France, (commonly called St. Louis), he summoned a general council of the church.

The melancholy state of the Christians in the east first engrossed the attention of the council, and the French king was persuaded to undertake his expedition to Egypt, which afterwards proved so disastrous. At the second meeting of the council, the emperor was summoned to answer the charges of the pope. His defence was ably pleaded by Taddeo of Suessa; but the council found him guilty, and solemn sentence of excommunication was pronounced, the throne of the empire declared vacant, and the kingdoms of Sicily placed under the controul of the pontiff. On being informed of this sentence, Frederic at first held it in derision, and wrote to all the princes of Europe, appealing against the arrogance of the church; but the domestic treasons which he soon discovered, the election of Henry, landgrave of Thuringia, as king of the Romans, and his subsequent victory over Frederic's son Conrad, soon shewed him the fatal effects of the enmity of the pope; and he made every effort in his power to reconcile himself with the church, but in vain. He had even determined to submit to the humiliation of a personal confession of his offences to the pope; and for that purpose was on his way to Turin, the residence of Innocent, when he was informed of the revolt of Parma, which had always been attached to his family—a revolution effected by the personal relations of the pope in that city. The emperor's indignation at this event put an end to all ideas of accommodation; and, collecting some reinforcements from the cities of Piedmont, which remained attached to him, he hastened to join the army of his son Henzius, and lay siege to Parma. This army was increased by the addition of the troops of Padua, Vicenza, and Verona, under the command of Eccelino; but the garrison of Parma had also been powerfully reinforced by Azzo of Esté, who had collected from every quarter the adherents of the Guelphs, and the entire army of Ferrara, at the risk of leaving his own territories exposed to the ravages of Eccelino. The number of its defenders soon occasioned a scarcity of provisions in Parma, and the emperor attempted to increase the popular discontent occasioned by this by an act of most atrocious cruelty. Having conducted, in sight of the walls, eight Parmesan prisoners, four of high rank, he ordered them to be beheaded, assuring the besieged, that they should witness the same spectacle every day till his prisoners (1000 in number) were finished. But this bloody spectacle was not repeated. The troops of Pavia declared that they came to serve as soldiers, not as executioners; and the emperor consented, lest this enormity should prove more fatal to himself than his enemies. In the mean time, certain of ultimate success, he employed his army, during the winter, in building a new city, called Vittoria, into which, when he had reduced Parma, he proposed to remove its inhabitants. But the besieged having received a supply of provisions from Mantua and Ferrara, took advantage of the emperor's absence on a hunting excursion; and suddenly making a sally, and assaulting the ramparts of Vittoria, carried the place. The imperialists were put to flight with great loss, and Frederic, returning from the chace, joined them in their retreat to Cremona. The whole imperial treasure and jewels fell into the hands of the victors, and the new city was burnt and rased to the ground. Notwithstanding this misfortune, and the defeat of his son Conrad in Germany, the spirit of the emperor remained undaunted. Even the intercession of St. Louis had failed in mitigating the rancour of Innocent; and, aware that no reconciliation could now be effected, Frederic continued the war with unabated vigour. Having sent his son, Frederic of Antioch, to the assistance of the Ghibelines at Florence, the Guelphs were at length expelled from the city, and many of their castles in the country were compelled to surrender. In Romagna, success attended the opposite party. The Bolognese, under the command of Ubaldini, the papal legate, succeeded in reducing to obedience the principal cities; and at length ventured to attack the imperial army under Henzius, king of Sardinia, at Fossalta, a place two miles from Modena. The battle was carried on, during the day, with equal success; but, at night, the Bolognese renewing their attack, the Ghibeline army was thrown into confusion, and Henzius himself taken prisoner. All the attempts of the emperor to prevail on the Bolognese to accept a ransom for his son were unavailing; and Henzius remained at Bologna in a state of honourable captivity till his death in the year 1271.

The consequence of the victory at Fossalta was the accession of Modena to the Guelph alliance. On the other hand, at Verona, and Padua, and the surrounding territory, Eccelino, as chief of the Ghibelines, exercised a power now almost independent of the emperor; and the annals of these cities, during his long reign of blood, exhibit only scenes of diabolical cruelty, into the details of which we rejoice that the limits of this historical sketch preclude us from entering. Frederic had now retired into Apulia, from whence he sent considerable supplies to the army of St. Louis, then in the isle of Cyprus, and made a last and unavailing attempt to reconcile himself to the pope. On the 13th of Dec. he died of a dysentery at Florentino, aged 56; having reigned 31 years as emperor, 38 as king of Germany, and 52 as king of the Sicilies.

The death of Frederic was followed by an entire change of the state of affairs in Italy. The crown of Germany, after the death of his son Conrad, was contested, for more than twenty years, by many princes of different families; and when Rodolph of Hapsburg (ancestor of the house of Austria), was at length elected, neither that prince, nor his successors, Adolphus of Nassau, and Albert of Austria, felt themselves sufficiently masters of their German dominions to interfere in the affairs of Italy. Sixty years, therefore, elapsed after the death of Frederic II. before the imperial dignity was conferred on any individual; while the ties which had so long connected the Italian states with the empire were almost completely broken, and the authority of the German Cæsar no longer either dreaded or revered.

The pope, now released from his apprehensions, returned through Genoa and Lombardy to Perugia, being received with the greatest respect, even by the Ghibeline cities, while at Milan, and other states attached to his party, his return resembled a triumphal procession. But Innocent's ungrateful behaviour to the people of Milan soon alienated their affections; and their choice of the Marquess Lancia of Montferrat, a zealous Ghibeline, for their captain-general, proved their indifference for the papal party. Indeed, though the names of the factions continued the same, the interest of the pope, or the emperor, was but little considered by either side. The real contest was between the nobles and the people; and where the former were of the one party, the latter inclined to the other. At Milan, for example, the people were Guelph, the nobles Ghibeline—at Placentia the reverse; and the state inclined to one side or other, as either part of the community acquired the preponderance. This circumstance serves to explain the sudden and otherwise unaccountable changes in the policy of the Italian republics.

In the mean time, Conrad, king of the Romans, the emperor's eldest surviving son, had entered Apulia, which had been governed by his natural brother, Manfred, prince of Tarento, where his authority was acknowledged, except in Naples and Capua, which had been excited to rebellion by the pope. These cities, however, were soon forced to surrender, and Conrad remained master of the kingdom; which he did not long enjoy, being suddenly cut off by a fever at Lavello, in the 26th year of his age, leaving his infant son, Conradin, to the care of Manfred, and the regency to Berthold, margrave of Hoemburg, general of the German troops. The first act of these guardians was to solicit the protection of Innocent for their ward, who was innocent of the offences committed by his ancestors, and whose helpless condition ought to recommend him to the papal compassion. But the pontiff, who had not forgiven the house of Suabia, and, in the lifetime of Conrad, had endeavoured to raise competitors against him, now demanded, in his own name, the immediate surrender of the kingdom, promising, at the same time, to bestow it on Conradin when he arrived at the years of puberty, if he could shew any title to it.

To these terms, Manfred and Berthold found themselves obliged to submit; and the pope at the head of an army, and accompanied by the Guelph nobles, who had been exiled by Frederic, entered Apulia. His first act was to deprive Manfred of part of his domains, which he bestowed on Borello d'Anglone, his personal enemy, who immediately set out to take possession. In his way, however, he was accidentally met by Manfred; and a skirmish having ensued, Borello was slain. Innocent immediately cited him to appear and stand trial for this murder; and Manfred, finding that Berthold and his friends were unable or unwilling to protect him, after a long flight through a country entirely occupied by the troops of his enemies, at length was received by the Saracen troops at Luceria, who, notwithstanding the opposition of the governor, were determined to shew their respect and affection to the son of their deceased commander. Putting himself at the head of these troops, he immediately attacked the army of the pope, commanded by Cardinal William Fiesco, his nephew; and, having been successful in a skirmish, inspired them with such a panic, that they fled with precipitation. But Manfred derived still greater advantages from the death of Innocent IV., which was followed by repeated defeats of his troops; and, in less than two years, Manfred recovered the whole kingdom, which he continued to govern as regent for Conradin.

In the mean time, considerable changes had also taken place in the Tuscan states. At Florence, the people attached to the Guelph party had revolted against the Ghibeline nobles, to whom Frederic II. had entrusted the government, and recalled the exiles of the opposite faction. Not content with this domestic victory, they proceeded to attack their Ghibeline neighbours, the Pisans, and their allies. Their endeavours were crowned with success: Pistoia first submitted, and received a Florentine garrison; Sienna was next compelled to join their league; Volterra, one of the strongest cities in Tuscany, was taken, and the Pisans, after repeated defeats, obliged to beg a peace.

Innocent IV. was succeeded in the pontificate by Alexander IV. who, although of a more moral and religious character than his predecessor, was by no means equal to him in talents. His first public act was to preach a crusade against Eccelino Romano; this was entrusted to Philip, archbishop of Ravenna, who proceeded to Venice, and there collected the Paduans and other exiles who had fled from the tyranny of Eccelino. He also received considerable assistance from the Venetians, and was joined by the Marquess Azzo of Esté, and the Ferrarese, the republic of Bologna, Count Louis de San Bonifazio, lord of Mantua, and the citizens of Trent, who had revolted against Eccelino. On the other hand, that tyrant was master of Verona, Vicenza, Padua, Feltra, and Belluna; had secretly reconciled himself with his brother Alberico, who governed Treviso; and had made an alliance with the Marquess Oberto Pellavicino, and Buoso da Doara, the alternate podestas of Cremona. The crusaders were at first victorious; and having defeated the governor of Padua, they entered that city with the fugitives, took possession of it, and laying open the dungeons, delivered nearly 1000 victims of the cruelty of Eccelino. But the unfortunate citizens of Padua, who were serving in his army, felt the weight of his vengeance, and of 11,000 men scarcely 200 escaped alive. In the mean time, Alberico Romano arrived with an army, and, offering his aid, wished to be admitted into Padua; but the legate, discovering that he attempted to raise a mutiny among his troops, wisely rejected his assistance.

The troops of Eccelino, and his Cremonese allies, had now made themselves masters of Brescia; but the latter, indignant at being defrauded of their share of the conquest, deserted the former, and soon after joined themselves with the papal army. The last victory of Eccelino was the capture of the castle of Friola in the territory of Vicenza. The unfortunate garrison had their eyes torn out, and their noses and legs cut off; nor were the women, the children, or the priests, exempted from this most dreadful mutilation. But the monster had now filled up the measure of his crimes, and the hour of vengeance, so long delayed, was at hand. Having marched into the Milanese, he was met at the bridge of Cassano, over the Adda, by Azzo of Esté, with the troops of Ferrara, Mantua, and Cremona. Deserted during the battle by the Brescian cavalry, his army was thrown into confusion. His German soldiers, indeed, still made a desperate resistance; but Eccelino, being severely wounded by a brother of one of his mutilated captives, was taken prisoner, and a total route ensued. The captive tyrant maintained a sullen silence, and, fixing his ferocious looks on the ground, seemed insensible to the shouts of joy of his conquerors. Refusing food and medical assistance, he tore open his wounds, and died at Soncino 11 days after his defeat. He was in his 66th year, and his reign of blood had lasted 34 years.

The papal army was immediately admitted into the cities under his power; Vicenza received a podesta from Padua; and Verona elected to that office Martino della Scala, who afterwards became their sovereign lord. Alberico Romano, expelled from Treviso, took refuge in the castle of San Zeno, among the Euganean mountains, but the Guelphs determined utterly to extirpate a family so justly detested, and commanded by the marquess of Esté, besieged the fortress. Alberico was reduced by famine to surrender, imploring the compassion of Esté for his six sons and two daughters, one of whom was the widow of Rinaldo of Esté, his brother, but in vain; the whole family were put to death, and their mangled limbs sent to the cities which had endured the tyranny of Eccelino. The extinction of the family of Romano, and the fall of the tyrant, which occasioned universal exultation, were followed by a general peace in Lombardy; and the attention of the pope was turned solely to the affairs of the kingdom of Naples.

Manfred, in the midst of his victories, was informed of the death of his nephew Conradin in Germany; and immediately, at the desire of the Sicilian nobility, assumed the title, and was crowned king of the two Sicilies. The arrival of dispatches from Conradin soon proved the falsehood of the report; but Manfred informed the messengers that, having now accepted the crown, he could not surrender it, but declared that Conradin should be his heir, and invited him to reside at his court. At this period, the Ghibeline nobility had been, by the increasing influence of the democratic party, banished from Florence; and, taking refuge at Sienna, easily obtained the protection of that republic. The Florentines immediately declared war against Sienna, and that state was obliged to beg assistance from king Manfred. The reinforcement granted by him was so small, that, in the first combat with the Florentines, the German troops were cut to pieces, and the standard of the king of Naples conveyed in triumph to Florence. Indignant at this disgrace, and excited by Farinata Uberti, the able chief of the Florentine exiles, Manfred immediately sent to Sienna a considerable body of cavalry under the command of Count Giordano d'Anglone, who, joined by their Tuscan auxiliaries, awaited the approach of the Florentines. Uberti had, in the meantime, carried on a secret correspondence with those of the Ghibelines, who still remained in Florence, and persuaded them, on the first opportunity, to desert the standard of their country. He had contrived to persuade the anziani, or chief magistrates, that, on their appearance before the gates of Sienna, it would be immediately surrendered. His stratagem was successful; the anziani conducted the army, reinforced by the troops of Bologna, and all the forces of Lucca, and the other Tuscan cities, to the plain of Arbia, five miles from Sienna, and there awaited the promised surrender.

On a sudden the gates of the city were thrown open, and the Neapolitan cavalry, followed by the Siennese and the Ghibeline exiles, made a desperate charge on the main body of the Florentines. While the astonished magistrates attempted to rally their disordered troops, the Ghibeline gentlemen in the army seized the opportunity, and cutting down the standard-bearer, carried off the Florentine colours, and deserted to the enemy. This act of treachery decided the battle; the Guelph army was totally defeated; and 10,000 of the Florentines and their allies were left dead on the field. Such was the terror occasioned by this defeat, that the whole Guelph population deserted Florence and retired to Lucca; and this example was followed by all the cities and towns of Tuscany. Guido Novello, count of Casentino, was appointed podesta of Florence, and the Neapolitan troops were ordered to be paid out of its revenues. Such was the inveteracy of the Pisans and Siennese, that, at a diet of the Ghibeline cities, they even urged the demolition and total destruction of Florence. This proposition had even met with the concurrence of the Assembly; but the patriotic firmness and manly eloquence of Farinata Uberti was successful in altering their resolution; and he, who had been the chief cause of the fatal defeat of Arbia, had now the honour of being the sole defender and the saviour of his country.

While these contests occupied the Tuscan states, the republics of Lombardy were, one after another, sinking into a state of vassalage, and in many of them a few private gentlemen had achieved that victory over their independence, which the princes of Suabia had so often in vain attempted to gain. This was, no doubt, in part owing to the imperfect nature of their civil constitution; but what contributed chiefly to the elevation of the nobles, and the decay of the republican spirit, was the great change which had taken place in the military system during the last century. At the period when the Lombard cities were struggling for their liberties, the armies of the emperor were, for the most part, composed of infantry, and the nobles, on horseback, acted as a kind of light cavalry. To such troops the citizens could easily oppose a body of light cavalry equally effective, while their hardy burghers, animated with the ardour of liberty, were more than a match for the half armed and half disciplined serfs of whom the German infantry principally consisted. A very great change had now taken place; the chief strength of an army now consisted in a heavy armed cavalry, consisting almost entirely of gentlemen, from their youth trained up to the use of these weighty habiliments of war. The rider was covered from head to foot with massy plates or rings of steel, protected with a buckler, and armed with a lance of such a length as to keep at a distance the swords of the infantry. The front of the horse, who, to support such a weight, required to be of a heavy and powerful breed, was equally secured. Against a charge from a body of cavalry of this description, no body of infantry, before the general use of fire-arms, could possibly stand. A few hundred knights thus armed, could cut their way through the largest bodies of infantry; numbers were unavailing; and nothing but a troop armed like themselves could check their progress. To endure the weight, and acquire the full use of arms of this description, was impossible without early training and continual exercise. From this circumstance, the nobles, constantly accustomed to field sports and manly exercises, soon acquired a decided advantage over the citizens, whose habits disqualified them from a service of this kind. The consequence of this change afterwards, was to force the republics to hire a body of mercenaries for their defence, and the frequency of the wars soon occasioned a race of men, whose sole occupation was war, and whose swords were at the service of those who could pay best, or held out the most favourable expectations of plunder. The very means used, however, for defence against the nobles, frequently occasioned the enslaving of a state; and the popular leader, after overcoming the nobles, not unfrequently made use of the same mercenary troops to secure to himself despotic authority. At Milan, the sovereign power fell into the hands of Martino della Torre, who also became lord of Lodi and Novara; and, from his humanity and prudence, the same authority continued in his family; and his successor, Philip della Torre, added to these cities Como and Bergamo. But a powerful rival to this family was raised up by the pope in the person of Otho Visconti, archbishop of Milan, who, siding with the nobles, proved a powerful check to the ambitious designs of Philip.

Alexander IV. was now dead, and Urban IV. his successor, a man of talents, began, with zeal, to carry into effect the designs of Innocent IV. against Manfred and the house of Suabia. He first attempted, but without success, to put a stop to the marriage of Constance, daughter of Manfred, with Peter, son of James, king of Arragon. Having then persuaded Edmund, son of Henry III. of England, to renounce the investiture of Naples, formerly bestowed on him by Innocent, he immediately offered the crown to Charles count of Anjou and Provence, brother to St. Louis. This prince, whose talents and courage eminently qualified him for such an undertaking, accepted the gift, and prepared to collect an army to attack Manfred. His power was greatly increased by the alliance of Philip della Torre, and an army of Tuscan exiles of the Guelph party, who kept in check the Ghibelines in Lombardy. During these warlike preparations Urban IV. died, and his successor, Clement IV. who was a Frenchman, was even now devoted to the interests of the court of Anjou, and gave immediate proof of his attachment, by appointing him senator of Rome. Charles immediately proceeded by sea, and escaping the fleet of Manfred with difficulty arrived at Rome; and, taking an oath to obey the conditions, and pay the tribute imposed by the pontiff, was solemnly invested with the crown of the two Sicilies. In the mean time, his army, under the command of his wife Beatrice of Provence, his nephew Robert de Bethune, and Count Guy de Montfort, son of the famous Simon Earl of Leicester, crossed Mount Cenis, and passing through the Milanese, conducted by Napoleon della Torre, was received into the territories of Mantua and Ferrara by the Count San Bonifazio and Obizzo, grandson of the last Azzo of Esté; having defeated the troops of the Marquess Pellavicino at Capriolo. At Ferrara they were joined by 400 Florentine exiles and 4000 Bolognese; and Charles putting himself at their head, entered Apulia by the way of Ferentino. He was met near Benevento by the army of Manfred; but the degenerate Apulians were unable to stand the repeated and impetuous charges of the French, and even the Germans having given way, a total route ensued, and Manfred himself was slain while in vain endeavouring to rally his troops. The conqueror refused to allow to his body the

Christian rites of sepulture; but the French soldiers, more generous than their leader, having buried him near the bridge of Benevento, raised a rude pile over his grave, to which each soldier carried a stone, a monument equally honourable to the dead and the living. But the cruelty of Charles was not confined to this insult; on his entry into Benevento, he put to death Count Giordano Lancia, Peter Uberti, and many other adherents of the late king: and, a few days after, having seized Queen Sybilla, and the two children of Manfred, with his sister, while attempting to escape into Greece, they, too, became victims to his barbarity, and were murdered in prison. Such was the commencement of the reign of Charles of Anjou. Every corner of the kingdom was subjected to the rapine and cruelty of the French, and the extortions of the king, and even the papal party regretted the exchange they had made of the mild and paternal sceptre of Manfred, for the bloody sword of Charles.

The French victories in the south of Italy, proved of essential advantage to the Guelph party in Tuscany. Count Guido Novello, who commanded the troops of Manfred in Florence, was at last obliged to evacuate that city; and the Guelphs having chosen Charles of Anjou as their lord, and having received from him a troop of 800 French horse, under the command of Guy de Montfort, once more expelled the Ghibelines, who were forced to take refuge at Pisa and Sienna. Florence immediately declared war against these two republics; and, joined by the army of the king of Naples, commanded by himself, laid siege to the castle of Poggibonzi near Sienna, which, after holding out for four months, was at length compelled to surrender. Charles then marched into the territory of Pisa, and made himself master of several fortresses belonging to that state. In the mean time, the Neapolitans and Sicilians, longing for deliverance from the yoke of the French, had sent a deputation into Germany to solicit Conradin to reclaim the inheritance of his ancestors. The ambassadors of Pisa and Sienna seconded these solicitations; and Martino della Scalla at Verona, and Oberto Pellavicino at Pavia, promising to assist him with their troops, the young prince entered Italy, accompanied by Frederic duke of Austria, and attended as far as Verona by the duke of Bavaria, his uncle, and the count of Tyrol, his step-father, with their troops. From Verona he proceeded to Pavia, and at the head of 3500 cavalry, passed through Lombardy without opposition. Lucina had now revolted from Charles; Henry of Castile, senator of Rome, had declared in favour of Conradin; and the pope, beginning to be alarmed, recalled Charles from Tuscany to defend his own kingdom. While that prince laid siege to Luceria, Conradin repaired to Pisa, and having there received considerable reinforcements, attacked and defeated William de Belselve, Charles's lieutenant in Tuscany. From thence he proceeded to Rome, and, regardless of the anathemas of Clement, who had retired to Viterbo, converted to his own use such of the treasures of the church as he could get possession of. His army now amounted to 5000 cavalry, at the head of which he entered Abruzzo, and encamped in the plain of Tagliacozzo. He was there attacked by the army of Charles, which only consisted of 3000 men, 800 of whom he placed in ambuscade under the command of Aiard de St. Valery. The first charge of Conradin was successful, and the French were put to flight; but the Germans having found the body of prince Henry of Cosenza, and taking it for that of the king of Naples, imagined that their victory was complete, and leaving their ranks, proceeded to plunder. In this state of disorder, they were charged by St. Valery's reserve with complete success, and Conradin and his barons, after a short resistance, obliged to betake themselves to flight. Having arrived at Astura, 45 miles from the field of battle, he embarked in a boat, with the intention of landing in Sicily; but being pursued by Frangipani, lord of Astura, was by him taken prisoner and delivered up to Charles. The king, determined to get rid of his unfortunate competitor, summoned him before him as a traitor. The result of this mock trial was, (as might be expected,) the condemnation of Conradin; and the last male representative of the house of Suabia perished on the scaffold. This execution took place in the presence of Charles, 29th October, 1268, and was followed by that of the duke of Austria, the two Lancias, the counts Donoratico of Pisa, and many others of the adherents of Conradin. The inhabitants of Augusta in Sicily were put to the sword, and in every city of the kingdom the unfortunate Ghibelines were inhumanly massacred.

Two months after the execution of Conradin, the pope, Clement IV. died; and as for nearly three years the conclave could not agree in electing a successor, the states of the church remained, during the interval, under the power of Charles. That ambitious prince now aimed at making himself master of all Italy. His attempts had at first every prospect of success. The power of the Ghibeline lords in Lombardy was now much weakened; and at a general diet of the Guelph cities at Cremona, the king of Naples was declared head of their confederation, and was, by many of them, acknowledged as their lord. His attention, however, was now for a time diverted from the affairs of Italy by the last crusade of his brother St. Louis.

On the death of this zealous defender of the faith of the plague near Tunis, Charles assumed the command; but no sooner had he defeated the Bey of Tunis, and compelled him to acknowledge himself a vassal of the crown of Sicily, than he returned home; and his example was followed by the other crusaders, except Edward of England, who alone proceeded to the Holy Land.

The cardinals at length elected Tebaldo Visconti, then in Palestine, who, on his return, assumed the name of Gregory X. His first attempt was to reconcile the Guelph and Ghibeline states. For which purpose he travelled into Tuscany; and at Florence, Pisa, and Sienna, was successful in recalling the Ghibeline exiles. But the king of Naples, who considered this pacification as not at all conducive to his interest, contrived, in a very short time, to force them again to emigrate. The pope, fully aware of his ambitious designs, attempted to give a head to the empire, who might serve as a check to him; and having persuaded the other competitors to withdraw their claims, Rodolph of Hapsburg was elected king of the Romans. He next succeeded in reconciling to the Western church the Grecian emperor, Michael Paleologus; and still retaining that zeal against the infidels, which had carried him in his youth to Palestine, was preparing to lead another army of crusaders to that country, when his plans were interrupted by death. The reigns of his three immediate successors, Innocent V., Adrian V., and John XXI., together only lasted one year; but Nicholas III. the next elected pontiff, exerted all his great personal talents, and the interest of his family, (the Orsini at Rome,) to carry into effect the schemes of Gregory X. Having conciliated the friendship of the German monarch, he contrived completely to shake off the yoke of Charles of Anjou; and had afterwards the honour of acting as mediator between these two princes. The latter was obliged to give up the office of senator of Rome, and head of the Tuscan League; and the former granted the long denied charter, which entirely separated the territories of the See of Rome from the domains of the empire. Having appointed his brother, Bertoldo Orsino, count of

Romagna, he nominated seven new cardinals of his family and connections, and thus secured a majority in the sacred college. His last act was to bring about, by means of his legate cardinal Latino, a peace at Bologna, between the Gierimei and Lambertazzi, two powerful families, whose dissensions had involved their fellow citizens in war; and at Florence, between the Guelphs and Ghibelines. These transactions were soon followed by the death of Nicholas, whose reign had been thus useful to the church, and advantageous to his own family.

An important revolution had in the mean time taken place at Milan. The archbishop, Otho Visconti, with the nobles, after a long warfare, defeated and took prisoner Napoleon della Torre; and the Milanese, having expelled the remaining branches of the family, conferred the sovereignty on Visconti; who thus became the founder of a dynasty of princes, whose sway, at an after period, extended over all Lombardy.

On the death of the late pope, the cardinals, influenced by the threats and violence of the king of Naples, elected as his successor Martin IV.; who, entirely devoted to the interest of Charles, deprived the Orsini family of the government of Romagna, filled Italy with its exiles, and the Neapolitan treasury from the confiscation of their property. The pontiff also, to second Charles' designs against the Grecian emperor, excommunicated him for relapsing into heresy, and dignified with the title of a crusade the expedition against Constantinople, for which Charles was making preparations. But it was destined that a check should now be given to the ambition of the king of Naples, and a bloody sacrifice affixed to the shades of Manfred and Conradin. John de Procida, a nobleman of Salerno, the physician and friend of Frederic II. and Manfred, had, on the death of Conradin, taken refuge at the court of Peter and Constance of Arragon, and was by them honourably recompensed for his attachment to the house of Suabia. But his ardent spirit could not enjoy repose, while his country was enslaved by the murderer of her princes. Having, therefore, excited Constance and Peter to undertake the defence of the oppressed Sicilians, whom he visited, and whose spirit he kept alive, he proceeded to Constantinople, where he obtained pecuniary assistance from the emperor, and to Rome, where he received a promise of aid from Nicholas III. The death of that pope seemed at first to impede his designs; but his successor having insulted the Arragonian ambassadors, Peter at length made serious preparations for invading Sicily, concealing, however, his intentions, by an expedition to the coast of Africa. Procida in the meantime repaired to Sicily, to await a favourable opportunity for insurrection.

This very soon occurred. The brutal insolence of a French officer to a female roused the indignation of the inhabitants of Palermo, and a general massacre of the French was the consequence. The example of Palermo was followed by the other cities of Sicily; and long before the fleet of the king of Arragon reached its shores, the French had been either exterminated, or expelled from the island; Peter and Constance acknowledged as king and queen of Sicily; and the former sent to Charles, whose fleet now besieged Messina, a solemn defiance and challenge. In the mean time, a scarcity of provisions obliged the latter monarch to reland his troops in Italy; and his whole fleet and transports were destroyed by Roger de Loria, the Arragonian admiral. Charles then determined to accept of the challenge of his rival; and it was agreed, that the next year a private and judicial combat should take place at Bourdeaux, under the auspices of the king of England, between 100 knights on each side, which was to decide the fate not only of Naples and Sicily, but of the hereditary dominions of each party. The preparations for this combat left the south of Italy for a short time in a state of tranquillity. But the pope opposed this mode of decision, and in the mean time passed sentence of excommunication against Peter; and, as king Edward I. of England refused to guarantee the place of battle, the king of Arragon did not appear on the day appointed, although waited for by his antagonist. Martin now conferred the title of king of Arragon on Charles of Valois, second son of Philip the Hardy, king of France; and the king of Naples set out by sea from Provence, on his return to Italy. Before his arrival, however, his son Charles, prince of Salerno, had been provoked to hazard an engagement with the Arragonian and Sicilian fleet. The superior skill and valour of Roger de Loria decided the day; and the prince of Salerno, and his principal officers, fell into the hands of the Spanish admiral. Charles of Anjou seemed at first unmoved by this misfortune, and continued to make preparations to invade Sicily; but his disguised distress and anxiety produced a fatal effect on his health, and occasioned his death at Foggia, in the 69th year of his age, and 19th of his reign. His death was soon followed by that of Martin IV. who was succeeded by Honorious IV. a man of talents, but aged and infirm. The kings of France and Arragon also died this year, both in consequence of wounds received in a battle, in which the former was defeated by the latter. Peter was succeeded in Sicily by his second son James; and as Charles of Salerno still continued a prisoner, the kingdom of Naples was administered by Robert count d'Artois, his cousin. The division of the Sicilian kingdoms, and the captivity of the king of Naples, tended considerably to alter the state of Italy; and the republic of Florence, which had lately adopted the democratical form of government, which it continued to retain, was now generally looked up to as the head of the Guelph confederation.

The object of chief interest in the north of Italy had for some years been the naval war between the states of Pisa and Genoa for the possession of Corsica, in which the fleets of the former were repeatedly defeated. The Guelph cities, taking advantage of this, formed a league against Pisa. In this extremity, the Pisans appointed Count Ugolino de la Gherardesca their general. This nobleman was successful in his negotiations to dissolve the league; and, having obtained peace, continued to retain his authority. His tyranny soon became odious to the Pisans; and at length having, in a fit of passion, slain the nephew of Roger Ubaldini, archbishop of Pisa, that prelate headed an insurrection against him. Ugolino was defeated and taken, and, by order of the archbishop, thrown with his sons into a dungeon, where they were left to die of hunger.

Soon after this event, Honorius IV. died, and Nicholas IV. was elected his successor. This pontiff raised the Colonna family in Rome to that power and eminence, which enabled them to rival the Orsini. He also obtained the deliverance of Charles II. king of Naples; but no sooner was that prince set at liberty, than he released him from the obligation of his oath; and the king and pope set themselves to attack the house of Arragon both in Spain and Sicily. On the death of Nicholas, the papal see continued for two years vacant; and was at length filled up by Peter Morone, a hermit, who assumed the name of Celestine V. and entirely submissive to Charles II. took up his residence at Naples. The unfortunate anchorite soon showed his incapacity for reigning; and even Charles found him utterly useless in promoting his designs. He was easily persuaded to resign, and Boniface VIII. was elected; but the latter, jealous of his feeble predecessor, shut him up in a tower in Campania, where he did not long survive.

James of Sicily having now succeeded his brother

Alphonzo of Arragon, Frederic, the youngest of the family, was left to govern Sicily. But James soon after entered into a treaty with Charles of Naples. Having married his daughter Blanche, and given up Sicily, the pope bestowed on him Sardinia and Corsica, although these belonged to the Pisans and Genoese. But the Sicilians, indignant at this treaty, crowned Frederic as their King. In Tuscany, the rivality of the factions of the Bianchi and Neri at Pistoia had spread to Florence and Lucca. In Florence, the Bianchi were headed by Vieri Cerchi, and the Neri by Corso Donati, and the cities presented the same scene of confusion as during the contest of the Guelphs and Ghibelines. By the intervention of pope Boniface, the chiefs of both parties were exiled from Florence; but the Bianchi returning immediately, took possession of the city, and oppressed their antagonists. At Lucca, the Neri were more powerful, and expelled the Bianchi, among whom was Castruccio Castracani, who, retiring to England, entered into the army of that country. The pope now invited to the assistance of the king of Naples against Sicily, Charles of Valois, on whom he conferred the title of Count of Romagna. On entering Tuscany, he was received into Florence on condition of not interfering with the politics of the state; but no sooner was he admitted, than he recalled the exiles; and having arrested the Bianchi, plundered their houses, and banished their chief leaders. Among the latter, were the poet Dante, and the father of Petrarch. Valois then left Florence to carry on the war in Sicily; but the prudence and valour of Frederic overcame all the attacks made upon him, and a peace was at length concluded, when his title was acknowledged by the pope, and his marriage with Eleonora, daughter of Charles II. of Naples, united the interests of the rival families.

The pride and violence of Boniface had now raised against him powerful enemies in the Colonna family, whom he had excommunicated, and in Philip the Fair, king of France, whom he had offended by interfering with the rights of the Gallican church. At length William de Nagaret, a French gentleman, incensed by his insolence, having collected a few soldiers, surprised Boniface in Anagni, and made himself master of his person and treasure. He was however rescued by the people of Anagni, and returning to Rome, put himself under the protection of the Orsini. But indignation at the late insult offered him, had aggravated the violent passions of the pope. He soon took offence at his protectors, and was preparing to leave them, when he was prevented by the Orsini, and confined to his apartment. Boniface was now raised to a pitch of insanity; he refused all sustenance, and the following morning was found dead in his chamber, having repeatedly dashed his head against the wall.

Into the transactions of Lombardy at this period, it is impossible for us to enter at large, from the intricacy of its revolutions, and the rapid changes in the government of its cities: it was at present engaged in ineffectual struggles against its tyrants. The king of the Romans, Albert of Austria, fully occupied in combating his German rivals, could take no interest in the affairs of Italy, and the king of France alone possessed any influence. Benedict XI. who succeeded Boniface, having retired from Rome, where his power was thwarted by the cardinals of the Orsini and Colonna families, took up his residence at Perugia, where his first act was to excommunicate those concerned in the outrages offered to his predecessor. But Philip, who supposed himself included in this sentence, and dreaded more decided opposition, contrived to have a poison administered to Benedict, which occasioned his death in a few days.

The contest in the conclave lasted nearly a year, but at length the artifices of Philip prevailed, and the new pope, Clement V. took up his residence in France, and shewed himself completely devoted to the interests of the king. At his request the emperor Andronicus was excommunicated, and the order of the Knights Templars, whose riches had excited the cupidity of Philip, were cruelly proscribed.

The party of the Neri, now triumphant at Florence, had, after a long siege, made themselves masters of Pistoia, and dispersed an army led by Cardinal Orsini against them. In Lombardy, Matthew Visconti had been expelled from Milan, and most of the other cities were distracted by internal commotions; and the death of Azzo VIII. had involved his states in a war between his natural and legitimate children. Charles II. of Naples was also dead, and was succeeded by his second son Robert, by the decision of the pope, who set aside the right of Caribert, king of Hungary, the son of Robert's elder brother.

On the assassination of Albert of Austria by his nephew, Henry count of Luxemburg was nominated king of the Romans; and having secured for his son John the kingdom of Bohemia, prepared to pass into Italy. He first endeavoured to conciliate the friendship of the pope, by confirming the grants of his predecessors to the church.

Having then proceeded to Lausanne, he was met by the deputies of most of the Italian states, who vied with each other in their professions of attachment; and the Pisans, especially, having laid at his feet 60,000 florins, urged him immediately to visit Tuscany. The only powers who did not send deputies were, the king of Naples, and the republics of Florence, Lucca, Sienna, and Bologna. These feared, lest, by publicly acknowledging his authority, they should afford him a pretext for interfering with their affairs, and recalling the exiles. Henry then arrived at Asti, where he was joined by the Lombard lords; and from thence to Milan, the gates of which were, after some hesitation, opened to him by Guido della Torre. At Milan he received the iron crown of Lombardy; and, having received the oath of fidelity from the states, succeeded in most of them in pacifying the factions. But a sedition was soon excited at Milan, by a demand of a considerable contribution, which the poverty of Henry rendered necessary; and although it was quelled by the expulsion of Guido della Torre and his family, yet it spread to the other towns; and Henry was obliged to reduce Lodi, Como, and Cremona. But Brescia resisted him, and only capitulated after a tedious siege. Genoa was next visited by Henry, where he met a similar reception; loyal at first; but they, too, were disgusted by his rapacious exaction. In the mean time the king of Naples and the Florentines prepared for war; and it was only by means of Count Guido, and the Ghibelines of Tuscany, that Henry escaped the Florentines, while on his way to Pisa. At that city his pecuniary wants were supplied; and, after being treated with the greatest respect for two months, he proceeded to Rome, at the head of an army of exiles of the Ghibeline and Bianchi factions. The troops of Naples had, however, taken possession of the Vatican; and the ceremony of his coronation was performed, in the church of the Lateran, by three cardinals appointed by Clement for this purpose. He then returned to Tuscany, and sat down before Florence; but, although that state had received considerable reinforcements, it did not venture to attack him. Having thus defied Florence, the emperor encamped at Poggibonzi, where he solemnly pronounced sentence against the king of Naples; and the Florentines, who had now entered into a solemn treaty with Robert, and acknowledged him as their protector and lord, were included in the same condemnation. The emperor having now formed an alliance with Frederic, king of Sicily, and received an additional body of German troops, and the promise of aid from the Pisan and Genoese fleets, proceeded to invade the kingdom of Naples. But these preparations were rendered nugatory, by the sudden death of Henry, while on his march at Buonconvento, near Sienna; and this unexpected event occasioned the immediate dispersion of his army. The body of the deceased emperor was magnificently entombed at Pisa; and that republic, justly alarmed for its safety, took into pay about 1000 German soldiers, under the command of Uguccione della Faggiuola, on whom they conferred the lordship of their city.

This general proceeded to attack Lucca, which he surprised, and gave up to pillage. He next laid siege to the castle of Montecatini, but was attacked by the Florentines, under the command of Philip, prince of Tarento, brother to Robert of Naples. But the Pisan troops were victorious; and after a severe engagement, in which Peter, prince of Naples, and Charles, son of Philip of Tarento, were slain, the Florentines were put to flight, with the loss of 2000 killed, and 1500 prisoners.

But the tyranny of Uguccione, after this victory, soon occasioned his downfal. The people of Lucca, indignant at the arrest of their brave countryman Castracani, were the first to revolt; and while Uguccione marched with his troops against that city, its example was followed by Pisa: and thus excluded from both states, he was forced to take refuge at the court of Cane Grande della Scala, at Verona. His retreat was followed by a general peace in Tuscany.

In Lombardy, the prince of Verona had made himself master of Vicenza, then under the government of Padua, the only remaining free state of Lombardy; and obliged the latter state to accede to an unfavourable treaty. But the Paduans having infringed the treaty, were so powerfully attacked, that feeling the want of a leader, they were obliged to confer the sovereignty on James of Carrara, in whose family it long continued. Not long after, Cremona was taken by Galeazzo Visconti, and added to the territory of Milan. When the Lombards lost their liberties, they lost with them their former enterprizing spirit of commerce, which was transferred to the still flourishing republics of Tuscany; and, although encouragement was given to poetry and the arts, at the courts of the petty sovereigns of Lombardy, it is remarkable that the objects of it were generally natives of other states.

At this period, the succession to the empire was contested by Louis of Bavaria, supported by John, king of Bohemia, son of the late emperor; and Frederic of Austria.

Pope Clement V. having died at Avignon, was succeeded by John XXII. who directed his chief attention to raise again the Guelph party in Lombardy, and humble the rising power of the Visconti, but without success; for Galeazzo, son of Matthew Visconti, retained the power of his father, and was assisted by Louis of Bavaria, who had defeated his rival. The pope, indignant at this protection given by Louis, notwithstanding his protestations, proceeded to depose and excommunicate him. Louis had, however, now acquired an adherent, whose victories made more impression than the papal anathemas. This was Castruccis Castracani of Lucca, who had made himself master of Pistoia; and, assisted by Visconti, had completely defeated the Florentine army, and taken their general Raimond de Cardone prisoner, whom he conducted in triumph to Lucca, after insulting the Florentines by encamping under the walls of the city, and actually celebrating games there. The Florentines now had recourse to the king of Naples, on whose son, Charles, duke of Calabria, they conferred, for ten years, the military government. In the mean time, Louis arrived at Trent, where, at a meeting of the Ghibeline deputies, he openly accused the pope of heresy. At Milan he received the iron crown; but jealous of Visconti, who had so eminently served him, he expelled him from the city, and imprisoned his adherents. He next forced Pisa to open her gates to him; and, accompanied by Castruccio, whom he created duke of Lucca and Pistoia, proceeded to Rome, where he was invested with the imperial crown, without the authority of the pope. In the mean time, the duke of Calabria having taken Pistoia, Castruccio returned to Tuscany, and was successful in recovering it; but died, in consequence of the fatigue he underwent, aged 47. Galeazzo Visconti, who served in his army, fell also a victim to fatigue; and their deaths were soon followed by that of the duke of Calabria; and the republic of Florence was released at once from the dread of a powerful antagonist, and a foreign lord.

The conduct of the emperor now rendered him hated and despised in Italy. Having deprived the children of Castruccio of Lucca, he actually set it up to sale, and disposed of it to a Genoese nobleman; and his conduct to his other allies was no less disgraceful. Milan was regained by Azzo Visconti, who refused admittance to Louis; and that prince, still farther weakened by the death of Cane della Scala of Verona, retired to Bavaria, to defend himself against the attacks of the Austrian family. On the retreat of Louis, John, king of Bohemia, son of the emperor Henry VII. entered Lombardy, and in one year made himself lord of many of the principal cities. His success was but transient; the king of Naples, and the republic of Florence, first attacked him, and were even joined by their ancient antagonists, the Ghibeline princes of Lombardy, and the emperor; and the king of Bohemia, unable to withstand such a confederacy, retired to Paris, having first sold the sovereignty of the states which had submitted to him.

During the pontificate of Benedict XII. the successor of John XXII. the rising power of Florence is the chief object worthy attention. Having obtained, in addition to their former allies, the assistance of the republic of Venice, they succeeded in humbling Mastino della Scala of Verona, who had made himself master of Lucca; and soon after purchased from him that city, of which, however, the Pisans contrived to gain possession, and defeated the Florentines. Walter de Brienne, titular duke of Athens, the general of the troops of Florence, had, by his intrigues, persuaded the people to appoint him lord of the city; and, desirous to make himself completely sovereign, betrayed the interests of the state, by making peace with the Pisans, and giving up all claims on Lucca. His power, however, was not of long continuance; the citizens rose in a body, and, having put to death the ministers who had been the tools of his tyranny, forced him to take refuge in his palace, from which he fled privately on the 26th of July, 1343: a day, whose anniversary continued to be held sacred at Florence.

The expulsion of the duke of Athens was followed by an attempt of the nobles to obtain a share in the government, but without success. In the mean time, the rest of Tuscany was annoyed by a body of 2000 disbanded mercenaries, which had been in the service of Pisa, who, headed by a German, styling himself duke Guarniari, laid waste and plundered the whole country. The smaller states were glad to get rid of this "great company," as it was called, by the payment of a contibution; and at last, having pillaged the most fertile parts of Romagna and Lombardy, they retired to Germany loaded with booty. The impunity with which these banditti escaped held out encouragement to similar adventurers, whom we shall afterwards find acting a considerable part in the affairs of Italy.

The kingdom of Naples was now destined again to be the scene of war. On the death of king Robert, who had arrived at the advanced age of eighty, he was succeeded by his grand-daughter Jane, or Joan, who was married to her cousin Andrew, second son of Caribert king of Hungary. But the criminal passion of the queen for his cousin Louis, prince of Tarento, on the one side, and the jealousy, violent temper, and ambition of Andrew, on the other, rendered this union unhappy. At length the party attached to Jane determined to dispatch the king; and, with the knowledge and participation of the queen, soon carried their designs into execution in a very barbarous manner. This atrocious act, which could not be concealed, excited general indignation in the kingdom; and the pope, Clement VI. immediately insisted on the punishment of the principal conspirators; and Louis, king of Hungary, brother to the deceased, openly accusing Jane as an accomplice, and asserting his own rights to the kingdom, prepared to maintain them by a powerful army. At this period, the emperor, Louis of Bavaria, died, and was succeeded by Charles IV. son of John, king of Bohemia, who had been slain at the battle of Crécy: a prince whom the pope had set up in opposition to Louis some time before his death. This year was also distinguished by the short-lived revolution at Rome, under Colas de Rienzo; and by a general famine throughout Europe, which was followed by pestilence, which, first appearing in Turkey, spread in the course of the three following years through every country of the continent, from whence it passed to Britain, and even to Iceland. In Italy its ravages were tremendous. In the city and territory of Florence alone, Boccace estimates the number of deaths at 100,000; and at Pisa, out of every ten persons, seven fell victims to the contagion. This dreadful scourge occasioned a temporary cessation of war in the north of Italy. In the south, it compelled the king of Hungary to evacuate the kingdom of Naples, from which queen Jane and her second husband, Louis of Tarento, had fled to Provence. His retreat enabled them to return; and, on his second invasion, Jane, having obtained from him a truce, agreed to have her conduct investigated by the pope. The decision of the court of Avignon was in her favour: The pope acknowledged Louis of Tarento king of Naples, but ordained 300,000 florins to be paid to the king of Hungary, to defray the expences of the war. But that monarch declared, that he did not make war for money, but to avenge the death of his brother; and suffered the queen to be reinstated, without demanding the subsidy.

The picture which Italy presents, for a series of years after this period, is truly deplorable. In Lombardy, all the smaller states were falling, one by one, a prey to the tyranny of the Visconti. That family was now represented by Barnabas and Galeazzo, who, having poisoned their elder brother Matthew, divided between them their dominions; and exercised throughout Lombardy, on their subjects and their enemies, cruelties equal to, if not surpassing, those of Eccelino Romano. In Tuscany, the rivalship of Florence and Pisa, of Sienna and Perugia, kept alive constant warfare; and the bands of adventurers employed in their wars spent the short intervals of tranquillity in oppressing the smaller states, and plundering the peasantry. Naples was overrun by bands of the same description, whose depredations the feeble and dissolute government of that kingdom was unable to repress. In Romagna, the troops of Innocent VI. had succeeded in executing the designs of his predecessors, and subjected to his immediate sway all the free cities and independent nobles. Bologna was the last that surrendered, being also attacked by the army of Barnabas Visconti. That lord immediately declared war against the pope, but was at first repulsed by the troops of the king of Hungary, his ally. Barnabas, however, having joined the Pisans, engaged in his service a band of English adventurers, commanded by John Hawkwood, and proceeded against Florence. His new auxiliaries had introduced with them what was more fatal than the arms of Visconti, the plague, which again commenced its ravages in Florence, and obliged its citizens to remain spectators of the devastations occasioned by the combined armies, with whom their general Malatesti had a treasonable connection. At length, the Visconti, having concluded a seperate treaty with the pope, the example was followed by Pisa and Florence, and a few years of tranquillity were given to Tuscany.

On the death of pope Innocent, Urban V. had returned to Rome, aware that his presence was necessary in Italy to check the power of the Visconti; who, being now allied by marriage to the kings of France and England, set no bounds to their ambition. For this purpose, at his desire, the emperor Charles IV. entered Italy with a powerful army; but the Visconti, aware of his avarice, procured a peace by the advance of a sum of money. His other transactions in Italy were of a similar nature: for money he granted a peace to the Pisans and Florentines; and, for a similar reason, liberty to the city of Lucca. Having attempted to interfere in the affairs of Sienna, his troops were defeated, and he himself obliged to secure his safety by flight. His return to Germany was soon followed by that of the pope to Avignon, after venting his wrath by excommunicating Barnabas Visconti; a sentence which that tyrant so much disregarded, that he forced the legates actually to swallow the bulls which they had presented to him.

On the death of Urban, Gregory XI. recommended war; but the Florentines, distrusting him, concluded an alliance with Visconti. The states of the church again rebelled, and Gregory was obliged to visit Italy, having first condemned the Florentines. But these republicans, despising the interdict, continued the war, having engaged in their service Hawkwood and the English condottieri. At length, Bologna having detached itself from the league, and made a separate treaty with the pope, a congress met at Sarzana to negotiate a general peace. It was, however, suddenly dissolved by the death of Gregory—an event which produced important changes in the state of Italy.

As there was a majority of Limousin cardinals in the conclave, the election fell on the archbishop of Bari, who took the name of Urban VI. a person entirely devoted to their views. But his election was opposed by the other cardinals; and, as his character soon shewed itself in his imprudent and violent conduct, his enemies in the college having assembled, declared the election illegal, and nominated Robert of Geneva, who took the name of Clement VII. To him, Spain, France, and Naples adhered; while Urban was acknowledged in Italy, Germany, England, Hungary, and Portugal. This schism almost completely destroyed the papal authority; for neither the one nor the other pontiff could, from their individual character, command the respect of the Christian world.

The schism in the church was followed by general revolutions in Italy. At Florence, the family of the Albizzi having endeavoured to expel their political rivals from the city by force of arms, were successfully opposed by Salvestro di Medici and Benedetto Alberti; but during these commotions, the Ciompi, or lowest class of artizans, having taken arms, defeated the magistrates and officers of justice, effected a temporary change in the government; but this new administration was (as might be supposed) of no long duration; and, after a few weeks, the Alberti and Medici families acquired the ascendancy.

The same year, Galeazzo Visconti died at Milan, and was succeeded by John Galeazzo, his son. The death of the emperor Charles IV. soon followed, and Wrenceslaus, his son, was elected king of the Romans. The antipope Clement, hitherto protected by queen Jane, was forced, by the machinations of Urban, to take refuge at Avignon. The pope also raised up a rival against the queen, in the person of Charles Durazzo, her nephew, the legitimate heir of the crown; although Jane had adopted, as her son and successor, Louis of Anjou, brother of king Charles V. of France.

The army of Charles, consisting chiefly of adventurers, and a few Hungarians, passing through Tuscany, made a conquest of Arezzo. At Rome, Charles received the investiture of the kingdom, and took the title of Charles III. and then made himself master of Naples, without opposition. The queen having surrendered herself, was smothered to death by his orders.

Louis of Anjou immediately asserted his rights, and invaded Naples with a powerful army; but his death at Bari dispersed his troops, and left Charles, for a time, without a competitor. He, however, only survived one year, being murdered in Hungary, (whither he was called by the barons of that country,) by order of the widow and daughter of king Louis. His son Ladislaus, only ten years old, was left under the care of his mother Margaret; but a powerful party in the kingdom proclaimed Louis II. of Anjou, also a minor; and Naples, torn by the contests of the rival factions, remained in a state of anarchy.

In the mean time, John Galeazzo Visconti having poisoned his uncle Barnabas, and being now sole master of Milan and its conquests, aimed at the dominion of all Lombardy. The Venetians had incited Antonio della Scala of Verona to make war against Francisco Carrara of Padua, who had formerly assisted the king of Hungary against them; but Visconti, having allied himself with the latter prince, made himself master of Vicenza and Verona, and obliged della Scala to take refuge at Venice. In order to evade his promise of giving up Vicenza to Carrara, he next agreed with the Venetians to divide the Paduan territories, and made war on his former ally. On this formidable league being formed against him, the elder Carrara abdicated in favour of his son Francisco Novello, and retired to Treviso.

That prince, however, unable to defend himself, was, with his father, obliged to surrender; but the treacherous Visconti immediately threw them into prison. Having thus overcome his two principal rivals, he might now be considered as master of Lombardy, as the the families of Savoy, Monferrat, Gouzaga, and Esté, were his allies, or rather dependants. The character of this new disturber of Italy differed greatly from former conquerors. Incapable of heading an army, and of a timid and suspicious nature, his plans as a statesman were bold and enterprising; trusting to others the execution of his designs, his measures were taken with promptitude and decision; while no feelings of justice or humanity, of shame or remorse, ever impeded his unprincipled ambition.

His views were now directed to Tuscany, where he attempted (though without success) to make himself master of Pisa. He next endeavoured to excite the jealousy of the other states against the Florentines, whom he justly regarded as his most formidable opponents; but they, aware of his designs, prepared, in conjunction with the Bolognese, to defend themselves against his attacks. In the mean time, Francisco Novello Carrara, having discovered that Visconti intended to put him to death, escaped with his family from his place of confinement, and, after a series of interesting adventures, at length succeeded in reaching Florence, where he left his wife and children. He then proceeded to Bologna, and, receiving from that republic promises of support, repaired to Bavaria, and persuaded the duke to lead his army into Italy in behalf of the Florentines. While he was thus employed, the army of Visconti, and his allies, amounting to 15,000 horse, and 6000 infantry, proceeded into Tuscany. The united army of Florence and Bologna was far inferior in number; but its commander, Hawkwood, was greatly superior to the Milanese generals. But, before any action could take place, Carrara, at the head of a few hundred men, had, without waiting for the Bavarians, passed through the Venetian into the Paduan territory. His former subjects received him with enthusiasm; and having, during the night, entered the city by the bed of the Brenta, he easily overpowered John Galeazzo's soldiers, and once more became lord of Padua. But the Florentines were not so fortunate in all their allies. The duke of Bavaria, who soon after reached Padua, being prevailed on, by the intrigues of Visconti, to desert the league, John, count of Armagnac, who also brought his troops to their assistance, was defeated by James del Verme, near Alexandria, and died soon after of his wounds. His defeat exposed Hawkwood and the Florentine army, who had advanced towards Milan, to the most imminent danger, the Milanese general having cut the dikes of the Adige, and inundated the valley of Verona, where they were encamped; but Hawkwood, leaving his camp, to deceive the enemy, marched during the night through the inundated plain, and, after much fatigue and danger, at length arrived in Tuscany. A short peace followed, but was soon disturbed by the machinations of Visconti; and the next ten years contain nothing but events of the same nature. The emperor Wrenceslaus having in vain attempted to obtain money, by offering his assistance against Visconti, at length concluded an alliance with him, and erected his dominions into a regular fief of the empire, with the title of duke of Milan. Successive intrigues made him master of Pisa, Sienna, and Perugia; and Florence, deserted by her allies, alone remained unsubdued. In the mean time, the princes of the empire deposed the emperor Wrenceslaus for incapacity, and elected Rupert, elector-palatine, on the express condition of his revoking the grant of the dukedom of Milan. This prince was not, however, acknowledged by Boniface IX. who was unwilling to incur the displeasure of Visconti. Having, notwithstanding, contracted an alliance with the Florentines, he entered Lombardy with an army; but, being met near Brescia by the forces of the duke of Milan, the Italian cavalry soon evinced their superiority, and Rupert was forced to retreat. Leopold of Austria, and the archbishop of Cologne, having left him, and returned home, he was obliged to remain in a state of inactivity, and soon after to evacuate Italy.

Visconti now turned his arms against John Bentivoglio, lord of Bologna, and, being successful in gaining the city, put him to death. Florence was now left without an ally; all the cities which formerly served as outlets for its commerce were in the hands of its enemy, and its citizens were reduced to the greatest distress, when Providence interfered in their behalf: the plague again broke out in Lombardy, and the tyrant of Milan was cut off in the midst of his successful career.

By his will, his states were divided among his sons, under the care of their mother Catharine, daughter of Barnabas Visconti. But one year had scarcely elapsed, before many of his conquests had returned to their former owners. Bologna again obeyed Boniface IX: Sienna asserted her liberty; and the duchess Catharine, seized by the Milanese, died in prison, by poison. Carrara took Verona and Vicenza; but the Venetians, retaining their ancient hatred against the family, soon deprived him of his conquest, and excited a conspiracy at Padua against him. He was at length forced to throw himself on their mercy; but the supreme council were inflexible, and this gallant and unfortunate prince perished, with all his family, in the dungeons of Venice.

The same year is distinguished by the capture of Pisa by the Florentines, and the final destruction of the independence of that state. This was the first departure of that republic from its former liberal policy; and the era of the decay of its civil liberties, may be dated from its first war of conquest. The papal chair was now filled by Gregory XII and Benedict XIII. was the antipope at Avignon; but the clergy, weary of the schism, endeavoured to prevail on them to refer their claims to a general council. The popes at first consented, but afterwards refused to appear; but their cardinals, with deputies of the clergy, and ambassadors from the different states, assembled at Pisa. The first result of their deliberations, was to condemn both the popes as guilty of heresy and schism, and to declare the pontificate vacant. The archbishop of Milan was elected by the name of Alexander V. under the promise of soon calling another council, for the reformation of the clergy.

The states of the church were, however, in the hands of Ladislaus, king of Naples, who, under pretence of embracing the party of Gregory XII. retained them in his name. But the Florentines and Siennese determined to assert the rights of the church; and, bribing into their service Braccio Montone, a celebrated leader of condottieri, and many other of his associates then in the pay of Ladislaus, prepared to combat the king of Naples with his own troops. That prince first commenced the war by the invasion of Tuscany, but his projects were thwarted by the military skill of Montone; while the Florentines, assisted by Louis II. of Anjou, who had received the investiture of Naples, carried the war into the states of the church, and made themselves masters of Rome. But Alexander V. did not live to enter that city, having died at Bologna. His death was generally ascribed to the effects of poison, administered to him by Cardinal Cossa, who was elected his successor, under the name of John XXIII. Louis of Anjou, after two unsuccessful campaigns, at length defeated Ladislaus at Rocca-secca; but, unable to improve his victory, was again forced to return to France, and interfere no more with the affairs of Italy. The pope was forced to leave Rome, and take refuge at Florence; and that state, menaced by the Neapolitan troops, commanded by Sforza, were on the point of concluding a treaty with him, when Ladislaus was attacked by a disease, said to have been occasioned by his excesses, which soon terminated in his death.

In Lombardy, John Maria Visconti, duke of Milan, and Facino Cane, his principal general, were murdered by Hector, a natural son of Barnabas Visconti; but Philip Maria, the second son of John Galeazzo, having married the widow of Cane, (aged 40, while he was only 20,) was followed by the soldiery, and soon regained the city of Milan.

The death of the emperor Rupert was followed by the election of Sigismund, king of Hungary, who, anxious to put an end to the schism in the church, prevailed on John XXIII. to call another general council at Constance. On the proceedings of this celebrated assembly, it is impossible to dwell here. After long deliberations, John XXIII. and his two rivals, Gregory IX. and Benedict XIII. were deposed: the abuses in the church, and the vices of the clergy, were exposed without any steps being taken for their reformation; while their zeal against reformers was shewn by the cruel execution of John Huss, and his disciple Jerome of Prague, although the former had received a guarantee of safety from the emperor. At length a new head was given to the church, in the person of Martin V. of the Colonna family, and his first act was to dissolve the council, and reserve to himself the farther reformation of the clergy.

At Naples, Jane II. the sister and successor of Ladislaus, had married James of Bourbon, Count de la Marche; but that prince, irritated by the irregularities of his wife, treated her so ill, that the people of Naples revolted against him; and, the pope having declared in favour of the queen, he returned to France, where he soon after died in a convent. But Louis III. of Anjou, having asserted his claims to Naples, succeeded in obtaining the concurrence of Martin, and the assistance of Sforza. On the other hand, Jane had recourse to the alliance of Alphonzo of Arragon, to whose family the crown of Sicily had again returned, whom she adopted as her heir. She also engaged in her service, Braccio Montone, who had now established himself in the principality of Perugia, his native city. This war was terminated in two years, by the intervention of the pope, and Louis again retired to Provence. But Alphonzo, jealous of the influence of Caraccioli, the queen's favourite, caused him to be arrested, and attempted to seize the queen, who had recourse to the protection of Sforza, who defeated Alphonzo, but was obliged to retreat to Aversa. Jane now chose Louis as her successor, and was assisted by the armies of the Duke of Milan, and Francis Sforza, the successor to the command of the troops of his father, who was drowned in crossing the river Pescara.

The party of Jane was successful. Don Pedro, brother to Alphonzo, was obliged to yield Naples, and shut himself up in a fortress; and the queen was completely re-established in her authority, by the decisive battle of Aquila, and the death of Montone. The remains of his band of adventurers entered into the Florentine service, under the command of Nicholas Piccinino. Martin V. resumed the territories wrested from the church; and of all the principality of Braccio, nothing was left to his son Count Oddo but the castle of Montone.

At this period, the chief influence at Florence was possessed by Nicholas d'Uzzano, of the same party and policy as Maso Albizzi; but, notwithstanding his power, the Medici, at the head of the democratical party, were gradually increasing in wealth and authority, and John di Medici, (father of the great Cosmo,) now attained to the office of gonfalonier of justice.

A treaty had been concluded with Philip Visconti; but the ambitious spirit of that prince soon excited new wars and revolutions. Francis Carmagnola, his general, had succeeded in the conquest of Genoa, which was in a state of anarchy from its intestine discords. This was followed by the acquisition of Parma and Bergando; and Brescia and Crema were surrendered to his arms. Bellinzona, Duomo d'Ossola, and the Levantine Valley, were next wrested from the Swiss; but 3000 of that gallant nation having crossed Mount St. Gothard, attacked the army of Carmagnola, which, although consisting of 24,000, was with difficulty able to keep its ground, and the Swiss were permitted to retire unmolested.

The interference of Visconti, in the affairs of Romagna, after the death of Montone, was considered by the Florentines as an infraction of the treaty, and war was immediately commenced; but the republicans were defeated in six successive battles, and obliged to apply for aid to the senate of Venice. In the meantime, Carmagnola, having incurred the jealousy of Philip, had fled to Venice, where, eager for an opportunity of revenge, he zealously pleaded the cause of Florence; and the senate, roused by his exhortations, placed him at the head of their troops. Brescia soon submitted; and the duke alarmed, acceded to a peace with the republicans, allowing them to retain their conquest. But the Milanese, dissatisfied with the terms of the peace, prevailed on Philip immediately to break the treaty, and invade Mantua. His troops were at first victorious; the event of a second battle was doubtful; but in the third, which was fought at Macalo, on the Oglio, Charles Malatesti was completely defeated, and, with 8000 men, was taken prisoner by Carmagnola. They were, however, released next day, by the generosity of that leader and his soldiers; but this act excited the suspicions of the supreme council of Venice, and afterwards occasioned his ruin.

This defeat occasioned a second peace between Philip and the republics. But the attempts of Florence against Lucca being frustrated by Sforza and Peccinini, now in the pay of the duke, the war was again renewed, but with less favourable auspices. The Venetian fleet on the Po was almost entirely destroyed by the Milanese, and the army of Carmagnola surprised and routed near Soncino by Sforza, while in Tuscany, Piccinino made demonstrations against Pisa, and laid waste the Florentine territory. After his defeat, Carmagnola continued for some time in a state of inaction, which increasing the suspicions of the Venetian council, he was invited to Venice, to give his advice on the sate of affairs; but no sooner had he arrived than he was thrown into prison, and after a secret trial, where he suffered the torture of the rack, was publicly beheaded in St. Mark's place. His trial was never made public, but throughout Italy he was generally considered as a victim rather to the jealousy, than the revenge of the Venetians.

In the meantime, Martin V. had been succeeded in the pontificate, by Gabriel Condolmieri, a Venetian, who embraced the cause of the republics and of the Orsini at Rome. But this pope, who took the name of Eugene IV. was hasty and passionate, and his whole reign exhibits a series of contests with the Colonna; the Hussites in Bohemia; the council at Basle for the reformation of the church; and his own vassals in Romagna.

The emperor Sigismond now entered Italy, and at Milan received the iron crown, but without obtaining an interview with the duke. He then succeeded in restoring peace between the republics and Philip; and, repairing to Rome, was invested with the imperial crown, from whence, after attempting in vain to act as mediator between the pope and the council of Basle, he returned to Germany, convinced by experience, that it was in vain for an emperor, without an army, to interfere in the affairs of Italy.

The death of queen Jane II. of Naples, now re-kindled the war in that country. The Neapolitans embraced the party of Rene of Anjou, son of Louis III. while the duke of Suessa, the prince of Tarento, and the Count of Fondi, declared in favour of Alphonzo of Arragon. The latter prince, whose actions entitled him to the appellation of the magnanimous, having engaged the Genoese fleet near Gaeta, was defeated, and with his brothers made a prisoner, and conveyed, by order of Visconti, from Genoa to Milan. Here his brilliant talents and amiable manners were more effectual than his arms; and the duke, persuaded by his arguments, renounced his connection with the French, and allied himself to his captive, whom he immediately set at liberty. But the Genoese, on receiving Visconti's orders to reconvey Alphonzo to Naples, determined no longer to be the submissive slaves of his caprice; and expelling the Milanese governor, and the garrisons of Genoa and Savona, reasserted their liberty, and leagued themselves with the Venetians and Florentines. The ruling party in the latter state was now that of the Medici. Two years before, the death of Nicholas d'Uzzano, who had kept in order the rival factions, had thrown the chief power into the hands of Rinaldo Albizzi, who having brought Cosmo di Medici to trial, obtained his banishment to Padua. Not content with the exile of his rival, Rinaldo proposed to attack those magistrates who opposed his measures; but in this his friends refused their aid. The magistrates soon after having cited him to appear, to give an account of his conduct, on his resistance, exiled him and his principal adherents, and recalled Cosmo di Medici. Rinaldo, who took refuge at Milan, incited Visconti again to make war on Florence, and Piccinino again invaded Tuscany. This war, which continued for five years, with various success, is more interesting from the military achievements of Sforza and Piccinino, than the importance of its results to the parties concerned. It was at length terminated by Visconti, who submitted the terms of the treaty to the arbitration of Sforza, the commander of the republican troops, whose interest he attempted to conciliate, by conferring upon him the hand of Bianca Visconti, his natural daughter, with Cremona and Pontremoli as a dowry.

In the mean time, Eugene IV. had been declared contumacious by the council of Basle, which elected, as his successor, Amadeus VIII. of Savoy, who resigning his temporal dominions to his son, took the name of Felix V. On the other hand, Eugene called a rival council at Ferrara, which afterwards removed to Florence, where the emperor John Palaeologus VI. and the deputies of the Greek church met, in order, if possible, to effect a union between the churches.

Three years before this period, Rene of Anjou had entered Naples, but, notwithstanding the assistance of Pope Eugene, his influence daily declined; and Alphonzo having defeated the lieutenants, and taken possession of the fiefs of Sforza in Abruzzo, proceeded to besiege Naples.

Sforza prepared to march to the assistance of Rene, but Visconti, jealous of his son-in-law, hinted to Eugene that this was now the time to recover the marquisate of Ancona from Sforza; and sent Piccinino to command his army. But during these transactions, Alphonzo succeeded in surprising Naples, and Rene was forced, like his ancestors, to retire to his hereditary states.

Sforza was now attacked by the pope, the king of Naples, and the duke of Milan; and at the end of four years was reduced to the greatest extremity, when he was joined by the Venetians and Florentines, through the influence of Cosmo di Medici, who was his personal friend. Their combined efforts were successful, Sforza was re-established at Ancona, and the war was even carried to the gates of Milan, when Visconti again made offers of accommodation to his son-in-law, which Sforza, by the secret advice of Cosmo, accepted, and leaving the marquisate of Ancona to Pope Nicholas V. who had a short time before succeeded Eugene, proceeded to march to the assistance of the duke against his former allies. But his progress was arrested by the accounts of the death of Philip, of a dysentery, at Porta Zobbia, and the revolution at Milan occasioned by that event.

On the duke's death being known to his council, it was debated whether the sovereignty should be offered to Sforza, or Alphonzo of Arragon. The latter party had the majority, and the first intimation which the citizens of Milan received of the death of Visconti, was the hoisting of the Arragonian banners on the castle. Four distinguished citizens, however, Trivulzio, Bossi, Lampugnani, and Cotta, having barricaded the streets, and cut off the communication with the castle, called a meeting of the deputies of the people, who, asserting the independence of the republic, established a constitution similar to Florence. The example of Milan was followed by Pavia and Parma, which established independent governments, but most of the other cities agreed to follow the fate of Milan.

The Venetians having refused to enter into a treaty with the new republic, the war still continued; and Sforza being invited by the Milanese to become their general, found it prudent to become the servant of those whom he had hoped to govern.

The senate of Milan had soon occasion to distrust their new general, on whom the Pavisans conferred the sovereignty of their city; as, desirous of continuing in his command, he contrived to defeat all negotiations for peace: At last the Venetians having suffered a total defeat at Caravaggio, and having discovered by whom their former proffers had been frustrated, applied to Sforza, who deserting the republic of Milan, entered into the service of Venice. The war, however, continued only one year longer, for the Venetians, worn out by the length of the war, were easily persuaded by the Milanese to accede to a treaty; to which Sforza at first pretended to accede, but having gained the alliance of the Duke of Savoy, continued to carry on the war. Milan was now visited by a dreadful famine, and the army of Sforza cut off all supplies; the misery of the people at length raised them in an insurrection against the government; the gates were thrown open, and Sforza, entering the city at the head of his troops, was acknowledged prince and duke of Milan.

A formidable league was soon formed against the new sovereign, by the Venetians and king of Naples, but his cause was warmly adopted by Cosmo di Medici, and the Florentines. Hostilities were, for a short time, delayed by the visit and coronation of the emperor Frederic III. of Austria; but, immediately on his departure, Tuscany was invaded by Ferdinand, duke of Calabria, natural son to Alphonzo, while the duke of Milan was attacked by the Venetians, the duke of Savoy, and the Marquess of Montferrat. Rene of Anjou, however, having entered Italy at the desire of Sforza and the Florentines, effectually checked the progress of Piccinino and the Venetians; and the taking of Constantinople by the Turks, having excited a general alarm and desire for peace, a treaty was concluded at Lodi, between the Venetians and duke of Milan, to which the king of Naples soon after acceded.

Nicholas V. a pontiff who had given great encouragement to the restorers of literature, was now dead, and his successor was Alphonzo Borgia, who was named Calixtus III. The war of Genoa is now the chief object of interest in the affairs of Italy. That state had, for many years, carried on war with Alphonzo of Naples, with various success. At length, weakened by intestine discords, and the destruction of their colonies by the Turks, the Genoese threw themselves under the protection of Charles VII. of France, whom they acknowledged their lord, and received a French garrison, under the command of John, son of Rene of Anjou, who took the title of duke of Calabria.

The death of Alphonzo, at Naples, occasioned new changes.

On receiving this intelligence, Calixtus III. immediately declared the kingdom forfeited to the holy see by the extinction of the legitimate line. But Ferdinand was acknowledged by the parliament of Naples, and on the death of Calixtus, which happened soon after, Pius II. confirmed his right, and, along with Sforza, embraced warmly his interest. The Florentines and Venetians remained neutral. On the other hand, the arrival of the Duke of Calabria excited a general insurrection among the Neapolitan barons, and Ferdinand, defeated at Sarno, with difficulty retained Naples.

In the mean time, a new revolution at Genoa occasioned the expulsion of the French, and the fleet of Rene was defeated; and his son, unable to receive succours from France, and deserted by many of his principal generals, was forced to evacuate Naples. At this period, Louis XI. of France, desirous of acquiring the friendship of Sforza, ceded to him his rights over Genoa; and the violence of the reigning party there having occasioned an insurrection, the state at length submitted to his authority. Soon after this event followed the death of Cosmo di Medici, whose talents and virtues well deserved the title conferred on him by his fellow-citizens, of father of his country. Pope Pius II. having died at Ancona, where he had repaired to join the crusade of the Venetians against the Turks, was succeeded by Paul II. who refused to pay the contribution agreed to by his predecessor for the crusade, and the expedition did not take place. Sforza having now concluded an alliance with Louis XI. sent his son Galeazzo to his aid, in the civil war in which he was then engaged.

This was the last act of that great statesman and warrior, whose character, though tinged with the vices of the age, stands deservedly high in the history of his country. He died of a dropsy at Milan, on the 8th March, 1466, and his son Galeazzo was, without opposition, acknowledged his successor. The death of Sforza occasioned an attempt, by the independent party at Florence, to throw off the yoke of Peter di Medici, but without success; and the struggle ended in the banishment of Acciaioli, Soderini, and other friends of liberty. By their influence the Venetians declared war on Florence; but the war had no decisive results, and peace was concluded by the intervention of Paul II. and Borso of Esté, duke of Ferrara and Modena. The power of the Medici was now completely established in Florence; and, on the death of Peter, his sons Lorenzo and Juliano, the eldest of whom was only 22, were acknowledged chiefs of the republic. But the actual government of the state continued for some time in the hands of the same persons who, during the illness of Peter di Medici, had, as his friends, been possessed of the administration.

A dangerous enemy, however, was soon raised up to the Medici in the person of Sixtus IV. the successor of Paul II. This pope, who was said to have arrived by no very honourable means at that high office, devoted his whole influence to the advancement of his nephews; some of whom, whose characters but ill qualified them for such situations, were elevated to the highest stations in the church, while the others were invested with temporal principalities, and connected, by marriage, with the most illustrious families of Italy. Jerome Riasio, one of these favoured relatives, had become intimate with Francisco Pazzi, a Florentine gentleman, whose family, having incurred the jealousy of Lorenzo di Medici, had retired to Rome. In him Sixtus found a proper instrument for the destruction of the Medici. It was agreed, that assassination was the only manner by which their measures could be effected; and Salviati, archbishop of Pisa, Jacob Pazzi, uncle of Francisco, and other enemies of the Medici, were added to the number of the conspirators. The time chosen for their purpose was during the festivities on the visit of Cardinal Riario at Florence; and the two brothers were attacked in the church during the celebration of mass. Juliano was murdered; but Lorenzo defending himself was surrounded by his friends, and escaped to his house. In the mean time, the archbishop having attempted to make himself master of the palace of justice, was seized, and hanged, in his priestly dress, from the windows of the palace. Of the conspirators, a similar fate attended the first; the others were massacred by the people; and Bandini, the actual murderer of Juliano, who had taken refuge at Constantinople, was delivered up, a year after, by Mahomet II. to the vengeance of Lorenzo. The pope, aware that his connection with the conspiracy was discovered, immediately interdicted Florence, on account of the death of the archbishop; and without dissembling his participation in the crime, declared war against the republic.

About the same period, Milan was the scene of a similar catastrophe. Galeazzo, duke of Milan, the unworthy son of Francis Sforza, had become, by his tyranny and licentiousness, detested by the Milanese. Having at last grossly injured Jerome Olgiati, that gentleman, assisted by Carlo Visconti and John Lampugnani, determined to revenge himself by the assassination of the tyrant. Their plan was successful, and Sforza fell a victim, in the church of St. Ambrose, to their resentment, or patriotism. Visconti and Lampugnani were immediately put to death by the guards; but Olgiati suffered, with heroic fortitude, a more cruel death by the hands of the executioner. The duke was succeeded by his son John Galeazzo, under the tutelage of his mother, Bona of Savoy. This guardianship was disputed by the brothers of the late duke, who endeavoured to excite an insurrection; which was suppressed by the prime minister Cecco Simoneta. Octavian Sforza was drowned in crossing the river Adda, and his brothers banished to different cities.

In the war between the pope and his ally, Ferdinand of Naples, against Florence, the latter state sustained the loss of many of their strongest fortresses, by the supineness, or the treachery, of Hercules, duke of Ferrara, their general, and was obliged to apply for aid to the duchess of Milan and the Venetians: but the former was occupied by the revolt of the Genoese; and the latter, exhausted by their Turkish war, were unable to afford any assistance. At this period Rene, second duke of Lorraine, began to assert his claim to the throne of Naples, as representative of the house of Anjou; and Ferdinand, alarmed lest support should be afforded to him by the Florentines, began to shew himself inclined towards peace. Lorenzo di Medici, whose affairs were now reduced to the greatest extremity, taking advantage of this inclination, determined to have a personal conference with the king, and proceeded to Naples, contrary to the advice of his friends, who dreaded the notorious treachery of Ferdinand's character. His enterprize, however, succeeded; and Ferdinand, convinced that the friendship of Florence was his best protection against the French, concluded a treaty; and Lorenzo returned to Florence, where his authority was now implicitly acknowledged, and his power strengthened by that liberality and generosity, which acquired to him the title of the Magnificent. The capture of Otranto by the Turks, now terrified Sixtus into a peace with Florence, and the fortresses taken during the war were restored.

The last transaction of any consequence during his reign, was his war, in conjunction with the king of Naples, the duke of Milan, (now under the direction of his uncle Ludovico, commonly called the Moor,) and the Florentines, against the Venetians, whom he excommunicated. In a short time, however, the league concluded a separate treaty, which so much enraged the pope, that it threw the gout into his head, and occasioned his death.

The suffrages of the cardinals were in favour of Baptista Cybo. This pope, who took the name of Innocent VIII. was no less lavish of the honours and treasures of the church to his natural sons, than Sixtus had been to his nephews; and besides this scandal, his indolence of temper permitted the most unbounded licentiousness and venality in his court. His enmity to the king of Naples was soon evinced, by his interruption of the commerce formerly carried on; and the barons, incensed by the tyranny of Alphonzo, duke of Calabria, having revolted, were assisted by Innocent. But Ferdinand, having secured the friendship of Lorenzo di Medici and Ludovico Sforza, sent his son against Rome. The papal troops were defeated, and a peace was granted to the pope, by the intercession of Ferdinand and Isabella of Arragon and Castile. The Neapolitan barons, though concluded in the treaty, fell victims to the perfidy of Ferdinand.

Innocent now courted the favour of Lorenzo, on whose son John, (afterwards Leo X.) he conferred a cardinal's hat, though at that time only eight years old. The reign of this pontiff presents little more that is interesting, except the greatness of Lorenzo di Medici, for which we must refer our readers to the interesting work of Mr. Roscoe. That illustrious statesman died in his 44th year, beloved and lamented by his countrymen. His death was followed by that of Innocent, who, on his death-bed, permitted his son to plunder the public treasury. His vices, however, were made to appear venial, when compared with the atrocities of Roderigo Borgia, who succeeded him by the name of Alexander VI. This pontiff united in his own person all the vices of which former popes either were accused or were guilty; and the elevation of Borgia continues, to our own days, a lasting stain on the Romish church. The authority of Ludovico Sforza still continued paramount at Milan, notwithstanding the majority and marriage of his nephew; but his ambition was still unsatisfied. The strict union which subsisted between Peter, son of Lorenzo di Medici, and Ferdinand of Naples, thwarted his views; and this feeling, heightened by his jealousy of Isabella, duchess of Milan, his niece, who was the daughter of Alphonzo, duke of Calabria, urged him to the desperate step of inviting Charles VIII. of France to assert his claims to the crown of Naples. This young and ambitious prince eagerly embraced the opportunity afforded him, and entering Italy by the Alps of Savoy, arrived at Arti, where he was seized with the small-pox, and remained for a month in extreme danger. Having then proceeded into the Milanese, he was joined by Ludovico Sforza, who accompanied him for a few days, but retired to Milan on the death of the duke, his nephew: an event ascribed to poison administered by Ludovico; whose conduct, in imprisoning the duchess and her infant son, and immediately assuming the title of duke, certainly gives probability to the suspicion.

On the entry of Charles into Tuscany, Peter di Medici in vain attempted to reconcile himself to him; and the Florentines, incited by the opposite party, issued a decree of banishment against the Medici; and the king of France entered Florence with the pomp of a conqueror. His entry into Rome was no less triumphant; and Alexander, who at first shut himself up in the castle of St. Angelo, was forced to accede to a treaty dictated by Charles. A considerable change had now taken place at Naples. A few months before the invasion of Charles, Ferdinand, now in his seventieth year, died, and was succeeded by Alphonzo II.; but that prince, whom the approach of the French affected with a degree of terror approaching to frenzy, resigned his crown in favour of his son Ferdinand, and retired to a monastery at Messina, where he did not long survive. The young king made an attempt to defend Naples; but Charles (who now, for the first time, was obliged to draw his sword) easily overpowered him, and forced him to retire to the isle of Ischia, and Naples received the French monarch. The example of the capital was speedily followed; and, of all the cities in the kingdom, Brindisi alone retained its allegiance to Ferdinand. Such were the results of the expedition of Charles, and all this was achieved with astonishing rapidity. It was in the end of summer 1494 that the French army marched from Lyons, and on the 25th February following, Charles made his entry into Naples, and in a few weeks after completed the conquest of the kingdom. No sooner were the Italian potentates recovered from the surprise and panic occasioned by this rapid conquest, than a league was formed by the Venetians, the pope, and the duke of Ferrara, against Charles. This alliance was also joined by the perfidious Sforza, who began to fear that Charles would support the claims of the duke of Orleans to the duchy of Milan, in right of his grandmother Valentina Visconti.

On receiving the accounts of this confederation, to which were also joined the emperor Maximilian, his son the archduke Philip, and Ferdinand of Spain, Charles recrossed the Alps with equal rapidity, and the troops left by him at Naples were soon expelled by Ferdinand II.; whose return the Neapolitans, heartily weary even of the short rule of the French, hailed with acclamations. The death of this young prince soon followed, and his uncle Frederic became his successor. In the mean time, Sforza, by his pride and ambition, had excited the hatred of all the neighbouring states, and especially of the Venetians and Florentines, and the duke of Orleans now openly asserted his rights. But the declining health of the king of France, for a while delayed any active measures; and on the death of that monarch, the duke of Orleans, who succeeded him by the name of Louis XII. was for some time too much engaged by his domestic concerns to engage in Italian affairs. At length, an army of 30,000 French, led by Louis of Luxembourg, James Trivulzio, and Robert Stuart, Lord d'Aubigny, entered the Milanese, and, being joined by the Venetians, were joyfully received at Milan, where Louis for three months resided, and was acknowledged duke of Milan. On his return to France, however, Sforza, who had retired into Tyrol, again reoccupied Milan at the head of 15,000 Swiss; but these Soldiers, when opposed, at the siege of Novarro, to their countrymen in the French service, were persuaded by the latter to desert the service of a traitor and assassin; and Ludovico Sforza, attempting to escape in disguise, was taken and delivered to Louis, by whose order he was confined in the castle of Loches in Touraine, where he remained till his death, ten years after. In the mean time, Cæsar Borgia, by a series of the most detestable perfidies, had made himself master of Romagna, and had now turned his views to the conquest of Florence; when a considerable check was given to the career of his ambition by the death of his father Alexander VI. whose infamous conduct had alienated the minds of the Christian world from the head of the church.

Pius III. his successor, only lived twenty-six days; and Juliano della Renere, one of the nephews of Sixtus IV. was raised to the pontificate by the name of Julius II. At the same time, the archduke Philip concluded a treaty with Louis, in the name of his father-in-law Ferdinand of Spain, by which it was agreed, that the kingdom of Naples should be divided between them, as Frederic of Naples had already abdicated, and received a pecuniary compensation, and a retreat in Anjou, from Louis. The treacherous Ferdinand, however, only waited till the arrival of the troops sent by the emperor to his assistance; and his general Gonsalvo de Cordova then attacked the French troops of the duke of Nemours at Cerignola, and completely defeated and expelled them from Naples. Louis' declining health put a stop to his plans of invading Spain in revenge; and the Spaniards, on the conclusion of a peace, remained in possession of Naples. Louis, however, conferred on Francis, count of Angouleme, the hand of his daughter Claude, which had before been promised to Charles prince of Spain, son of the late archduke Philip of Austria; and a foundation was thus laid for the personal hostility of these distinguished princes. The pope having now succeeded in overthrowing the power of Borgia in Romagna, still found a check to his ambition, in the cities possessed in that country by the Venetians. The wealth and ambition of that republic had been long objects of jealousy to the other states of Europe; the emperor Maximilian was actually engaged in a war with it; and the intrigues of the pope soon produced the League of Cambray, in which the kings of France and Spain joined themselves to the confederacy. The duke of Ferrara, and the marquess of Mantua, embraced with eagerness the opportunity of throwing off the yoke; and, after considerable delay, Charles VIII. duke of Savoy, also joined the alliance. The first conflict was decisive, and the defeat at Ghiana d'Adda placed the Venetians at the mercy of the confederates; but, fortunately for them, the seeds of discord were already sown among these ill-assorted allies. Julius especially, having now recovered the whole of Romagna, and whose ambition now embraced a wider field, exerted himself to bring about a peace; and the Venetian republic, though stript of its conquests, was left inviolate.

The pope, thwarted in his projects against Ferrara by the interference of Louis, now set on foot an alliance, termed the Holy League, for the purpose of expelling the French from Italy. The new confederates were Ferdinand of Spain, the Venetians, and the Swiss. Powerful as were these antagonists, the army of France, commanded by Gaston de Foix, duke of Nemours, succeeded in raising the sieges of Brescia and Bologna, and at Ravenna completely routed the troops of the League; but this last victory was dearly bought, by the loss of their gallant general, who fell in a skirmish, after the battle, in his 21st year. The death of Foix was fatal to the French interest; dissensions arose in the army; Milan was seized by the Swiss, who reinstated the family of Sforza, in the person of Maximilian, son of Ludovico; and France, invaded by the emperor and Henry VIII. of England, became now the theatre of the war, when the death of Julius, whose restless spirit had animated the contest, gave a promise of repose to the nations. John di Medici, who assumed the name of Leo X. now ascended the papal chair. The death of his brother Peter, in 1505, had left him the representative of his family; and a revolution in Florence had raised him to the influence enjoyed by his ancestors in that state. On his accession to the pontificate, the French had gained considerable successes in the Milanese; but the exertions of the Swiss again replaced Sforza at Milan, and once more expelled the French from Italy. The League, however, was weakened by the defection of the king of England, who bestowed on Louis, now a widower, the hand of his young and beautiful sister. The aged monarch did not long survive this connection. His successor, Francis I. eager to recover Milan, and wipe off the stain on the glory of the French arms, soon crossed the Alps, and advanced against the Swiss troops of Sforza, posted at Morignano, a few miles from Milan. The Swiss defended themselves with obstinate valour for two days, and at length retreated in good order, although weakened by the loss of 10,000 men. The French loss amounted to 6,000; but their victory was decisive: Maximilian Sforza surrendered Milan, and, accepting a pecuniary consideration, resigned his claim to the duchy, and retired to France. The pope, alarmed at the progress of Francis, hastened to reconcile himself to him; and at a personal interview contrived, by his flattery, to gain over to his own plans the unsuspecting generosity of the king.

Soon after his return to France, the emperor Maximilian invaded the Milanese with a large army, and laid siege to Milan; but was repulsed by Charles of Bourbon. constable of France, and obliged to return to Germany, where he died. The king of France immediately declared himself a candidate for the imperial crown; but the electors, partial to the house of Austria, preferred Charles V. now by the death of his grandfather Ferdinand king of Spain and Naples, in his own right, duke of Austria and lord of the Netherlands, and enriched by the spoils of the new world. Francis, jealous of his fortunate rival, soon found a pretext for a war, which was in the end to be attended with consequences so fatal to himself; and the power and influence of the combatants soon involved all Europe in the quarrel. For the general history of this important struggle, see the article France, Vol. IX. p. 557, where it is related at such length, as to render it unnecessary for us to give any more than a short sketch of the transactions in Italy. Leo X. who had formerly favoured Francis, chiefly in order to use his influence for the aggrandizement of his nephew Lorenzo, duke of Urbino, had now his hopes of raising his family blasted by his death. Lorenzo left only one daughter, the Celebrated Catharine, and an illegitimate son Alexander The chief aim of the pope was now to obtain Parma and Placentia, which were held by the French. He therefore entered into an alliance with Charles, who proceeded to invade Lombardy. The troops of Francis were engaged in other quarters; and the Swiss, to whom he had trusted the Milanese, being ill paid, were easily gained over by Prosper Colonna, the papal general; and the short struggle was ended by the complete expulsion of the French. Francis Maria Sforza, brother to Maximilian, was invested with the dukedom of Milan. Parma and Placentia had already been surrendered to Leo; but that pontiff had not long survived the success of his intrigues, having died at Rome in the end of the year 1521. He was succeeded by Adrian VI. a Fleming, who had been preceptor to Charles V. and regent of Spain.

The undecided character and unpopular manners of Adrian formed an unfavourable contrast with the polished urbanity of his predecessor, and he died at the end of the year, very little regretted by the Italians. After a long contest, the cardinals united in favour of Julio di Medici, natural son to Juliano, who was murdered by the Pazzi. This pope, who took the name of Clement VII. had acted as prime minister to Leo X. but his conduct as a sovereign disappointed the hopes entertained from his success in a lower situation. The defection of Charles of Bourbon, who fled to Italy, was a severe blow to Francis; and the misconduct of Bonnivet, to whom he entrusted the invasion of the Milanese, ruined his affairs in Italy: and his army, commanded by Bayard, was completely routed by the imperialists under Bourbon, and their gallant general slain. Irritated by these reverses, the king of France again entered Italy, where he was joined by the pope and the Florentines, and laid siege to Pavia. On the advance of the imperial army to relieve it, Francis was so infatuated as to listen to the advice of Bonnivet, and leave an advantageous position to give them battle. The result was fatal to the French; and the captivity of their monarch left the emperor apparently undisputed master of Italy. But a conspiracy was now formed by Clement, Francis duke of Milan, and the Venetians, to throw off his yoke; and they attempted to gain over to their interest Ferdinand, marquess of Pescara, the imperial general, by the offer of the crown of Naples. The marquess remaining faithful to his master, immediately seized on the Milanese, and besieged the duke in his citadel, who was forced to surrender; and Charles of Bourbon, on whom the emperor conferred the investiture, remained master of the duchy, and, at the head of an army of 20,000, laid siege to Rome, and prepared for an assault. On the first attack, Bourbon was killed by a musket-shot; but his troops, commanded by Phillibert of Chalons, prince of Orange, made themselves masters of Rome, and the holy city was left a prey to the cruelty and rapacity of the soldiery. Clement retired to the Castle of St. Angelo, but was soon obliged, by famine, to surrender, and was retained in the same place a prisoner and a witness of the calamities of his unfortunate subjects.

The confinement of Clement gave the last impulse in favour of liberty to the republic of Florence; the adherents of the Medici were expelled, and the statues of Leo and Clement destroyed. At the head of this revolution was Philip Strozzi, the husband of Clarice, daughter of the unfortunate Peter di Medici, who herself contributed in no small degree to the success of the revolution. The newly emancipated republic embraced the cause of Francis, and were joined by the Venetians; while Lautrec, the French general, invaded Italy. Their cause was at first successful. By the assistance of Andrew Doria, Genoa again acknowledged the French dominion, Pavia and Alexandria surrendered to Lautrec, who now marched towards Naples; and Clement, during a negociation for ransoming himself, contrived to escape from his confinement. These apparent advantages, however, were soon frustrated. The pope, who saw no opportunity of regaining his ascendancy at Florence, through Francis, the ally of the republic, began to treat secretly with Charles. The army of Lautrec was weakened by pestilence, and its valiant leader fell a victim to its ravages; and Doria, indignant at the overbearing insolence of the French, deserted the service of Francis, and assisted his fellow citizens in asserting the liberties of their country. Another attempt of Francis on the Milanese failed by the skill of De Leyva, the Spanish general, and the Count de St. Pol was defeated and taken prisoner.

These reverses at length obliged the king of France to listen to terms of accommodation; and the peace of Cambray was concluded, by which he renounced all claims to Milan, Genoa, and Naples; and, what was still more degrading, left his Italian allies to the mercy of the emperor. But the formidable invasion of the Turks made that prince unwilling to excite fresh wars by any severity; and his proceedings during his visit to Italy were in general conciliating. Francis Sforza was reinstated at Milan, and united to the niece of the emperor; the duke of Ferrara's dominions were, notwithstanding the remonstrances of the pope, left inviolate; and an equitable treaty granted to the republic of Venice. Florence, however, with a fortitude worthy of its better days, resisted, for several months, the imperial armies; but its efforts were unavailing; and, on its surrender, Alexander di Medici, who assumed the title of duke of Florence, was confirmed by the sanction of the emperor. On the death of the marquess of Montferrat without issue, the inheritance, disputed by the duke of Savoy, the marquess of Saluces, and the marquess of Mantua, was decided by Charles in favour of the last claimant. From this period the affairs of Italy became comparatively of littte interest the petty intrigues, and crooked policy of its tributary chiefs are unworthy the attention of the historian; and its annals in future only contain the alternate victories and defeats of those potentates who contended for its dominion, while the natives themselves remained the passive and obedient slaves of him who gained the victory.

The attention of the emperor was now chiefly occupied by the progress of the reformers in Germany, and, anxious to bring to a conclusion the divisions in the church, he repeatedly urged Clement to call a general council, but without effect. Francis, aware that the importunity with which this measure was demanded was extremely disagreeable to the pope, now again endeavoured to detach him from the emperor. In this he completely succeeded, by the marriage of his son, Henry duke of Orleans, to Catharine di Medici, his grand-niece. Clement, however, still appeared devoted to Charles; but his unfortunate reign now drew near a close. The defection of Henry of England, and the complete emancipation of that kingdom from the papal dominion, an event, to which the intemperate violence of the Roman court had in no small degree contributed, deeply affected Clement's mind, and at length injured his health to such a degree as to occasion his death. He was immediately succeeded by Alexander Farnese, who assumed the name of Paul III. whose prudent government maintained, for some time longer, peace in Europe.

At length Sforza, duke of Milan, having put to death one of Francis' emissaries, the impatient spirit of the monarch could contain no longer, and though unable to gain a single ally, he marched with his troops into Italy. His first attempt was against the duke of Savoy, who, not receiving assistance from Charles, then engaged in the siege of Tunis, was expelled from Savoy, and obliged to take refuge in Piedmont. Francis now prepared to turn his arms against Sforza, but his plans were altered by the sudden death of that prince, whose duchy, as he left no heirs, was seized by Charles as a vacant fief of the empire.

Francis now lost his time in making out legal claims to the succession, while Charles, now arrived in Italy, and at the head of a powerful army, carried the war into France. This war, which was carried on with great exertions on both sides, was terminated by the conclusion of a truce for ten years, through the mediation of Paul III. This was signed at Nice, in June 1538.

In the mean time, an attempt was made to excite a revolution at Florence. Alexander di Medici had rendered himself justly detested by the tyranny of his government, and the brutality of his vices. The death of pope Clement, whose influence had in some degree restrained his excesses, left him completely at liberty, and his conduct became so odious, that his cousin Lorenzino di Medici, himself an associate in his debaucheries, intending perhaps to become his successor, took an opportunity of assassinating him. But Lorenzino's designs were frustrated; and although he was well received by Strozzi and the exiles, the principal inhabitants of Florence placed at the head of the government Cosmo di Medici, a youth of 18, the only remaining legitimate descendant of the great Cosmo, and their choice was ratified by Charles, who confirmed Cosmo in the dukedom. The emperor bestowed the hand of his natural daughter Margaret of Austria, the widow of Alexander, on Octavio Farnese, the nephew of the pope.

The war in Italy was again renewed, by the refusal of Charles to bestow on Francis' son, Charles duke of Orleans, the investiture of Milan, of which he had given a promise, at one of his interviews with Francis during the truce. On this occasion the dominions of Charles were invaded by no less than five French armies. That in Piedmont was commanded by Annibaut, while the count of Enghein, aided by the fleet of the corsair Hayradin Barbarossa, besieged Nice, the residence of the duke of Savoy. The arrival of the imperial troops, under the Marquess del Guasto, however, obliged these extraordinary confederates to raise the siege.

The following year was distinguished by the decisive victory of the count d'Enghien over Guasto and the imperialists, with a very inferior force, at Cerisoles in Piedmont. But Francis was too much weakened to follow up the victory; and its only result was the capture of a few towns in Piedmont. A treaty was at length concluded at Crespy; by which, among other things, it was agreed, that Charles should confer on the duke of Orleans the Milanese, and the hand of his niece, the daughter of Ferdinand king of the Romans. But the premature death of Charles of Orleans prevented the marriage, and gave the emperor an opportunity of evading the fulfilment of the condition. In the mean time, all hopes of reconciling the Protestants being at an end, their tenets were condemned, and their persons excommunicated, by the council of Trent; and their armies defeated by the allied troops of the emperor and the pope. But the latter, alarmed at the accession of power acquired by Charles, by the defeat of the reformed princes, soon withdrew his troops, and devoted his endeavours to the aggrandisement of his own family. He first obtained for Octavio Farnese the city of Sienna, after having in vain attempted to get for him the duchy of Milan. He next prevailed on the college of cardinals to erect into a duchy the territories of Parma and Placentia, which he conferred on his son Peter Ludovico Farnese, a monster of vice and tyranny. But the indignation of the Placentians soon roused them to resistance, and this wretch was assassinated in the fortress of Placentia, which the conspirators immediately seized in the name of the emperor.

The same year was remarkable, by the failure of the conspiracy of Fiesco, count of Lavagna, against Andrew Doria at Genoa; an event which it would be presumptuous to relate in other words than those of Robertson, and for which we refer our readers to the page of that elegant historian. The death of Paul III. followed soon after that of his son. Sensible, probably, of the mistake he had been guilty of, his last act was to reunite Parma to the states of the church. He was succeeded by cardinal Dumont, a person of an effeminate and voluptuous character, equally desirous with the late pope to advance his family; but Paul had bestowed principalities,—Julius III. confined his donations to estates and offices. The death of Francis I. occasioned a similar change in the court of France; for Henry II. though like his father ambitious and warlike, could be satisfied with the pre-eminence in martial exercises, and feed his ambition with the mimic victories of the tournament.

An event soon occurred, however, which drew the French monarch into hostilities of a more serious nature. Octavio Farnese had, notwithstanding the decree of his dying uncle, made himself master of Parma, with the connivance of Julius, who was willing that at least it should be saved from falling into the emperor's hands; but Charles, desirous of recovering this fief of the empire, having bestowed the investiture on Gonzaga, governor of Milan, and Farnese having in vain requested assistance from the pope, had recourse to the king of France, who embraced his cause, and commenced a war, which, however, produced no effect of consequence, and the attention of both Charles and Henry was diverted, for some time, to revolutions of greater interest, and wars of more vital importance. In the mean time, the power of Cosmo di Medici was daily increasing; the possession of Florence and Leghorn gave him the key of what are called the fetters of Tuscany; he had also received the principality of Piombino; and his ambition was now turned to the acquisition of Sienna. This ancient republic still retained its liberty, and, although torn by factions during the late war, successfully defended itself against the imperial troops. The aid afforded by Henry II. to the Siennese during this contest, had raised a powerful party in favour of the French in that city,—a circumstance which excited the jealousy of Charles and the alarms of Cosmo, who was besides desirous to extinguish, in a state so near him, the last sparks of that liberty, whose flame he had suppressed at Florence. The emperor, willing to create a diversion to the arms of Henry, now victorious in the Netherlands, permitted Cosmo to undertake the conquest of Sienna. His army was commanded by John James Medicino, marquess of Marignano, a soldier of fortune and of low birth, whom Cosmo flattered, by allowing him to bear the arms of the Medici, and acknowledging him a relation of the family. The French and Siennese had, as their leader, Peter Strozzi, the son of Philip, and Clarice di Medici, who maintained his hereditary tone of liberty, and thorough detestation of the enslavers of his country. The armies encountered near Marciano; but the valour and impetuosity of Strozzi were foiled by the superior military science of Medicino; and the former, weakened by a dangerous wound, was forced to retreat with the feeble remains of his troops, while his antagonist immediately laid siege to the city of Sienna. The Siennese, encouraged by Montluc, commander of the French garrison, defended themselves with determined valour for ten months, and at length capitulated on honourable terms.

These were not adhered to by Cosmo, who proceeded to new-model the government of the state, without any regard whatever to its former policy. Many of the citizens, however, retired to a small town called Monte Alcino, where they established a government similar to that of Sienna, and consoled themselves with this shadow of their ancient liberty. The pope, overjoyed by the re-union of England, under Mary, to the Romish church, now attempted, by his intrigues at the diet of Augsburg, if possible to disunite the Protestants in Germany; but his designs were interrupted by death. His successor, the virtuous Marcellus II. died on the 20th day of his pontificate, while meditating plans for the reformation of the church. The tiara was now conferred on John Peter Caraffa, who took the name of Paul IV.

This pope was of an intolerant and severe disposition, and filled with extravagant notions of the power and authority of the Roman see. He soon displayed this, in his insolent treatment of the imperial ambassador, who informed him of the pacific termination of the diet of Augsburg, an event so unpleasing to his bigoted mind, that he openly inveighed against Charles and Ferdinand. His nephews, whom the duke of Guise had gained over to the French interest, encouraged this temper, and at last induced him to conclude a treaty with Henry. But the emperor, having now abdicated his hereditary dominions in favour of his son Philip II. consecrated the last moments of his political existence to the negociation of a peace with Henry; and a truce for five years being concluded, the pope was left exposed to the vengeance of Philip. Paul, alarmed for his safety, now had recourse to intrigue; and having sent his nephew cardinal Caraffa to Paris, succeeded, by the united influence of the Lorraine family, the queen, and Diana of Poictiers, Henry's mistress, in persuading him to violate the league, and again renew the war. Emboldened by his success, the pope set the king of Spain at defiance, and proceeded to oppress the Colonna family, and other adherents of the house of Austria. Philip at first was prevented by religious scruples from openly attacking the pontiff; and it was with extreme reluctance, that, having in vain attempted pacific measures, he ordered the duke of Alva to invade the papal territory. The rapid progress of that general reduced Paul to his old intrigues; and, under pretence of negociating for a truce, he contrived to gain time, till the arrival of the French troops, and a considerable sum of money, again enabled him to set the duke at defiance. The French army was commanded by the duke of Guise, who, after relieving Rome, marched towards Naples, and endeavoured to force Alva to give him battle. But that experienced leader declined an engagement, and remained within his entrenchments, while the allied army was wasted by sickness, and weakened by the dissentions of its commanders.

But, in the mean time, the Spanish army in the Netherlands, commanded by Emanuel Philibert, duke of Savoy, completely routed the French under constable Montmorency at St. Quintin; and Henry was forced to recall the duke of Guise for the defence of France. The pope now hastened to appease Philip, which the superstitious veneration of that prince for the holy See rendered no difficult task; and the duke of Alva was even obliged to solicit, on his knees, the forgiveness of the pontiff for invading the sacred territory. At the same period, Philip, desirous to ingratiate himself with the Italian princes, of whose influence he intended to make use to counterbalance the authority of the pope, conferred on Octavio Farnese the city and territory of Placentia; and, having acknowledged him as duke of Parma, succeeded in detaching him from the French alliance. Influenced also by the intrigues of Cosmo di Medici, he conferred on him the investiture of Sienna in consideration of the sums due to him by his father, and on condition of his furnishing a body of auxiliary troops, in case of any attack on Naples and Milan.

This acquisition secured to Cosmo, who had assumed the title of Grand Duke of Tuscany, the complete dominion of that country. Two years after this, the peace of Chateau-Cambresis restored peace to Europe. The principal articles regarding Italy were, the restoration of Savoy to Emanuel Philibert, who was also united in marriage to Margaret of Valois, sister to Henry II. Elizabeth, daughter of that monarch, became queen of Spain, although her hand had previously been promised to the unfortunate Don Carlos, Philip's eldest son. Henry's troops evacuated Italy; Montferrat was restored to the duke of Mantua, and Corsica to the Genoese, whose independence was now acknowledged. The conditions of the treaty were observed with punctuality and fidelity; a circumstance to which, in Italy, the death of Paul IV. contributed in no small degree. This pontiff is said to have died from the distress occasioned by his nephew, the duke of Paliano, having in a fit of jealousy assassinated his wife, and murdered her suspected lover. His successor, Pius IV. instigated probably by the court of Spain, a few months after his accession, ordered this affair to be investigated; and the result of the inquiry was, the execution of the duke of Paliano, his brother, cardinal Charles Caraffa, and two other noblemen, their accomplices.

The return of the duke of Savoy to his hereditary states, was an event no less agreeable to his subjects, than fortunate to the other states of Italy. This prince, though from his infancy accustomed to war, had learned to estimate the value of peace; and, aware of the misfortunes which his country had suffered from being the theatre of war, exerted himself, in concert with the Venetians, in defending the frontiers of Italy, and preventing it from again being exposed to the devastation of foreign armies. The general state of Europe forwarded his designs. The death of Henry II. of France, and the religious animosities which distracted that kingdom under his successors, incapacitated it from interfering in foreign politics. The king of Spain, content with the ascendancy he enjoyed by the possession of Naples and Milan, and occupied by his endeavours to suppress the rising spirit of freedom, which, though extinct in Italy, was now kindling in the cities of Belgium, was unwilling to excite the jealousy of the inferior Italian potentates. The emperor Ferdinand, having acquired by marriage the kingdoms of Hungary and Bohemia, was employed in confirming his authority, and in increasing among the German princes the influence of the house of Austria. The conduct of Pius IV. and his successors Pius V. and Gregory XIII. also contributed, in no small degree, to the tranquillity of Italy. These pontiffs, instructed by the example of their predecessors, in the pernicious effects resulting from their attempts to aggrandise their families, devoted their attention to the affairs of the church, and rescued it from the scandal occasioned by former popes and their nephews, of which even the warmest of its defenders could not but be sensible.

The contest at Genoa between the old and new nobility, and the subsequent insurrection of the people against their divided lords, was fortunately terminated by the mediation of the pope, the emperor, and the king of Spain; and Genoa remained, till our days, undisturbed by any more intestine revolutions. Not long after this, the last Marquess of Saluces died in France, having previously ceded his dominions to Charles IX. whose troops immediately took possession of it, notwithstanding the remonstrances of the duke of Savoy, who claimed it as an ancient dependency of his dukedom. The latter prince, unable to accomplish his object by pacific measures, and unwilling to have recourse to war, was forced. during the remainder of his reign, to acquiesce, and the French remained possessors of Saluces. After his death, however, his son Charles Emanuel, taking advantage of the difficulties in which Henry III. was involved, made himself master of Saluces, where his cruel persecution of the Protestants has made his name odious in the annals of the reformed churches, while it acquired him, at Rome, the reputation of the active and zealous defender of the Catholic faith.

In Tuscany, the grand duke Francis (son of Cosmo di Medici) and his duchess, the celebrated Bianca Capella, died at Florence in the course of the same night; and as he only left two daughters by his first wife, Jane of Austria, the dukedom descended to his brother cardinal Ferdinand di Medici, who, laying aside the purple, assumed the government of Tuscany.

Soon after the peaceable establishment of Henry IV on the throne of France, having at length obtained the consent of the pope to his divorce of Margaret of Valois, he was married to Mary di Medici, the youngest daughter of the grand duke Francis; and the Tuscan family was thus honoured by a second alliance with the royal family of France. Henry now turned his arms against the duke of Savoy, desirous to recover Saluces, and punish that prince for his interference in the wars of the league. In one campaign, he made himself master of most of the duke's strongest fortresses; but the war was put an end to by the intervention of Pope Clement VIII. and the King of Spain. Saluces was left under the dominion of Savoy; but the country of Bresse was ceded to France, and 100,000 crowns were paid by the duke to defray the expenses of the war.

Much about this period Alphonzo II. of Esté, duke of Ferrara and Modena, died, and was succeeded by his son Cæsar; but Clement VIII. took advantage of this conjuncture, to assert the ancient claims of the church to the city of Ferrara, which was immediately seized by his troops. Cæsar, unable to contend with the pope, retired to Modena; and Ferrara was united to the papal territories. These changes, however, but little affected the general peace of Italy, which continued for upwards of twenty years; a period, doubtless, of great advantage to that country, but of little interest to the historian

The succession to the duchy of Mantua occasioned a contest, which once more laid Italy open to foreign invasion. Francis IV. duke of Mantua, left only a daughter, and was succeeded by his brothers Ferdinand and Vincent II.; but neither leaving any children, the dukedom was claimed by Charles Gonzaga, duke of Nevers, the heir-male of the family, and whose son was also married to Maria, daughter of duke Francis. The emperor Ferdinand II. unwilling that so valuable a principality should fall into the hands of a subject of France, conferred Mantua on the duke of Guastalla; while Charles Emanuel of Savoy asserted the old claims of his family to the marquisate of Montferrat, and obtained the support of the Spaniards. The duke of Nevers, unable to contend against such powerful rivals, applied for assistance to Louis XIII. of France, and was seconded by the Venetians, who dreaded the consequences of Mantua falling under the dominion of the Spaniards. The cardinal de Richelieu having, by the capture of La Roche, succeeded in subduing the Protestants, was not unwilling to enter into a war which might conduce to the great end he had now in view, the humiliation of the house of Austria. The French accordingly, commanded by Louis in person, crossed the Alps, and, without receiving opposition from the duke of Savoy, (whose prudence, or perhaps indecision, prevented him from taking any active part in the war,) proceeded to the relief of Casal, then besieged by the Spanish troops. The news of the insurrection in Gascony, of the Protestants under the duke of Rohan, obliged Louis to return to France; and the duke of Savoy, imagining all danger from the French at an end, united his forces with the besiegers of Casal. But the duke was soon taught the impolicy of his conduct, by the speedy return of the French army under the command of Richelieu; which, after menacing Turin, and forcing the duke to concentrate his troops for its defence, laid siege to the fortress of Pignerol, a post commanding the passes of Italy, and reduced it in a few days.

In the mean time, Louis returned and entered Savoy, which soon submitted to his arms; and the duke, overwhelmed with the weight of these sudden calamities, died at Turin, in the sixtieth year of his age. His son, Victor Amadeus I. instructed by the example of his father, hastened to conclude a treaty with Louis; whose troops now proceeded to Casal, which still continued to hold out. In Lombardy, however, the cause of the imperialists had been successful; the Venetian and French troops, commanded by Marshal d'Estrees, were defeated, and the city of Mantua taken by assault by Count Colalto, the imperial general. But the active mediation of Pope Urban VIII. or rather of his agent Julio Mazarine, succeeded in procuring a suspension of arms; and, at the diet of Ratisbon, the intrigues of Richelieu procured the acknowledgment of the duke of Nevers' right to Mantua, which was delivered up to him; while the duke of Savoy received a few towns in Montferrat; and the Gonzagas of Guastalla a pecuniary indemnification; and Pignerol, Luza, and two other fortresses, remained in the hands of the French, as securities for the performance of the treaty. The subsequent treaty of Querasque secured to the French the entire possession of Pignerol, and thus left them an easy entrance into Italy.

Three years after, war broke out a-new. Richelieu secured on his side Odoard Farnese, duke of Parma, and the dukes of Mantua and Savoy. The two brothers of the latter, however, Cardinal Maurice, and Thomas, entered into the imperial service. The death of Victor Amadeus left his dominions, and the care of his infant successor, in the hands of Louis. The campaign in Italy, however, was not at first successful; and although the duke de Crequi afterwards defeated the duke of Modena and the Spaniards, the state of the contending parties remained at the end of two years, much the same. At this period, the male line of the Rovere, dukes of Urbino, became extinct. The duchy was claimed by Ferdinand, grand duke of Tuscany, who married Victoria, grand daughter of the late duke; but Urban VIII. had already seized it as a vacant fief of the papal see; and Ferdinand, unwilling to contend with the pope, was satisfied with the inheritance of the private property of the Rovere. The Barberini, nephews of Urban, finding him firm in his refusal to grant them the investiture of Urbino, turned their ambition to the acquisition of the duchy of Castro, near Rome, the property of the duke of Parma, which they persuaded the pope to invade. That prince having allied himself with Ferdinand II. grand duke of Tuscany, and Francis I. of Esté, duke of Modena, marched at the head of 5000 men to the attack of the papal army near Bologna, commanded by Taddeo Barberini, though consisting of 20,000. This daring enterprise was successful: Barberini was forced to take refuge in Ferrara, and Farnese entered into and laid waste Romagna. The armies of Modena and Tuscany were equally successful, and the pope at length concluded a treaty with the dukes. This event was soon followed by the death of Urban VIII.

In France, by the death of Cardinal Richelieu and Louis XIII. the government was left in the hands of Cardinal Mazarine, who acted as prime minister to Queen Anne of Austria, regent during the minority of her son, Louis XIV. Mazarine, who entered warmly into the affairs of Italy, displeased by the election of Innocent X. who was his personal enemy, used all his interest to gain over the Italian princes. Thomas of Savoy, now in the French service, was successful in gaining over the duke of Parma; and that prince, repairing to Paris, concerted with the cardinal the plan of the war. Hostilities were commenced by the French army under the command of the Duke de Breze and Thomas of Savoy, which landed near Orbitello, and commenced the siege. But the fleet was in the mean time defeated by the viceroy of Naples, the duke de Breze killed, and the troops forced to reimbark and return to France. The second expedition was more fortunate, and the isle of Elba and the principality of Piombino surrendered to the French arms.

In the mean time, the kingdoms of Naples and Sicily were groaning under the oppression of the Spaniards, the chief object of each successive viceroy being to rival his predecessor in the raising of levies and taxes. The resources and the patience of the Neapolitans were at length exhausted; the ministers of Philip IV. had, by their misconduct, occasioned the revolt of Catalonia and Portugal; and these misfortunes, of too great magnitude to be long concealed from the people even in the most remote territories of Spain, awakened in the Sicilies the spirit of insurrection. The first explosion was at Palermo, where the crown of Sicily was offered to Francis of Vintimilla, Marquess of Gierace; but that nobleman, with great prudence, resisted this dangerous promotion, and succeeded in calming, for a time, the indignation of his countrymen. But the misjudged severity of the viceroy again excited the Sicilians; and the Spanish troops were forced to withdraw from Palermo. The severity of the duke of Arcos, at Naples, roused in that city a rebellion no less formidable. Headed by Thomas Aniello, (commonly called Maseniello,) a fisherman, the lower classes made themselves masters of the palace and the viceroy, committed numberless excesses, and sacrificed to their vengeance the most obnoxious instruments of the tyranny to which they were subjected. Their leader assumed the title of lieutenant-general of the King of Spain, and for ten days exercised the most unlimited authority; but at length, becoming intoxicated by a success so unexpected, he grew suspicious and cruel, and his whole conduct exhibited evident marks of insanity. He was assassinated on the 11th day of his short and extraordinary reign; but the Neapolitans still continued in arms, and assuming a republican government, chose as their commander Francis Toraldo, prince of Massa.

The insurrection at Palermo had, in the mean time, been quelled by Cardinal Trivalzio, whose influence as a churchman and an Italian, at length restored tranquillity. The Neapolitans, however, determined to throw off the yoke of Spain, now began to deliberate to whom they should make offer of the crown; and actually intreated the pope, as their suzerein, to confer it on some prince of French extraction.

At this period, Henry, duke of Guise, happened to be at Rome. This nobleman, whose character resembled that of the ancient heroes of chivalric romance, was immediately excited by the ambition of making himself master of Naples; and without waiting for any aid proceeded immediately to that city, and offered his services to the republic. He was received with enthusiasm by the people, and immediately appointed their general with the title of duke, or doge. The civil administration still remained in the hands of Gennaro Annese, one of the original insurgents; but the duke, after the conquest of Capua and Aversa, openly assuming an authority and state which showed his intention of aiming at the crown, Annese contrived to excite the jealousy of the people against him, and, in concurrence with the archbishop, carried on a secret negotiation with Don Juan of Austria, and the Spanish troops in the citadel. At length having, by a false report of an attack on Nisites, contrived to remove the duke and his troops from the city, the Spaniards, issuing from the fortress, were received without resistance; and Guise, after some unavailing attempts to force his way back, retreated towards Rome, but on his march was seized by treachery, and sent to Spain, where he remained a prisoner for five years. The Spaniards, again masters of Naples, punished the revolt with the greatest cruelty; and even Gennaro Annese, whose treachery had restored the Spaniards, perished on the scaffold.

The wars of the Fronde, which now raged in France, completely withdrew the attention of Mazarine from Italy; and in the course of a few years, the Spaniards recovered Elba, Piombino, and Casal: but no sooner was the cardinal reinstated in his power, than he again attempted to invade Naples, allowing the expedition to appear, however, as if solely the work of the duke of Guise, now delivered from prison. The capture of Castelmare was all that the duke could effect; and, meeting with no encouragement from the Neapolitans, he was obliged to return to France. Nothing farther of any importance was attempted in Italy during this war; which was put an end to by the peace of the Pyrennees.

From this period, there follows about twenty years of profound repose in Italy, which can scarcely be said to be interrupted by the contest of the Venetians with the Turks, commonly called the war of Candia, in which Pope Innocent X. in vain endeavoured to procure the assistance of the other Catholic potentates. During the pontificate of Alexander VII. a dispute which arose between him and Louis XIV. occasioned a mutual dismissal of ambassadors; and preparations for war were made on both sides: but the pope soon becoming convinced of his inability to oppose so powerful an antagonist, hastened to appease Louis, whose pardon he only obtained by the most humiliating concessions.

The king of France was now engaged in his wars in Flanders, and for some years interested himself but little in Italian affairs: the oppressive government of the Spaniards at length gave him an opportunity.

The city of Messina, in Sicily, had, from a very early period, enjoyed the privilege of being governed by its own senate, a right which its citizens had defended against the aggressions of several monarchs of the different dynasties which had in their turn been oppressors in Sicily. The Spanish ministers, jealous of this last remain of independence, made an attempt to deprive the senate of its jurisdiction, and put to death two of the magistrates who ventured to defend its rights. The remonstrances of the people on this atrocious outrage were considered by the court of Madrid as acts of rebellion, and the governor of Messina endeavoured to secure the persons of the senators as its instigators. But the people, alarmed for the fate of their magistrates, flew to arms, and the garrison were forced to take refuge in the citadel, which they were soon compelled to evacuate. The armies of the viceroys of Naples and Sicily now prepared to besiege the city, and the Messenians had recourse to the duke d'Estrees, French ambassador at Rome.

Louis, on receiving this intelligence, immediately sent a body of troops to Messina, to the great joy of the inhabitants, who hoisted the standard of France, and proclaimed Louis as their sovereign. In the course of the following year, the Spanish fleet being defeated by the French, the siege was raised, and the generals of Louis entertained hopes of conquering the whole island. But the lapse of 400 years had not effaced the recollection of the tyranny of Charles of Anjou; and however averse the Sicilians might be to the Spanish government, they exhibited still greater antipathy to the dominion of the French, and the conquests of the latter were confined to a few inconsiderable towns. At last Louis, weary probably of the expence of the contest, suddenly sent a peremptory order to his general, Feuillade, to evacuate Messina. The senate and nobles having in vain remonstrated against this cruel desertion, were forced to surrender to the Spaniards, but more than one half of the inhabitants removed to France: an emigration which, with the loss during the war, and the subsequent oppression of the Spaniards, so much weakened Messina, that half a century elapsed before it regained its former prosperity.

Not long after this, Louis acquired the important city of Casal, in Montferrat, by a treaty with Guerrieri, prime minister to Ferdinand Charles, duke of Mantua, by which, on the payment of 500,000 livres, the city was delivered up to Louis, and immediately occupied by 12,000 French, under Boufiers and Catinat. This dishonourable transaction excited so great indignation among the Italian states against the duke of Mantua, that he disavowed any knowledge of the transaction. The French, however, retained possession, and the extravagance and thoughtlessness of the duke, who was devoted to the passion of gaming, render his participation in the treaty not at all improbable.

The republic of Genoa now incurred the displeasure of Louis, by the steady attachment it continued to maintain to the Spanish interest. Under pretence of their fitting out a fleet for the service of Spain, the Genoese were attacked by a powerful French squadron: and on their refusal to surrender the ships, Genoa was bombarded and part of the city reduced to ashes; and the doge, and four of the principal senators, obliged to proceed to Paris, and there humble themselves before the haughty Louis.

In his conduct to Pope Innocent XI. the French monarch displayed the same overbearing insolence, nor can his obstinate opposition to the pope's wise restrictions on the right of sanctuary enjoyed within the premises of foreign ambassadors, be otherwise accounted for, than from his desire to shew to Europe that he had now arrived at such a height of power, as to despise the laws by which other civilized states were regulated in their mutual intercourse.

The indignation of Europe at length burst forth, and the league of Augsburg was formed by the Emperor Leopold with Holland, Spain, Sweden, Denmark, and Savoy, for the purpose of checking the ambitious designs of Louis. On the succession of William III. to the throne of Britain, that nation also joined the league.

The first commencement of the war in Italy was unfortunate for the allies. The troops of Victor Amadeus II. were defeated at Staffarda, by Mareschal Catinat, and all Savoy, with the greater part of Piedmont, fell into the hands of the French. The activity of prince Eugene of Savoy saved Turin; and in the following years these allies invaded Dauphiny, in order to divide the attention of Catinat. The success of their campaign was, however, interrupted by the illness of the duke, and his generals were forced to retreat. Casal was then invested by the combined troops of Spain and Savoy, and on its surrender was restored to the duke of Mantua, in consequence of a secret agreement between Louis and the duke of Savoy, who was now weary of the war, and determined to desert the cause of the allies. In fact, he concluded a treaty the next year, after sustaining a mock siege in Turin, by Catinat.

By this pacification, which was termed the neutrality of Italy, the duke received back Savoy, with all the other places occupied by France, and Adelaide, his eldest daughter, was betrothed to the duke of Burgundy, grandson of the French monarch. The defection of Victor Amadeus was soon followed by the general peace of Ryswick, terminating a war, which though it had not humbled the French king, had at least exhausted his resources to such a degree, as to render his ambition less formidable to his neighbours.

The commencement of the 18th century was marked by a new cause of contention, and a war still more important in its results. Charles II. the last king of Spain, of the house of Austria, dying without issue, bequeathed his dominions to the duke of Anjou, grandson to Louis XIV. who, repairing to Madrid, was immediately acknowledged as king, by the name of Philip V. The emperor Leopold, who claimed the succession in behalf of the archduke Charles, his second son, finding it vain to make attempts on Spain, marched a considerable army into Italy, under the command of prince Eugene. The Venetians observing a strict neutrality, he met with little or no opposition, till he attempted to enter the Milanese, when he was attacked near Chiari, by the united troops of the duke of Savoy and Mareschal Villeroi, whom he completely defeated. Cremona also was surprised and occupied by the Germans, and Villeroi taken prisoner; and a revolt at Naples, in favour of Charles III. was with difficulty quelled by the Spanish viceroy. Eugene then laid siege to Mantua, but the arrival of the duke of Vendome, with considerable reinforcements from France, forced him to give up the undertaking.

In the mean time, the duke of Savoy, offended that the sole management of the war was not committed to him, notwithstanding his connection with Philip, who had married his daughter, left the French party, and acceded to what was termed the grand alliance, consisting of the emperor king William III. the states of Holland, and the king of Portugal. The affairs of these great leagues, however prosperous elsewhere, was unsuccessful in Italy. Savoy was immediately invaded by the French armies, under Vendôme and Feuillade; and the duke at length, after the doubtful action at Cassinato, forced to take refuge in Turin, where he was closely besieged by Feuillade. But the archduke was now master of great part of Spain, and the decisive victory by Marlborough at Blenheim having expelled the French from Germany, prince Eugene hastened to the relief of Turin. The French army had been reinforced by the troops under the duke of Orleans and Mareschal Marsin, and was superior in numbers to that of Eugene; but the latter, attacking them with vigour in their camp, carried the entrenchments, and defeated them with great loss. Marsin was killed, and the duke of Orleans wounded, and the remains of the army fled with great precipitation. The effects of this victory were decisive of the fate of Italy, and the duchy of Milan and kingdom of Naples were occupied by the imperial troops.

During the course of the four following years, France was reduced to the greatest extremities, and Louis made several attempts to negociate, but with no success, and peace seemed still far distant, when two unexpected events, which took place much about the same time, contributed to accelerate its approach. The one was the death of the emperor Joseph I. who, leaving no heirs, was succeeded by his only brother the archduke Charles, who under the title of Charles III. was in possession of part of Spain, with the kingdom of Naples, and who was named Charles VI. The dismissal of the Whig ministry in England, and the consequent recall of the duke of Marlborough, tended still farther to prepare the way for the peace which was at length concluded at Utretch, by the kings of France and Spain, with the queen of England and duke of Savoy, the emperor still persisting in carrying on hostilities. The articles relating to Italy, were the acknowledgment of the duke of Savoy's right of succession to the crown of Spain, in default of issue of Philip V. and his acquisition of the island of Sicily, with the title of king. Charles VI. thus deserted by his allies, also made peace the following year. By this treaty, which was concluded at Rastadt, Philip V. was acknowledged king of Spain, while the kingdom of Naples, and duchy of Milan, were left in the possession of the emperor.

But the peace was not destined to be of long endurance in Italy. On the death of his first wife, Philip V. espoused Elizabeth Farnese, grand-daughter of Francis duke of Parma. This princess soon acquired great influence with Philip, while she in her turn was ruled by the intriguing and ambitious Alberoni.

The first attempt of this celebrated statesman was the sudden invasion of Sicily, which was so successful, that only two small towns were left in the possession of Victor Amadeus. This sudden aggression allied the emperor with the regent Orleans and the courts of Britain and Savoy against Spain. Sardinia, with the title of king, was bestowed on Victor Amadeus, in lieu of Sicily, which was ceded to the emperor. At length, Philip, alarmed at the number of his enemies, dismissed Alberoni, and peace was again restored.

The question of the right of succession to the duchies of Tuscany and Parma, now excited considerable interest; and by an agreement, concluded by the emperor and Philip V. it had been settled, that on the demise of the two dukes, neither of whom had any issue, the infant Don Carlos should receive the investitures, and on the death of Antonio Farnese, he was accordingly acknowledged duke of Parma. But the contest for the crown of Poland again divided the European powers; and France, Spain, and Sardinia, were leagued against the emperor. The result was fatal to the German interest in Italy; Naples and Sicily fell again into the hands of Spain, and Milan, with many other cities in Lombardy, were taken by Villars. In the mean time, John Gaston di Medici, grand duke of Tuscany, died, and the investiture was conferred by the emperor on Francis Stephen of Lorraine, his son-in-law, the Spaniards, however, remaining in actual possession. A peace was then concluded, by which Don Carlos was to remain king of Naples. Milan and Parma were to be restored to the emperor, and Tuscany to Francis of Lorraine. But this treaty was never executed, and the death of Charles VI. rekindled with double vigour the flames of war. His daughter Maria Theresa, queen of Hungary, and her husband Francis of Tuscany, were attacked by the French, Prussians, and Saxons; and Charles, elector of Bavaria, was crowned emperor by the name of Charles VII. In Italy, the queen was assisted by Charles Emanuel, king of Sardinia, while considerable British subsidies aided her in carrying on the war. But the troops of the infant Don Philip and the prince of Conti made themselves masters of all Savoy, and most of Piedmont.

The empress queen having now expelled Charles VII. from his hereditary states, and concluded a peace with the king of Prussia, was now able to assist her ally; and Charles Emanuel re-entered his dominions. The imperial troops then entered Genoa, but were soon after expelled by the people, who admitted a French garrison, and repelled the repeated attacks of the imperialists.

War at length was terminated by the peace of Aix-la-Chapelle, by which the states of Italy were distributed in the way in which they remained till our own times. The king of Sardinia, and the duke of Modena, (who had also been expelled) were reinstated in their dominions. Charles remained king of Naples and Sicily; but it was secured, that these crowns should not be united with that of Spain; Don Philip was left duke of Parma and Placentia; while Milan was restored to Austria, and the archduke Leopold, second son of the empress, became grand duke of Tuscany.

Between this period and the French Revolution, an era of profound peace intervenes, diversified by few events of general interest, if we except the gradual expulsion of the order of Jesuits from the different states, and their final abolition by the papal bull of Clement XIV. See JESUITS.

Under the government of the well-meaning, though injudicious emperor Joseph II. and his benevolent and liberal brother Leopold of Tuscany, abuses were reformed, the situation of the people ameliorated, agriculture improved; and the progress of science, and the arts, at Milan and Florence, attests their encouragement of philosophy and literature. Nor were these improvements confined to the Austrian dominions: at Rome, science equally flourished under the philosophic Clement XIV. and agriculture and the arts under the polished Pius VII. Turin, amid all the bigotry of the Sardinian court, produced the brilliant talents of Alfieri, and even Naples could boast of a Filangieri, and Caraccioli.

The dreadful earthquake, which in 1791 laid waste the country, and destroyed the cities in Sicily and Calabria, would in a less enlightened age have been considered as the omen and precursor of the tremendous convulsion which was about to agitate the political world.

The eyes of Europe were now turned on France, and it was not to be supposed, that the Italian potentates connected by blood with the unfortunate Louis XVI. and Maria Antoinette, could be indifferent spectators of their death, or regard without alarm the military spirit and conquests of the republic. In consequence, the king of Sardinia and the other Italian states joined in the league with the Austrians, Prussians, and British, and declared war.

The campaign of 1794, in Piedmont, was uniformly successful on the part of the French, and the defeat of the Sardinians near Milan, made them masters of that city. Corsica, however, surrendered to the British, and acknowledged George III. as its sovereign. The following year the Austrian and Sardinian troops were successful in some battles, and checked for a short period the progress of the republicans. But the events of 1796 decided the fate of Italy. The history of the celebrated campaign of Bonaparte, and the rest of the war in Italy, has already been related in the article FRANCE, and we must only slightly enumerate its results. The defeat of the king of Sardinia was followed by a peace, by which he surrendered Savoy and Nice. The battle of Lodi forced the pope and the dukes of Parma and Modena, and the king of Naples, to accede to the ignominious terms dictated by the victor; Florence and Milan fell before his arms, and Mantua alone remained in the hands of the Austrians.

The next years were no less disastrous: the revolution at Venice ended in the abolition of that state; the signal defeat of the Austrians occasioned the surrender of Mantua and Verona, and the emperor was at length compelled, by the treaty of Campo Formio, to acknowledge the Cisalpine republic, consisting of Milan, Mantua, Modena, and Bologna. Pius VI. was expelled from Rome, and died in exile; king Ferdinand was forced to abandon Naples, and take refuge in Sicily; and the king of Sardinia was deprived of all his dominions but that island. During Bonaparte's absence in Egypt, the attack of Tuscany excited a new coalition, and under Suwarrow and the Archduke Charles, the French were again driven from Italy. But the return of Napoleon soon gave energy to the French, and the decisive victories of Novi and Marengo again established his dominion in Italy. In 1805, he assumed the title of king of Italy or Lombardy; and under the mild administration of prince Eugene Beauharnois, his viceroy, that country began to recover from the misfortunes of the war. Louis duke of Parma was made nominal king of Etruria, and Joseph Bonaparte of Naples. The latter, on being appointed king of Spain, was succeeded by Joachim Murat, (brother-in-law to Napoleon,) whose distinguished bravery had often contributed to the victories of the French. After the battle of Leipsic, the subsequent defeats of Napoleon in France, and the surrender of Paris, the kingdom of Italy was occupied by the Austrians, with whom Joachim made a treaty. But on the return of Napoleon from Elba, he again joined his ancient leader; the Austrians invaded Naples, and Joachim, abandoned by his troops, left that kingdom to be again occupied by the Bourbons. In 1815, he landed again in Calabria, with a few troops, but was seized, and, being tried by a military commission, condemned to be shot.

Before closing this article, it is proper to state, in a few words, the present political divisions of Italy. Victor Emanuel, king of Sardinia, is now reinstated in Savoy and Piedmont, with the important addition of the city, and territory of Genoa. The duchies of Milan, Mantua, and Modena, with the cities of Verona, Vicenza, and Padua, Venice, and its former territories in Istria, and Dalmatia, are now comprised in the kingdom of Venice and Lombardy, and belong to Francis II. Emperor of Austria. It is, however, rumoured, we know not with what truth, that this kingdom is to be conferred on one of the princes descended from the Austrian family. The duchy of Parma and Placentia is governed by the archduchess Maria Louisa, formerly empress of the French, and the succession is settled on her son Napoleon Charles Francis. The territories of Florence, Lucca, Sienna, and Pisa, form the kingdom of Etruria, under Charles son of the late king. The aged Pius VII. has been reinstated in the ancient papal dominions, the temporal administration of which is chiefly committed to Cardinal Gonsalvez. The kingdoms of Naples and Sicily are again united under the feeble sway of Ferdinand IV. brother of Charles IV. and uncle of Ferdinand VII. of Spain. The island of Corsica remains annexed to France. From this sketch it appears, that the Austrian power is predominant; and connected as he is by marriage, with the kings of Sardinia and Naples, the emperor Francis may be regarded as master of the destinies of Italy. See Micale, *L'Italia avanti il dominio dei Romani;* Denina, *Rivoluzioni dell' Italia;* Sismondi, *Histoire des Republiques Italiennes du moyen age;* Robertson's *Charles V.;* Wraxall's *Memoirs of the House of Valois;* Cunningham's *History of Britain*, &c. &c. (E. J.)

PART II. STATISTICS OF ITALY.

ITALY is bounded on the north and north-west, by the Alps; on the east, by the Adriatic Sea, or Gulph of Venice; on the west, by the Tuscan Sea; and on the south, by the Ionian Sea. Its boundaries are thus strongly marked, and its situation entirely peninsular, being washed on all sides by the waves of the Mediterranean Sea, except on the northern frontier, where it is separated by the lofty barrier of the Alpine ridge from France, Switzerland, and Germany.

Its form is usually compared to that of a boot; it extends in an oblique direction from north-west to south-east, from 47° to 37° 45′ of north latitude. Its length from Mount Rosa, the highest summit of the Italian Alps, to Cape de Leuca, is about 670 British miles; and its breadth varies from 100 to 200 miles.

It was anciently known by a variety of names, originally appropriated to particular provinces, but in process of time applied to the whole country, especially by the poets. It was named Saturnia, from Saturn; Latium, from the Latini; Ausonia, from the Ausones; Venotria, from a tribe settled between Paestum and Tarentum; Hesperia, from its western situation in respect of Greece; and Italia, from Italus, a prince unknown in history.

In all periods of its history it has been divided into three great portions, namely, the northern, called Gallia Cisalpina, comprehending the provinces between the Alps and the Rubicon, originally peopled by Illyrians, succeeded by German Gauls; the central, called Italia Propria, comprehending all the states of Etruria, as far south as Capua, the inhabitants of which are supposed to have been of Lydian extraction; and the southern, called Magna Grecia, comprising the provinces adjacent to Greece and Sicily, and peopled at first by the Pelasgi from the Peloponnesus.

Gallia Cisalpina, afterwards called Togata, from its inhabitants being permitted to wear the toga as Roman citizens, contained the following tribes. 1. Ligures, who occupied the greater part of the districts of Nice, Piedmont, Montserrat, Genoa, Modena and Parma, and whose principal towns were Genoa, Nicæa, Portus Herculis, and Monæci. 2. Taurini, who occupied a part of Piedmont lying between the Alps and the river Po, from its source to the river Orco, and whose chief town was Augusta Taurinorum, now Turin. 3. Insubres, who occupied the northern portion of the duchy of Milan, and whose principal towns were Madiolanum and Ticinum. 4. Cenomanni, who occupied both sides of the river Sevinus, and whose towns were Bruxia, Cremona, Bedriacum, and Mantua. 5. Euganei, who were settled at the bottom of the Adriatic Gulph, and whose towns were Tredentum and Verona. 6. Veneti, who possessed the country along the coast of the Adriatic, from the mouth of the Po to that of the Taiamento, of which the chief towns were Patavium, Aquileia, and Forum Julii. 7. Istri, who inhabited a tract along the eastern coast of the Adriatic, between the river Tilavemptus, and the promontory of Polaticum, whose principal towns were Aquileia and Tergeste. 8. Boii, who inhabited the countries around Bononia and Mutina, (Bologna and Modena.)

Italia Propria, under which is commonly included the other division of Magna Grecia, contained, in this more extended sense, all the other provinces of the country, namely, 1. Etruria or Tyrrhenia, lying between the river Maera, the Appenine Mountains, the Tiber and the Tuscan Sea, was anciently divided into twelve districts, and contained the towns of Pisæ, Luca, Florentia, Fesulæ, Portus Herculis, Liburni (Leghorn) Sena, Arretium, Centum Cellæ (Civita Vecchia), &c. 2. Umbria, the supposed territory of the most ancient people of Italy, lying between the Rubicon, the Adriatic, the Tiber, and an imaginary line from the mouth of the Æsis to Ocriculum, and divided by the Appenines into two portions, the Cisappenine, or Maritime Umbria, and the Transappenine, or hither Umbria, contained, in the former division, Arminium, Pisaurum, Busta Gallorum, (Bastia,) Urbinum, Senogallia; and, in the latter, Nuceria, Spoletium, Narnia, Interamnium, Ocriculum. 3. Picenum, a fruitful territory between Umbria and the river Avernus (Pescara,) containing Ancona, Firmum, Asculum. 4. Sabinum, west of Picenum, between the Tiber, the Nar, and the Anio, containing Fidenæ, Cures, Crustumerium. 5. Latium, along the coast of the Tuscan Sea, extending south from the Tiber to the promontory of Circæum, anciently inhabited by the Æqui, Volsci, Hernici, Rutuli, &c. and containing Roma, Ostia, Ardea, Tusculum, Præneste, Alba, Tibur, Antium, Anxur, Minturnæ. 6. Campania, extending along the Tuscan shore, from Sinuessa to the river Silarus, and bounded on the east and north by Samnium, and containing Capua, Liternum, Baiæ, Puteoli, Neapolis, Herculaneum, Pompeii, Surrentum, Nolæ, Casilinum, Venagrum. 7. Samnium, lying on both sides of the Appenines, east from Campania, and bounded on the north by Latium, on the east by the Adriatic, and on the south by Apulia, contained Beneventum, Bovianum, Saticula, Caudium. 8. Apulia, called also Daunia, east of Samnium, and bounded by the Fronto on the north, the Adriatic on the east, and Calabria on the south, contained Arpi, Uria, Luceria, Asculum, Canusium, Venusia, Ferentum. 9. Calabria, called also Messapia and Japygia, a peninsula running out into the Ionian Sea, contained Brundusium, Hydruntum, Castrum Minervæ, Salentinum, Leuca, Tarentum, Callipolis. 10. Lucania, between the Tarentine Gulph and Tuscan Sea, contained Pæstum, or Posidonia, Forum Popilii, Potentia, Anxia, Metapontum, Heraclea, Sybaris, Velia. 11. Brutium, a peninsula south of Lucania, divided by the Appenines into two maritime tracts, called sometimes Calabria Citra and Ultra, contained Pandosia, Scyllæum, Rhegium, Croton, Metaurum, Mamertum, Petelia, &c.

Through these ancient districts and towns, highways from the capital were formed at different periods of the Roman empire, of which the most remarkable were, Via Appia, constructed by Appius Clodius, the most ancient of the Roman roads, passing through Forum Appii, Fundi, Minturnæ, and Sinuessa to Capua, and thence through Caudium, Beneventum, Canusium, and Barium, to Brundusium; Via Flaminia, leading through Etruria and Umbria to Arminium, passed by the towns of Ocriculum, Narnia, Fulginum, Forum Flaminii, Callis, Forum Sempronii, and Pesaurum; Via Emilia, the work of Emilius Lepidus, leading from Arminium, through Forum Popilii, Faventia, and Claterva to Bononia, and thence through Mutina, Aleste, Petavium Altinum, and Concordia, to Aquileia; Via Aurelia, ascribed to Aurelius Cotta, extending along the coast of Etruria to Pisæ, thence round the Gulph of Genoa to Nicæa into Gaul; Via Clodia, passing through the middle of Etruria to Lucca; and Via Cassia, through the interior of Etruria to Clusium and Florentia.

Ancient Italy was divided by Augustus into eleven provinces; but, after his death, this division was no longer regarded, except that the name of Gallia Cisalpina was generally discontinued, and that of Italy extended nearly to its present limits.

The progressive geography of Italy, since the fall of the Roman empire, cannot be accurately described, without a recapitulation of its eventful history; and to the preceding view of its political epochs and revolutions we must therefore refer for much of its civil geography. The following sketch of its principal divisions, previous to the French Revolution, is all that can at present be admitted on this part of the subject.

Upper or Northern Italy, called also Lombardy, contained several duchies, namely, Savoy, Piedmont, Montserrat, Milan, Mantua, Modena, Parma, and Placentia; of which the three first, and part of the fourth, belonged to the King of Sardinia, and the other to the Emperor of Austria. These territories of Austria, together with part of the Venetian dominions and the Ecclesiastical states, were formed by the French in 1797, into a new republic, called the Cisalpine, or Italian republic; and were divided into twelve departments, which were again subdivided into forty-five districts; namely, Agogna, containing the districts of Novarra, Vigevano, Domo d'Ossola, Varallo, and Arona; Del Lario, containing Como, Variso, Londrio, and Lecco: Olona, containing Milan, Pavia, and Monza; Serio, containing Bergamo, Treveglio, Clusone, and Breno; Mella, containing Brescia, Chiari, Verola, Alghisi, and Salo; Alto-Po, containing Cremona, Crema, Lodi, and Casal; Mincio, containing Mantua, Revero, Verona, and Castiglione delle Stiviere; Crostolo, containing Reggio, and Carrara; Panaro, containing Modena, and Castelnovo di Garfagnana; Basso-Po, containing Ferrara, Commachio and Rovigo; Reno, containing Bologna, Imola Cento, and Vergato; and Rubicon, containing Cesena, Sorli, Faenza, Ravenna, and Rimini. Besides these, Northern Italy comprehended the republics of Genoa and Lucca.

Central Italy comprehends the Ecclesiastical State, consisting of Campagna di Roma, Sabina, Il Patrimonio di S. Pietro, Ducato de Castro, Contado di Ronciglione, Perugia, Contado de Citta di Castello, Umbria, or Ducato di Spoleto, La Marca d'Ancona, Ducato D'Urbino, Romagna, Territorio di Bologna; the small republic of S. Marino, under the protection of the Pontiff; the Venetian dominions in Italy, namely, Dogado de Venezia, Il Paduana, il Polesine de Rovigo, il Veronese, il Vicentino, il Bressano, il Bergamasco, il Cremasco, la Marca Trevigiana, Patria del Friuli; Istria, Dalmatia; Ragusa, an independent state, generally under the protection of the Turks; and the Grand Duchy of Tuscany, containing il dominio Fiorentino, il territorio Pisano, and il territorio di Sienna: This last portion of Central Italy, together with Parma, Placentia, and Guastalla, was formed under the French into the kingdom of Etruria.

Southern, or Lower Italy, comprising the ancient Samnium, Apulia, Campania, Lucania, and Bruttium, forms the kingdom of Naples, which is divided into twelve provinces, called Giustizierati, or Jurisdictions, namely, Terra di Lavoro, Principato Ultra, Principato Citra, Calabria Citra, Calabria Ultra, Basilicata, Terra d'Otranto, Terra di Bari, Capitanata, Contado di Molise, Abruzzo Citra, and Abruzzo Ultra.

These different divisions have been again replaced nearly in their former political state. The King of Sardinia has recovered his dominions, such as they were in 1792. The Emperor of Austria has acquired the Venetian States, and all the territory between the Tessin, the Po, and the Adriatic, the Vallies of Valteline, Bormio, and Chiavenna. The Archduke Francis D'Este is made Grand Duke of Modena. The Archduchess Maria Beatrice d'Este becomes the hereditary sovereign of the duchy of Massa, and principality of Carrara, with the imperial fiefs of Lunigiana. The Archduchess Maria Louisa (late Empress of France) is sovereign of the duchies of Parma, Placentia, and Guastalla. The reversion of these states remains to be regulated by the allied courts; and is said to have been recently arranged in the following manner. After the death of her Imperial Highness, these duchies will be restored to the Infanta Maria Louisa (widow of the Duke of Parma and King of Etruria) and to her male descendants in a direct line, with the exception of the districts situated on the left bank of the Po, and inclosed in the estates of the Emperor of Austria. In default of male issue, the rights of succession of the Emperor of Austria and of the King of Sardinia will be revived. The Infanta Maria Louisa, in the mean time, obtains provisional possession of the principality of Lucca, with certain arrears assigned to her by congress. The Archduke Ferdinand of Austria regains the Grand Duchy of Tuscany, and also the principality of Piombino, with that part of Elba which formerly belonged to the king of the two Sicilies. The pope receives again the Marshes and their dependencies, the territories of Benevento, Ponto Corvo, Ravenna, Bologna, Ferrara, Commachio, &c. Ferdinand IV. King of the two Sicilies, is restored to the throne of Naples, without any change of territory or authority.

Aspect of the Country.

Italy may be regarded as a mountainous country.* The Alps, the highest range of mountains in the ancient world, form its northern boundary, separating it from France, Switzerland, and Germany; and the Appenines, rising near Genoa, extend through the whole length of the peninsula in a southerly direction, dividing it into two parts, nearly equal, and branching out into various ridges in their progress, so as to form a number of districts and vallies differing from each other in climate and productions. (See Alps and Appenines.)

Italy is intersected by rivers in almost every direction. The most considerable are—the Po, which rises from Mount Vesula, about 30 miles south-west from Turin, (at which city it is 1200 feet broad,) flows through a course of 300 miles, waters 50 cities in its progress, receives innumerable rivers and streams into its channel, (the chief of which are the Doria, Lesia, Tanaro, Tesino, Trebia, Adda, Oglio, and Mincio,) and is navigable within 25 miles of its source;—the Adige, which flows from the Tyrol southward to Verona, and thence south-east to the gulf of Venice, north from the Po;—the Arno, which rises in the Appenines, and flows by Florence and Pisa into the gulf of Genoa;—the Tiber, which rises also in the Appenines south-east of St. Marino, passes by Perugia and Rome (from which to its mouth it is at an average 300 feet broad,) receives in its progress 42 tributary streams or torrents, and reaches the Tuscan sea at Ostia, after flowing through a course of 150 British miles;—the Fiumesino, the ancient Rubicon, a diminutive but celebrated stream in the northern part of the Ecclesiastical State, which enters the Adriatic about 8 miles north of Rimini, and the Volturno, which rises in the Appenines above Venafro, runs south-east and afterwards westward, receiving the Sabbato in its course, and falls into the sea at Castello del Voltorno. The rivers which descend from the Appenines are so apt to swell suddenly, and to overflow the adjacent country, that it became necessary to erect strong dikes or mounds along their banks. But the stones and gravel brought down by these floods, being also confined by the banks, are continually raising the bed of the stream, and requiring the embankments to be proportionally elevated. This is particularly the case with the Po and its tributary streams; so that the country, in the progress of this river, appears to be intersected by a multitude of aqueducts, in some places not less than 30 feet in height, which are continually in danger of breaking out into the most destructive inundations, and which render it necessary for the inhabitants to have a large boat always at hand, in which they float with their families and most valuable effects, till the overflowing waters have subsided. These embankments must soon be incapable of farther elevation, and the rivers, no longer restrained, may at no distant period convert the fine delta of the Po into an extensive and useless marsh. The only possible remedy, if practicable, appears to be to deepen the channel, instead of elevating the embankments.

Italy contains many beautiful lakes, particularly in the northern division. Of these the most worthy of notice are—Lago Maggiore (ancient Verbanus), which is 27 miles in length, 7 or 8 in breadth, and in some places 1800 feet deep, contains the delightful Borromean islands, which may be ranked among the wonders of Italy, and is surrounded with banks abounding in every alpine beauty;—Lago di Lugano (anciently Ceresius Lacus) about 25 miles in length, from 3 to 6 in breadth, of an immense depth, and in some places said to be almost unfathomable, is surrounded with very high and steep banks, which cast a blackening shade over the surface of its waters;—Lago di Como, or Larian Lake, less beautiful, but more magnificent than Lago Maggiore, about 50 miles in length, from 3 to 6 in breadth, and from 40 to 600 feet deep, is surrounded with a lofty ridge of mountains, whose sides, down to the border of the lake, are covered with shady woods and fruitful orchards, and its waters are subject to sudden squalls and violent swells;—Lago di Varese, a noble expanse of water, of an oval form, about 12 miles long and six broad, is surrounded with gently sloping banks, which are clothed with all the luxuriance of vegetation;—Lago di Garda, or Benacus, 18 miles from Verona, is 30 miles in length, 3 in breadth, of very unequal depth, is surrounded with beautifully diversified scenery; and its waters, though usually tranquil, and presenting the finest sea-green hue, are at times agitated by waves, resembling rather the swellings of the ocean, than the commotion of inland waters, a circumstance strikingly described in a single line of Virgil:

> *Teque*
> *Fluctibus et fremitu assurgens, Benace, marino.*
> Georg. ii. 160.

In the central parts of the country, the largest lakes are those of Perugia and Bolsena; and, in the southern districts, those of Varano, near Mount Gargano, and Celano (anciently Fucinus), which is 47 miles in circumference, and from 4 to 10 in breadth. There are many smaller lakes in different parts of Italy, some of which are much celebrated for the beauty of their scenery, particularly Lago Albano in the vicinity of Rome, and Lago d'Agnano, supposed to be the famous pond of Lucullus, near Naples. It has been remarked as a singular circumstance, that the lakes of Italy are so little celebrated by the Roman poets, scarcely any of them being once mentioned, except Larius and Benacus, in two lines of Virgil; which is supposed to have been owing to the barren and unsettled state of Cisalpine Gaul in those times, which was scarcely considered as a part of Italy. But these deficiencies are now fully supplied, and the principal feature which distinguishes the Italian from the British lakes is, that the former, besides their greater extent, are surrounded by towns, villages, churches, and country seats, all placed, as if by the hand of a painter, in the most picturesque situations, finely contrasting and relieving the sublime and rougher parts of the landscape.

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* Of the fine country even of Tuscany, one half is mountainous, and produces nothing but timber; a sixth part consists of hills covered with the olive and vine; and the remaining third only is plain.

Nothing can exceed the natural scenery of Italy, in all the ingredients which compose the sublime or the beautiful. Its mountains present every variety of shape and magnitude, of rugged precipices, woody declivities, snowy summits, winding bases, and all the possible materials of picturesque beauty. Even the plains are varied by gentle swells and bolder elevations; while the extraordinary purity of the atmosphere, and consequent brightness of the light, gives a distinctness to every object, which cannot be conceived by those who are accustomed to the dimness of a vapoury sky. Its views, in short, we are assured by the concurring testimony of the most intelligent observers, never disappoint the traveller, or fall short of his expectations. The highest picturing of imagination, and brightest description of poetry, do not surpass the effect produced by viewing the vale of Clitumnus, the falls of the Anio, the banks of the Nar, the waters of Tibur, the groves of Albano, the plains, hills, coasts, and bays of Campania Felix.*

Some of the more celebrated Italian landscapes, besides those already mentioned, are, the bay of Naples; the adjacent promontory of Posilippo; the Val d'Arno near Florence, which is the Arcadia of Italy; the road by La Cava to Calabria; the prospect from the Palombiera of Vietri; the eastern shore of Mare Piccolo, &c.

In this place may be mentioned also a few of those natural curiosities with which the country abounds, and which usually attract the notice of travellers, but which our limits will not allow us to describe; namely, the Grotto of Puzzuolano, an excavation or tunnel nearly a quarter of a mile in length, leading to the Lago d'Agnano near Naples; the Grotto del Cane in the same vicinity, called by Pliny, Spiracula Ditis, remarkable for a deadly vapour arising from its bottom, and for the repeated experiments of its efficacy by letting dogs down into it; the vapour baths adjoining to the grotto; the Solfatara, a plain of sulphureous marl at Puzzuolo, which is so hot on the surface as to scorch the feet of those who walk over it, and is continually emitting sulphureous vapours, which, in some places, appear by night as a pale blue flame, anciently called Forum Vulcani, described by Petronius Arbiter, and alluded to by Milton in his Picture of the infernal regions; the Pietra Mala, a mountain 40 miles from Florence, on the road to Bologna, where a continual flame spreads over a portion of the surface, without any of the effects of a volcanic eruption; the intermittent fountains on the promontory of Torno, near Lago di Como; the wells at Casalnuovo, mentioned by Pliny in the second book of his natural history, where the water never rises or falls beyond a certain mark; Pulo di Malfetto, a curious cavern, where mineral saltpetre is found; the Claudian Emissario, a canal cut through the mountain Salvianus by the emperor Claudius, to carry off the superfluous water from Lake Celano; the echo near Pie de Luco, on the way to Caduta, on the banks of the Velino; and the falls of the same river at the same place.

Climate.

In regard to climate, Italy has been counted the garden of Europe, and the most delightful region on the face of the globe. Extending between the 38th and 46th degrees of north latitude, it would be exposed, by its situation, to a considerable degree of heat in summer, and of cold in winter; but by the influence of the seas, by which it is inclosed on so many sides, and of the mountains, by which it is intersected, its temperature is greatly moderated, and preserved from all extremes. Its climate, therefore, may be pronounced in general to be genial and temperate; but varies considerably even in districts not far distant from each other. It has been divided into four regions, each of which possesses a climate somewhat peculiar to itself. First, the Vale of the Po, or Lombardy, about 260 miles in length, and 150 at its greatest breadth, bounded by the Alps on the northwest and south, and open to the Adriatic on the east. This is accounted one of the most delicious climates in the world, its sunshine uniformly bright, its atmosphere clear and unclouded, and its sultry season cooled by the gales from the surrounding mountains. The second extends over the Roman and Tuscan territories, and being inclosed by the Appenines, so as to be well protected from the north, is more incommoded by the heats of summer than the cold of winter. Frost and snow are occasionally experienced; but the temperature is sufficiently high, and continued, to ripen completely the orange and the grape. The third is that of Campania Felix, and its immediate dependencies, where nature appears to pour out all its treasures, where the air is almost invariably genial, and the sky continually serene, and where the most delicate vegetable productions flourish in perfection. The fourth, lying beyond the Appenines, and opening to the east, is still warmer than the last; and abounds more in the productions of a southern latitude, such as the aloes and the palm. This extends over the southern extremity of Italy, including L'Abruzzo, Apulia, and Calabria. The mountainous regions vary in climate according to their elevation; and such is the influence of these local causes, that in their smaller vallies a cool temperature may be experienced in the south, and a sultry atmosphere in the north. The climate over the whole country may be considered in general as inclining to heat, the rays of the sun being powerful even in winter; and in summer, especially when the Sirocco blows, particularly sultry and oppressive. At the same time, the heat is never intolerable, but is cooled by breezes from the mountains or the sea. The sea breeze rises about eight in the morning, and continues without interruption till four in the afternoon; while, in the mountainous tracts, many retreats may be found, such as the baths of Lucca and the valley of Vallombrosa, where the mildest temperature may be enjoyed, even during the raging heat of the dog-days. Rain is not frequent during the spring and summer months; but occasional showers sufficiently refresh the air, and revive vegetation. These are not unfrequently accompanied by thunder storms, which in harvest are sometimes very destructive to the crops. In the end of autumn, rains are regular, and extremely heavy; and in winter, inundations to a wide extent often take place. But all these are only temporary interruptions of the prevailing serenity which constitutes the chief advantage of the Italian climate.

It has been recommended to invalids, especially to those of a consumptive habit, to reside at Pisa during the winter season; at the baths of Pisa, or the city of Florence, during the first part of summer: and, during the great heats of midsummer, at the country retreats on the hills beneath Fiesole.

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* Eustace.

It has been imagined, that the climate of Italy has become warmer that the descriptions by the ancient Romans would lead us to suppose it to have been in their time; and this change has been ascribed to the cultivation of Germany, by the clearing away of its immense forests, and the draining of its extensive swamps. But the lofty barriers of the Alps seem to preclude any cause of this kind from operating upon Italy; and others consider this higher temperature as the effect rather of earthquakes, volcanic eruptions, and similar local causes. It may be questioned, however, whether any change at all has taken place; and it is observed by travellers, that the same places which are described by the Roman writers as peculiarly cold, are still liable, in consequence of their situation, to severe winter blasts. But the most remarkable peculiarity in the climate of Italy, is the Mal-Aria, or unhealthy state of the districts called Maremma, in the summer and autumn months. This tract extends about 192 geographical miles in length, from Leghorn to Terracina, and about 40 in its greatest breadth in the Campagna di Roma. There is no visible sign of any insalubrity in the atmosphere of these regions; but the sky is as clear, the air as tranquil, and the verdure as fresh as in the most healthy district. Many of the places where it prevails, are even elevated, dry, and airy. But nothing can be more fatal than its influence, which occasions the worst kind of intermittent fevers, and is particularly hurtful to those who sleep in the open air during the night. The few inhabitants who remain in these tracts, are sickly and languid in their whole appearance; and even those who repair only to the temporary labours of the harvest, very frequently fall a sacrifice to the distemper, or at least have their constitutions seriously injured for life. Even in the vicinity of Rome, the shepherds and their flocks come every night during summer to take shelter within the walls from the noxious atmosphere of the adjoining country. The city itself is not free from the evil, and even its more elevated situations have begun to experience the influence of this spreading insalubrity. To this increasing action of the mal-aria, the diminished population of Rome during the last 20 years is, in the opinion of Chateauvieux, to be in a great measure ascribed; and the most fatal consequences must attend its farther progress. The real cause of this evil has hitherto escaped all research, and has been ascribed to the pestilential air of the stagnant marshes, or the exhalations of a volcanic soil. But it is not confined to the places more immediately exposed to such influences; and is found to increase with the diminution of the population, and the decay of cultivation. It appears to have been felt in the times of the Roman republic, but to have been limited to a few inconsiderable spots. The destruction of the Roman empire, the abolition of slavery by the influence of Christianity, the translation of the seat of government to Constantinople, by diminishing the cultivation of the surrounding country, are supposed to have occasioned that neglected state of the soil which produces the mal-aria; while the influence of the evil itself is gradually augmenting the cause, depopulating the fields, and leaving the soil to fall back into its naturally rank and humid state. It has, at the same time, been observed, that much of the sickness is occasioned by the peasantry, employed in these regions, sleeping on the ground during the night season, and neglecting to protect themselves from the sudden transition of the atmosphere, from the heat of the day to the chill of the evening; and that, if the lands were portioned out in small farms, proper houses built for the cultivators, and prudent precautions used during the unwholesome season, the Maremma might again be brought into tillage, and covered with inhabitants.

Soil and Agriculture.

In describing the soil and agriculture of Italy, it has been divided into three regions, each of which is distinguished by some prevailing features of husbandry; and which respectively excel in grain, fruits, or pasturage. The first, or principal corn-country, is that of Lombardy, or the great plain traversed by the Po, and already described, as to its boundaries, in the account of the different climates of Italy. This tract is, without doubt, one of the most fertile on the face of the earth; but not more in consequence of natural advantages than of human industry. The soil, which reaches to an unknown depth, is entirely alluvial, and consists of a black fertile mould, which is gradually more mixed with gravel, and that of a larger size, as it approaches the mountains. The principal labour of the cultivators consists in the use of irrigation, a practice which the number of rivers flowing with great regularity from the lakes at the foot of the Alps renders peculiarly applicable, and which the inhabitants have spared neither capital nor skill in carrying into effect. Where the fields are of considerable extent, two principal canals must be opened on different levels; the first of which, called the Gora, or canal of irrigation, receives the water from the river, so as to reach the highest of the fields, and distributes its contents on all sides by a multitude of inferior branches; and the second, called the Scolo, or canal of discharge, beginning from the level of the lowest grounds, carries off the water after it has passed through the fields, and conducts it into the river at a lower part of its course. The country between Lodi and Cremona is the richest part of these beautiful plains, where the soil is peculiarly fertile, and the irrigation most perfect. This fertility admits of the land being greatly subdivided; and a farm of sixty English acres is accounted large. These farms are laid out in fields of two or three acres, by rows of poplars, which gives the appearance of a wooded country; and in most of them pasturage is preferred to the culture of grain. The grass is chiefly clover, which is cut four times a-year, and serves for the food of the cows, from whose milk is prepared the celebrated Parmesan cheese. The cows are fed in the house with two of the crops cut green in summer, and the other two in winter made into hay. It is only during a few weeks in autumn that they are turned out to eat up the last shoots of the pasture. As it requires the milk of at least fifty cows to make the Parmesan cheese, the farmers of a district frequently unite their dairies for this purpose, and afterwards divide the profits in proportion to the quantity of milk supplied by their respective herds. Upon a farm of 100 acres, 30 of which are ploughed and 70 under grass, a farmer will maintain 100 cows, besides a few cattle for draught, and generally values his pasture lands at double the rate of those under corn. In these pastures the soil receives a top-dressing of dung every three years, as the irrigation would otherwise injure the quality of the grass; but, in the course of fifteen years, it becomes necessary to renew the herbage. The sluices are then shut, the ground ploughed in the autumn, and sown with hemp in the following spring. A course of cropping next succeeds, in the following order, forming a rotation of twenty years.

1st year, Hemp, followed by legumes.
2d . . . Oats, which grow to the height of six or seven feet.
3d . . . Wheat, followed by legumes.
4th . . Maize.
5th . . Wheat.

6th, and 14 following years, grass dunged every three years, and the grass cut four times a-year.

But with all this fertility of soil, ease of cropping, and favourable climate, the land of this finest district of Italy, according to a computation by M. Chateauvieux, with every allowance for the relative value of money, does not seem to yield above 3*l.* 18*s.* an acre; which would imply considerable deficiency in the agricultural management. A greater produce is raised by the culture of rice in the more level plains, where there is not a sufficient declivity to admit the ordinary process of irrigation. The ground, after receiving a single furrow, is sown with the rice, and when the plant is a few inches above the surface, the fields are laid entirely under water to the depth of several inches; in which state they remain till the crop be nearly ripe. After three successive crops without any manure, the ground is left without culture, and dung is spread upon the crop of plants which naturally spring from the soil. This produces an abundant, but inferior kind of grass, which is cut for two successive years, when the ground is ploughed, and the rice crops succeed as before. The profit of these rice crops is so great, being three times that of corn, that the proprietors let them at a separate rent, about 5*l.* 6*s.* per acre, and the farmers nevertheless usually acquire large fortunes. But the stagnation of so much water in a hot climate renders this species of husbandry so fatal to the health of the labourers and reapers, that the Milanese government has prohibited its extension beyond the limits to which it had reached at the time of the enactment.

The second region, where the culture of fruits, especially of the olive, predominates over that of grain, extends along the south declivity of the Appenines, from the frontiers of France to the borders of Calabria. In this district, particularly in Tuscany, the alluvial soil prevails, and is so deep and rich as to require manure only once in five years. The property is extremely subdivided, and the farms also so very small, that a single pair of oxen is sufficient to serve ten or twelve of them for ploughing the ground. The greater part of the tillage, indeed, is performed by a triangular spade, which the tenant is often bound to use, as supposed to be more favourable for the produce; and the corn fields are so much intersected by rows of vines and olive-trees, that a plough can with difficulty work between them. The most common rotation of crops is the following:

1st year, Maize, haricots, peas, or other legumes, with dung.
2d . . . Wheat.
3d . . . Winter beans.
4th . . . Wheat.
5th . . . Clover sown after the wheat, and cut in the spring, followed by sorgho, a sort of great parsnip, which yields a coarse flour for soup.

In this country, the utmost care and skill are exerted in the cultivation of the soil; and every spot presents the appearance of a garden. The produce is abundant, and the population immense; but the cultivators are always poor, and rather to be regarded as peasantry than as farmers. No leases are granted to the metayers, or tenants, who are, however, scarcely ever known to be ejected; but the terms of rent are highly unfavourable to industry or saving on the part of the labourer. The farmer engages to perform all the labour of the field at his own expence—to furnish the wood for the support of the vines—to bear half the cost of seed and dung—to pay the proprietor half the produce, or, if required, to sell it for his benefit—and to divide equally with him all the profit of the stock, even of the poultry and pigeons. On the other hand, the landlord lays out all other expences, and provides all other things not mentioned in the preceding articles. Thus the farmer has little inducement to improve his possession, to repair his house, or to add to the stock, which belongs to the landlord, or to take in more ground, which should be done at the expence of his proprietor; and having thus no direct or profitable mode of laying out his savings, he generally spends every year on himself and family all the gains of the season. Being too poor also to hire labourers, and having to attend alone to the labours of the seed-time and harvest, the pruning of the vines, and the culture of the olives, he is often too late in the most essential operations, and loses much time in the irresolution and indifference which his hurry creates. Hence, in the midst of a country, where every spot is covered with valuable produce, and every individual actively employed, there is nevertheless an entire absence of the conveniences of life, and an appearance even of the greatest penury.

By the utmost labour and skill the soil is supported by mounds of earth or stone, and the benefits of irrigation carried along the heights and declivities of the mountainous districts, which are thus clothed almost to the summit with vines and olives. One great agricultural improvement deserves to be particularly noticed, by which the Tuscans have contrived at once to arrest the fury of the inundatory torrents from the Appenines, and to convert them into a source of wealth. The quantity of mud and sand, carried down by the streams during the violent rains, is so great, as frequently to obstruct the course of the rivers in the more level parts of the country, and particularly to form complete marshes at their entrances into the sea. At the suggestion originally of the celebrated Torricelli, these marshy grounds are inclosed with a dike or embankment, and the water of the river being admitted into this enclosure, is retained by sluices in a stagnant state, till its sediment be deposited. This operation is repeated several times in the year; and, as three or four inches of earth are often deposited at one time, the level in the course of three or four years is so much raised, as to be no longer liable to be overflowed by the river; while the soil thus acquired is of the richest kind and highest fertility, so as to have been known in one instance to yield in the first crop twenty-five measures of wheat from one. This operation is named Colmata, and some of the most remarkable instances of it are to be seen in the Val di Chiana, in the plain of Pisa, and in the Val di Nievole.

The third region, or pastoral district, extends along the shore of the Mediterranean from Leghorn to Terracina, and reaches inland as far as the first chain of the Appenines, about 192 geographical miles in length, and about 40 at its greatest breadth, in the Campagna di Roma. This tract is denominated Maremma, and remains chiefly in a state of natural pasture, not in consequence of its being unfit for cultivation, but of its being uninhabitable except in winter. This proceeds from the prevalence of what is characteristically denominated Mal-Aria, an unhealthy constitution of the atmosphere, or of the soil, during the summer season, which produces the worst kind of intermittent fever, and which has been already described. (See under *Climate*, p. 553.) In the Tuscan Maremma, the soil seems to consist of pure argil, mixed with a little sulphur, and is becoming quite sterile. In the eastern part, where the Pontine marshes extend, the soil is constantly humid; but produces, when drained, the finest crops of maize, hemp, and legumes. These marshes, which had often been unsuccessfully and partially drained in former times, were more completely improved by Pius VI. between the years 1778 and 1788; but a still more effectual plan was commenced by the French engineers in 1813, under the direction of M. Prony. As the ground falls towards the sea by an inclination of seven feet, it was proposed to open parallels at certain distances for carrying off the water, and to intersect these by secondary canals, at an angle of 45°, by which means, as far as can be judged from the portion finished, the whole surface of the marsh might be rendered capable of cultivation. The soil in the Campagna di Roma, as well as in many other parts of the Maremma, is composed of those substances which are thrown out from volcanoes, such as Tufa and Lava, upon a basis of calcareous sand-stone, more or less consolidated, and abounding in sea-shells. The vegetable productions of the Maremma are rich and luxuriant. The lands are allowed to rest in pasturage during six successive years; are ploughed and sown on the seventh; and being left to themselves, are immediately covered with verdure, which is pastured again for five or six years by herds of cattle, horses, and sheep, during the winter season. The principal inhabitants of these countries are a race of wandering shepherds, who remove to the hilly or level districts according to the seasons; and a few sickly labourers, who remain only as long as the sowing and reaping of the crops require their presence. In the Tuscan Maremma, 400,000 sheep, 30,000 horses, and a vast number of cows and goats are annually reared for the supply of the Valdarno, and other vales of Tuscany, where no cattle are bred.

In the south of Italy the state of agriculture is as low as can well be conceived, and even the wealthiest proprietors are both ignorant of the subject, and indifferent about any attempts for its improvement. Throughout the whole realm of Naples, every kind of agricultural production is indebted to the mildness of the climate, and the fertility of the soil, rather than to the industry and skill of the inhabitants. They have no idea of the proper management of land, especially in the application of manure, and the sowing of artificial grasses; and, except in the districts where wine, oil, and almonds are produced, the uniform round of husbandry consists in sowing corn, as long as the land will yield a crop, and then letting it lie fallow, or rather in natural grass, to recover its exhausted powers. Even the most ordinary attention to the nature of the soil is often omitted in laying it under crop; and in many towns and villages, the usual order of cultivation, namely, gardens in the nearest grounds, then orchards, then olive-grounds, then vineyards, then natural pastures, is pertinaciously followed, though it should even happen that the nature of the soil was such, as to require the very reverse of such an arrangement. The grains most frequently sown are wheat, barley, Indian corn, and pulse; but not one half of what might easily be raised; and for every ten persons employed in the culture of corn, it is calculated that twenty are occupied in that of the grape. These two kinds of produce also are greatly mixed together. Elms and poplars are planted in rows for the support of the vines, and between these rows are sown corn and pulse, without any fallow; but sometimes, to prevent the land from being exhausted, early crops of lupins and beans are put in, which are hoed up before coming to fruit, and buried under the surface by way of manure. Yet, though the husbandry is so slovenly, and the horticulture almost equally superficial, every production is found in the highest perfection, and greatest abundance; and, in some places, the fields are so fertile as to yield three crops in one year; namely, beans, Turkey-wheat, and brocoli, or some similar vegetable, which grows through the winter. It is no small discouragement to agricultural improvement in the Neapolitan territories, that every kind of stock and produce, all live animals, and even the sheep, are subject to an excise, which is rendered still more injurious by the oppressive mode in which it is collected.

The implements of husbandry in Italy are every where of a rude construction. Even in Lombardy, the waggon is one of the clumsiest vehicles possible, being raised like a high scaffold above four small wheels, and drawn by means of an elevated pole, under which the oxen are yoked in a very uneasy manner. The plough is constructed in a very awkward style, and in despite of all the known principles of mechanics. The handles are of unequal lengths, and both so very short, that the ploughman, having no lever to assist him, is forced to bend much forwards, and to use all his weight to keep the share from entering too deep into the ground. Oxen are uniformly employed by the farmers, both in the plough and waggon; and horses used only for riding to market and church, or for drawing a small provision cart, or other family conveyance. In many places, especially in small inclosures, most of the work is done by the spade and hoe. The grain is separated from the straw in many places by the trampling of cattle, which are tied in a string, and whipped round and round till the operation be finished. In the Terra di Otranto, it is done by two oxen dragging between them a heavy rough stone, which breaks the sheaves and shakes out the corn.

The operations and productions of agriculture are so various in different parts of Italy, that no general description can be given, which would be nearly applicable to the whole country, especially to the southern districts. A few of the prevailing objects and modes of culture may, however, be cursorily mentioned, in addition to those already detailed.

Rice is cultivated in many of the marshy districts of the south, especially around Salerno, and in the fertile vale of Diano; but its cultivation always adds to the insalubrity of the place; and, while it enriches the trading inhabitant of the city, usually shortens the life of the industrious peasant.

Rye is sown in many grounds of Calabria, whose elevated situation renders them too cold for wheat. Its introduction is ascribed to Charles V. who observed in his progress through the province so many lands lying waste from the want of a crop suitable to their temperature, and ordered a more hardy species of grain to be imported from the north: Hence the natives distinguish it by the name of Germano.

Millet grows to great perfection in the more humid soils, and particularly in the vicinity of Nocera.

Flax and hemp, which grow to a great height in so fertile a soil, are cultivated in many parts of Italy, but especially at Bologna, Reggio, and Cape Leuca; at which last-mentioned place the seed appears to be the principal object of the cultivator, and is a principal article of exportation to Venice and Trieste.

Cotton is very generally raised, and with great profit, through the whole province of Otranto, but particularly around the city of Taranto, where the soil, light and somewhat swampy, appears to be peculiarly favourable for its cultivation. It is the shrubby kind that is cultivated, which, when fully grown, resembles the raspberry plant.* When the ground is designed for cotton, it is carefully ploughed, and sometimes dug with the spade, after harvest, or repeatedly tilled between January and April, and the more it is treated like garden ground, the surer is its produce. It is well manured before the seed is sown in the end of March, or beginning of April, and neatly dressed in flat narrow ridges. As soon as the plants are four fingers high, they are thinned to the width of eight inches, and the ground carefully hoed, to eradicate the weeds. When they are eight or nine inches high, two inches are broken off from the tops, that the growth of the leaves and stalks may be checked, and a greater portion of blossoms produced. About the end of September the pods begin to burst, and from that time the cotton harvest continues to the end of October, the women being daily employed in breaking off the ripe capsules, and carrying them home in sacks. The cotton is then separated from the seed, by means of two cylinders, and is afterwards drawn through a comb or heckle. On account of the careful tillage of the land in raising the cotton, it is followed by an abundant crop of wheat or barley next year; and the produce of the cotton itself is the most profitable of all crops, surpassing even the vine and the olive. A tomolata of land, that would be adapted to the cultivation of cotton, bears a higher price, but still yields a greater profit, than what is employed either in vineyards or olive plantations, according to the following statement by M. de Salis.

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* The true cotton tree, *Gossypium arboreum*, grows also around Taranto, and bears much larger pods than the cotton plant, which furnish double the quantity of cotton; but it is of a coarser quality, and brings a very inferior price.

		Purchase money.	Value of produce.
One tomolata of land.	For cotton, . .	1000 ducats (*L* 187, 10s.) . .	100 ducats (*L* 18, 15s. 0d.)
	For olives, . .	250 —— (*L* 46, 17s.) . .	15 —— (*L* 2, 16s 3d.)
	For vines, . .	200 —— (*L* 37, 10s.) . .	10 —— (*L* 1, 17s. 6d.)

The proprietor and tenant usually cultivate the cotton fields in partnership. The latter generally furnishes the seed; but the trouble of tillage, the expense of the harvest, and the profits of the crop, are equally shared by both parties.

Tobacco is cultivated successfully in many of the southern districts; but the best is produced near Cape Leuca. It is transplanted in April, and the leaves gradually stripped off. These are dried in the shade, and placed in a heap, but never moistened. The points of the leaves, dried in ovens, and then ground, are considered as yielding the best sort of snuff. This article forms also a considerable branch of interior trade in the Ecclesiastical territory.

Among the fruits of Italy most deserving of particular notice, must be ranked the grapes and olives; which are cultivated so generally and on so great a scale, as to come properly under the head of agricultural produce. In many farms, corn, wine, and oil, are equally the objects of attention; and the fields which bear the grain and pulse are little more than ridges, or narrow stripes between the rows of olive-trees, or of poplars and elms clothed with the vine. The vines are also in many places, particularly at Taranto, kept low upon pales; but little care is taken in selecting the grape, according to its quality; and the modern wines of Italy, except in some of the southern districts, are so very inferior to what the ancient vintage must be supposed to have produced, that the inferiority has been ascribed to an alleged change in the climate. But, even in the days of Pliny, the two most celebrated of the ancient wines, the Cæcuban and the Falernian, had lost much of their excellence; the former, in consequence of a canal cut by Nero across the vale of Amyclæ, where it was produced; and the latter, in consequence of the cultivators being induced, by the great demand, to pay more attention to the quantity than the quality of their produce. In the Ecclesiastical states particularly, it is a practice to put a great quantity of water into the vat along with the grape, which renders the wine, though otherwise good, unfit for exportation or long keeping. The modern Italians also, being habitually sober, and using wine chiefly for the purpose of quenching thirst, are not very careful of the qualities of their wines, and are quite satisfied if they are not new, flat, or unwholesome. They are generally either too racy or too luscious for the taste of the European nations.

The olive is cultivated very generally in Tuscany; and particularly in the southern provinces of Bari, Otranto, Calabria, and Abruzzo. Six hundred thousand salme* of oil are estimated as the annual produce of the Neapolitan dominions, of which more han one half is consumed within the kingdom. Olive plantations extend along the whole coast of Bari; and at Biseglia, a small town of this province, the olives are equal to the finest produced at Seville. But it is at Gallipoli, in the province of Otranto, that the greatest attention is paid to the culture of the olive, and the preparation of the oil. A lightish clay soil, dry situation, and sloping exposure to the south, sheltered as much as possible from winds, is considered as most eligible for the cultivation of the olive. The plant is propagated in a great variety of ways; by grafting slips or runners from the roots upon the wild olive tree, which then yields fruit in three years; by planting very deep in the earth a branch of a bearing tree, which in ten years becomes a profitable tree; by putting small shoots into the ground, which are transplanted in the third year, and bears fully in thirteen years; or by slipping off shoots from the stem of a bearing tree in such a manner as to take a part of the parent stock along with them, and planting them in a nursery, to be removed into the olive grounds in the third or fourth year. Too little attention is paid to the quality of the olives which are propagated; but the two prevailing kinds are the Salentina, which yields the best fruit, though it is very subject to the blight; and the Cellina, which, though less productive of oil, yet grows to a greater size, and is less liable to be injured by the weather. Where the trees are not pruned, which is the case in Calabria, they grow to a great height, but yield a smaller quantity of fruit. It is the practice, however, to cut out the central branches; and, without leaving any leading stems, to give the whole a bushy spreading form. The ground is dug around the trees upon the hills in the beginning of the year, and a quantity of fine manure applied to the roots; but the plantations on level grounds are sufficiently tilled by the crops which are raised between the rows, generally of wheat for two successive years, and fallow during the third. The olive is sufficiently ripe for the table in the month of October, but not for making oil till the end of December. The quality of the oil is greatly injured by the practice (which is very common, except at Taranto) of allowing the fruit to hang on the tree till it drop, which often does not take place till the end of March, or beginning of April. In Calabria, the fruit is also suffered to remain on the ground after it has dropped, sometimes so long as the month of June, so that much of it is rotted, and the rest produces a very inferior kind of oil. This negligence is principally owing to the obligation laid on the vassals of carrying their olives to be bruised at the mills of their baron, which are usually too few in number for the purpose; and the cultivators seem to think the olives as safe on the ground, as in the fermenting heaps, waiting for their turn at the mill.

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* One salma is equal to 40 English gallons.

In Italy, all the fruits common in the more temperate countries of Europe are produced in the greatest abunnance and the highest perfection, besides many other productions which properly belong to more southern latitudes. Apples, pears, peaches, apricots, pine-apples, medlars, pomegranates, melons, red and yellow azarol-plums, cherries, almonds, dates, figs, chesnuts, pistachio-nuts, carobs, lemons, citrons, oranges, are commonly produced throughout the country, and many of them without culture. Cherries have been known to be so abundant at Nocera, that hands have been wanting to gather them, and so cheap as not to repay their carriage to Naples; so that the owners of orchards have invited the public to eat and carry away what quantities they pleased.—Date trees were formerly more abundant in the south of Italy; but the Saracens cut down most of the male-palms at the time of their expulsion from the country, and even the Christians were ready to wreak their vengeance on the plant, as if peculiarly connected with Mahommedanism. They are still found in some places to the height of 40 feet, but their fruit rarely ripens well, except when the sirocco and other southerly winds prevail much during the season.—Fig trees attain a considerable size, and are found in great variety in the country; but those which are earliest ripe are most esteemed. They are generally propagated by slips, planted in a shady place, and regularly watered. Though the wild plant abounds every where, so as to afford easy opportunities of caprification, this method is rarely employed; but the Neapolitans ripen the fruit by touching the eye of it with a feather dipped in oil. Near Trani, the trees are planted in rows, and dressed like dwarfs and espaliers, according to the practice of the ancients, which renders the fruit larger, and the trees more vigorous.—Almond trees appear in forests, especially along the eastern coast; and the chief cultivation which they receive, is to stir the ground around the roots, and to prune out the central branches for the admission of the air.—The hazel-nut is cultivated in many places, especially in the principality of Avellina, hence called "Nux Avellana." Around the town are more nut-bushes than in any country whatever, which are planted in rows in the best soil, regularly pruned in the form of bushes with straight stems; while the ground between the rows is dug and manured during winter, and generally sown with corn in the spring. So great is the produce, that the trade in nuts is said to bring annually 60,000 ducats, (*L.*11,250) to the town of Avellina.—Oranges are said to have been first cultivated at Reggio, and thence to have spread over the country. They are now found to thrive in the northern districts around the lakes of Como, Garda, and Maggiore, and even at the very foot of the Appennines, where there is often frost in the winter season strong enough to congeal water. At Taranto, they are propagated by layers, a twig being stuck in a pot full of earth in the autumn, and, in the following May, severed from the parent stock for transplantation. It is generally six or eight years before the trees arrive at a full bearing state.

Italy affords many vegetable productions, which scarcely require any cultivation, yet yield a valuable article of home consumption, or of foreign trade. Among these may be noticed the ornus, or manna ash-tree, which grows spontaneously, requiring no other culture than cutting down the strong shoots around the trunk, and which continues to yield manna every year for the space of a century; but, in consequence of these annual bleedings, seldom attains a considerable size. The gathering of the gum begins about the end of July, when a horizontal cut, inclining upwards, is made in the trunk of the tree, and repeated every day as long as any drops of manna exude, which are generally collected in a kind of cup formed of a maple leaf. One tree will afford about a pound and a half of manna every season, which usually sells at the rate of five tari, or 4s. per pound.—In some of the maritime tracts of the south, liquorice is collected in great quantities, and the roots are now generally exported in their natural state.—In Abruzzo, and of late also in Lombardy, saffron is an article of considerable attention to the peasantry.—A great variety of medicinal herbs are produced in the mountains of the Marsi in Abruzzo Ultra, which are annually frequented by apothecaries from the most distant parts of the country. The aloe grows abundantly in Terra di Otranto and other provinces in the south of Italy; and, besides its medicinal juice, attempts have been made, with considerable success, to manufacture a useful thread from its leaves, (see manufactures in this article.) The Indian-fig, the carob-tree, the caper-bush, the cornelian-cherry, the bead-tree, the storax-tree, are very commonly met with in the fields and uncultivated tracts. The oleander, the myrtle, the laburnum, the jasmine, the Judas-tree, the Spanish-broom, the bean-trefoil, the provence-rose, the cinnamon-rose, the syringa, the laurustinus, the bay, the laurel, the lylac, are a few of the flowering shrubs which adorn the Italian scenery. Lavender, rosemary, rice, sumach, sage, euphorbia, tree-heath, arbutus, campanula, and a multitude of interesting botanical beauties, abound in its varied surface. The natural vegetation is, in most places, remarkably luxuriant. The Spanish-reed rises to a height which almost emulates the bamboo of India; and the *ferula communis* of Linnæus grows to the length of twelve feet. Its branches are gathered as fodder for asses, but are said to be hurtful to all other animals; and its stem is used for making chicken-coops, bird-cages, hurdles for packing sheep, and other similar articles. The mountains are generally clothed with wood of every European species; and in Apulia, particularly, are many forests of immense extent. That of Gioia is said to be fifty miles in circumference, and twenty-four at its greatest breadth.

Animals.

The horses of Italy are of little reputation, and few are reared in the country, except in the ancient Japygia, now the provinces of Bari and Otranto. Formerly, the Neapolitan horses were much celebrated, and formed a valuable article of exportation. But, for many years, the breed has been much neglected in consequence of their exportation having been prohibited, or at least subjected to so heavy a duty as amounted to a prohibition. Hence the farmers and gentry turned their attention to the rearing of mules, which are found better adapted for the bad and mountainous roads in that country, and which will carry a load of 500 weight through the most difficult paths without stumbling. This prohibition, however, is said to have been removed, and the breed of horses to have been again much improved. But they are considered as too soft and feeble to endure much fatigue, and their spirit quite destroyed by the brutal manner in which they are broken in. The Calabrian horses are handsome in shape, spirited in their motions, and capable of enduring great fatigue; but are in general of a small size, and seldom free from vice.

Very little attention is paid to the breeding of cattle throughout Italy in general, though the labours of husbandry are so uniformly carried on by means of oxen. In Lombardy and Tuscany, the cows are generally of a blood-red colour, and long lank figure; but the oxen of a grey colour, moderate size, good shape, gentle disposition, and great strength. The breed is kept up by regular importation from Switzerland; and 2000 cows are reckoned to pass every year over St. Gothard, to be dispersed in northern Italy. In Tuscany, the farmers understand well the fattening of cattle; and, in that view, make use of heifers, which they buy in at the age of three months, and sell about twelve or fifteen months afterwards to the butcher. Considerable quantities of cattle are reared in Abruzzo and Calabria; and De Salis describes a beautiful breed on the lands of the duke of Martini in Otranto, with small heads, short legs, long carcases, the oxen of which, in particular, were of remarkable size, and majestic appearance, with sparkling eyes, enormous dewlaps, and hinder parts greatly resembling those of a lion. Little butter is made in any district of Italy, as oil is so much in use every where; but the milk is employed in making cheese, sherbets, &c.

Italy is the only country of Europe in which the buffalo is found; and great droves of them are fed in the extensive marshes along the coast of the Mediterranean sea, from Salerno to Piana di Calabria, particularly upon the banks of the Garigliano and the northern plains of the Terra di Lavoro. They are of a black colour, ferocious aspect, yet easily tamed, and very submissive to the drivers, but said to be vengeful of injuries. They are seldom used for draught, except in conveying timber for the royal navy from the forests of Calabria. They partake as much of the hog as of the bull; and their flesh, which is extremely fat and rancid, is eaten chiefly by the lower classes of the people; the chine being the only part that comes to the tables of the wealthy. Their milk, however, is extremely pleasant; and the small new cheeses made of it, called Muzzarelle, are accounted a great delicacy. Their hide also, though light, is so compact as to have supplied the buff coats, used as armour in the 17th century.—The sheep in Puglia are very large, and in Otranto are almost universally of a black colour. The white breed, whose beautiful fine white wool was so much admired by the ancients, and which are known by the name of *pecore gentili*, are almost quite extinct, as they are of a very delicate constitution, and require (what the poverty of the shepherds cannot afford) the protection of housing during the colder seasons. Besides, there is now less demand for wool in these districts, than for the cheese made from the ewe-milk, of which the black species, called *pecore moscie*, yield a greater quantity.—The swine are fed in large herds, in the forests, especially in Calabria, where their keeper goes before them with a horn or bagpipe, whom they learn to follow with wonderful docility. In the southern provinces, these animals are almost universally of a black colour, and without any hair on their skin, which bears a considerable resemblance to that of the elephant; hence they are never called *porci*, but *animali neri*.

In the Appennines, the wild boar is sufficiently common, and is hunted with one lurcher and two or three mastiffs, the huntsman keeping on horseback, and being armed with a lance and pistols. In Puglia, stags are numerous, particularly in the royal forests. The marmot and the ibex are also reckoned among the wild animals of the Appennines; and the crested porcupine is supposed to be peculiar to the south of Italy. Dormice, which, in the times of ancient Rome, were kept in warrens, and fattened for the tables of the epicures, are still accounted delicate game in the southern districts, and are caught with sheep-hooks, after being smoked out of their nests in hollow trees. But the most remarkable of the wild animals of Italy is the lynx, or tyger-cat, which is most frequent in the mountains of Abruzzo, and is peculiarly fierce, swift, and subtile. It is from 18 to 20 inches high, and above 25 inches in length to the root of the tail; of a whitish colour, with yellow spots like stars; with soft short hair, and a large head like that of a tyger. All its motions and habits greatly resemble those of a cat, and, when taken young, it is easily domesticated.

Among the most curious of the feathered race in this country may be mentioned, the little falcon of Malta, the *certhia muraria*, the *turdus roseus*, the *cyanus*, and the *alauda spinoletta*. All kinds of wild fowl, usually denominated game, are very abundant; particularly ducks and snipes, which frequent the marshy tracks. Great quantities of quails and stock-doves are taken by means of nets placed across the defiles, through which they pass in their annual flights. Of the former, 60,000 are said to be taken annually in the island of Capri alone.

Snakes, and particularly asps, are very frequent in many of the southern provinces, and the latter abound chiefly on such of the calcareous mountains as are covered with fragrant aromatics. The *lacerta orbicularis* is considered as peculiar to the kingdom of Naples. The meloe uckorii is found in astonishing quantities in the vicinity of Supersano, in the province of Otranto; and the liquor pressed from them is often employed as an escarotic in removing warts, and as a substitute for the common blistering fly. The famous tarantula spider is an inhabitant of the Tarentine fields; but its bite has not been found, on experiment, to produce the effects ascribed to it.*

The finny tribe, which frequent the coast of Italy, are extremely numerous;† and the fisheries, particularly on the southern shores, furnish a great proportion of the food of the inhabitants. The people of Taranto may be said to depend entirely on their fisheries, and pay immense sums annually to the crown, and to private persons, for the right of fishing:

	Ducats.		Sterling.
To the king, as rent	3735	.	*L.* 700 6 3
To the king, for the exclusive privilege	5435	.	1018 2 6
To monasteries, &c. for beds of shell-fish	6168	.	1160 13 0
To a duty on fish sold out of the city, farmed at . . .	5615	.	1052 16 3

The most remarkable and productive of the Italian fisheries is that of the tunny, which enters the Mediterranean about the vernal equinox, and, steering along the European shores, repair to the seas of Greece to deposit their spawn, returning in May in a direction which brings them nearer the African coast. About that time, they abound on the southern shore of Italy, and, in autumn, steer northward to Amalfi and Naples; but stragglers are occasionally caught through the whole year. They are taken by nets, spread over a large space of sea, (by means of cables fastened to anchors,) and divided into several compartments; the entrance being always directed towards that part of the water from which the fish are expected to come. A man, placed on the summit of a high rock, gives the signal of their approach, which is more easily perceived, as they proceed in large shoals, shaped like a pyramid, having the base directed to the tide or current, which enables them to swim with extraordinary velocity. As soon as the shoal has penetrated to the inner compartment, the passage is closed, and the slaughter commences. The quantity of this fish consumed annually in the two Sicilies, is said to exceed all calculation. From the beginning of May to the end of October, they are eaten fresh, and used in a salted state all the rest of the year. The sword-fish and the pelamides are also taken in considerable quantities, the former by boats, provided with harpooners, and the latter by nets. Many of the smaller fish are taken by night-nets, of a very simple construction, being nothing more than baskets made of the twisted branches of the myrtle.

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* See Swinburne's *Travels*, vol. i. p. 395.

† Swinburne gives a list of 50 different sorts of fish which are taken in the vicinity of Taranto.

Shell fish are, if possible, still more various and abundant; of which a hundred different kinds have been enumerated in the Mare Piccolo alone.* Of these the muscles and oysters are the most valuable. The velvet muscle, or *Cozza nera*, as it is called by the Italians, is universally esteemed for its delicacy, and nearly 10,000 cantara of them are said to be annually taken in the Mare Piccolo, into which they are carefully transplanted in beds; and poles being driven into the sand, are afterwards drawn up with the fish adhering to them. The oysters of Taranto are considered as the most excellent in Europe; and, during the winter season, (in which alone it is allowed to take them,) are sent in large hampers overland to Naples. The scallop also is very large and fat on the south coast, still verifying the saying of Horace,

> *Pectinibus patulis jactat se molle Tarentum.*

The *murex purpurea* may likewise be mentioned as the shell fish which is supposed to have furnished the Tarentines with their finest purple dye. But the most curious of all the testaceous tribe on these shores is the *Pinna marina*, one of the muscle species, which frequently exceeds two feet in length, and throws out a large tuft of silky threads, which float about as a snare to allure small fish. This shell-fish is torn from the rocks and sand, by a kind of hook, or rather forceps, for the sake of its bunch of silk, called *lanapenna*, which is sold in its crude state for about 5*s*. 6*d*. a pound, and forms a very valuable article of manufacture. (See *Manufactures*.)

Minerals.

The mineralogy of Italy, particularly its volcanic products, would furnish a very extensive and interesting subject, but far beyond the compass of our present limits.† The richest mineralogical region is Piedmont, which almost rivals the Carpathian mountains in Hungary; and, next to Piedmont, is the Milanese territory, particularly around Sienna; but its mines have been almost entirely neglected, as Austria possesses already abundance of ancient and productive mines.

Gold is found in the mountains of Challand, near the Vale of Aosta, in the superior regions near Macugnana, in the vale of Sesia; and the torrent of Evenson rolls down pebbles of quartz, veined with this precious metal. The mountain of Polino is also said to contain a gold mine belonging to the Duke of Spoletto, but it is scarcely at all wrought, and probably its ore is not rich.

Silver is found in the valley of Sesia and Aosta, in Orco, Lans, Maira, in the northern division; and between Reggio and Scilla in the south.

There are rich iron mines in Sessera, Lans, Susa, Vraita, Ges, Vermenagna, and in the province of Abruzzo Ultra. One very productive was recently discovered on the mountain of Arunzo, near the lake Celano.

Copper mines are very numerous in the district of Aosta, and in the other places of Piedmont already mentioned as containing mines of silver and iron. It is found also above the lake of Como, in the Milanese territory. Antimony, arsenic, and zinc, are also found along with the copper and lead in the silver mines. A rich vein of cobalt has been discovered to the east of Mount Blanc; and plumbago, or black lead, near the baths of Binay. There are several mines of alum in the Ecclesiastical territory, which are generally found very near the surface, particularly in the mountains of Tolfa, and which are said to be discovered by the prevalence on the soil of certain verdant shrubs, named agrifolio.

The calcareous combinations form the prevailing feature in the Italian mountains, and their volcanic productions. Limestone is the general base of the southern hills; and one mountain particularly, which advances into the plain between Intro d'Aqua and Pitto Rano, in Abruzzo Ultra, contains a multitude of round limestone balls, some of which are extremely large, and, when sawn through, display concentrated strata in their interior. Beautiful marbles, of various hues, are found in the Genoese and Tuscan territories. Native sulphur is very abundant, especially in the volcanic regions of the south. Coal is not unknown in the country, and a vein of excellent quality has been discovered near the source of the Garigliano. In Calabria there are natural mountains of rock-salt, much stronger than what is made from sea water; but they are not permitted to be worked, as the revenue derives so great a tax from the manufacture of that article. In the neighbourhood of Taranto are two immense salt lakes, one of which is nearly eight miles in circumference during winter, when they are filled with water; but in the summer, when they are dried up, a considerable quantity of fine white salt is deposited, which is the property of the crown, and of which more than 10,000 tomoli‡ are annually sold, besides what is secretly carried off by the peasantry. There are several salt pits in the Ecclesiastical territory, particularly at Servia and Ostia.

Manufactures.

The manufactures of Italy are neither numerous nor extensive, when compared with the fertility of the soil, and advantageous situation of the country. Silk, wool, and cotton are the principal articles which occupy its manufacturing population; but a greater proportion of these commodities are exported in the raw state, than wrought up at home. The former may be considered as the staple of Italy; and many of its poor find regular employment in the care of the silk-worm, and the culture of the mulberry tree, on which it feeds. The Tuscans manage their silkworms so as to have two hatchings in a year; but, in Calabria, though with a more propitious climate, they are less successful. Even in this latter district, they find it necessary to rear the worms in houses of a particular construction. The windows are long, but only about six inches wide, which prevents too great a quantity of air from being admitted at a time; and when the eggs are on the point of being hatched, these openings are entirely shut, and a moderate fire kept up in the rooms. As soon as the insects come out of the shell, they are placed on beds of reeds, and there fed with the leaves of the red mulberry, which the Calabrese prefer to the white, so generally employed in China, Piedmont, and Languedoc; and which, they imagine (apparently without reason) to produce a more compact, heavy silk. In case of a blight among the mulberries, various leaves have been tried as a succedaneum, and the tops of brambles been found to answer the

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[*] De Salis gives a list of 185 species found on the coast of the Neapolitan territories.

[†] See Alps, Appennines, Volcanoe, Vesuvius and particularly Spallanzani's *Travels in Italy*.

[‡] Five tomoli and a fifth, are equal to an English quarter.

purpose best. The silk-houses in the south are usually the property of the more wealthy inhabitants, who furnish rooms, leaves, eggs, and every necessary implement, for which they take two-thirds of the profit, leaving the other third for the attendants. A succession of eggs from different places is found necessary to renew the breed, and preserve the good quality of the silk. The pods are carried to public caldrons, where a duty is paid for boiling and winding; and as the winders work by the pound, they perform their task in a slovenly careless manner. In the Neapolitan territories, excise duties are extremely heavy on this article. Every mulberry tree pays a tax of two carlini (about nine-pence Sterling) per annum. As soon as the silk is drawn, while the article is still wet and heavy, forty-two grano (about 1*s*. 6*d*. Sterling) are exacted for every pound, and even the refuse and unprofitable pods are forced to pay one grana (nearly a halfpenny,) per pound. Great duties are also laid upon the exportation of the raw material, so that the poor merchants are compelled to smuggle for a livelihood. Yet, with all these exactions and oppressions, about 800,000 pounds weight are annually produced in the kingdom of Naples, of which one half is supposed to be worked at home, and the other half exported in the raw state. The best silks in the whole of the Italian districts, and perhaps, in the world, are said to be those of Mondovi, Dronero, and Cavaglio, near Coni, and of the little tract of Fossombrona in the duchy of Urbino. The most curious silk manufacture in Italy is that which is made from the tuft of the pinna-marina, which is called, in its crude state, lana-penna, but is cleansed from its impurities by washing in soap and water, drying and rubbing with the hands. It is then passed through combs of bone; and afterwards, for finer purposes, through iron combs, or cards, so that a pound of the coarse filaments is usually reduced to about three ounces of fine thread. When mixed with about one-third of real silk, it is spun on the distaff, and knit into gloves, caps, stockings, vests, &c. forming a stuff of a beautiful brownish yellow colour, (resembling the burnished golden hue on the back of certain flies and beetles,) but very liable to be moth-eaten, and requiring to be wrapped in fine linen. A pair of gloves costs on the spot about six shillings, and a pair of stockings eleven; but its sale is not very extensive, and the manufacture is peculiar to Taranto.

Wool is exported chiefly in the raw material; and the provinces of Italy, particularly those of the south, with every advantage for the manufacture of broad cloths, depend almost entirely on the foreign market for most woollen stuffs. Formerly, the woollen manufactures of Padua were in a very flourishing state; and its cloths are still esteemed the best in Italy. Manufactures of woollens have been recently established at Rome; and that named St. Michael is famous for its fine cloths, but are all undersold by the English articles. The cotton is also exported in great quantities; but, in several provinces, especially that of Otranto, is manufactured into a variety of valuable commodities. In Gallipoli, muslins of all kinds, and cotton stockings, are made in considerable quantities; and at Nardo and Galatona, in its vicinity, are wrought those famous cotton coverlets which are exported to all parts of the world, and bring in a considerable revenue to the crown. At Taranto and Francavilla, a sort of Manchester, not so fine, but more durable than the English, is produced, and also a peculiar kind of cloth, called *pelle di diavolo*, with several other articles; but the former of these towns is chiefly celebrated for the extraordinary beauty and fineness of the cotton stockings which are made by its inhabitants, some of which cost on the spot not less than a guinea a pair.

A singular manufacture of thread from the leaves of the aloe, which was introduced by the Spanish soldiers who served in Sicily when that island was subject to the crown of Spain, is still prepared in the south of Italy. The white, smooth, and tender leaves which cover the stem, after being soaked in running water eight or ten days, and then bruised by beating between two stones, are stretched upon a table, and scraped with a blunt, smooth iron, to remove the coarser fibres, leaving the fine yellow filaments, which are again soaked, washed, and beaten, to soften and whiten them, and then made into nets, night caps, handkerchiefs, &c. which, with a little improvement in the preparation of the thread and dyeing of the stuffs, might be rendered at once a cheap and valuable article of clothing.

At Teramo, in Abruzzo Ultra, is a manufacture of pottery-ware, remarkably hard and fine, for which there is a considerable demand in Germany by the way of Trieste; and the porcelain made at Naples and Milan may vie with any in the world as to elegance of form, and beauty of design. The mosaic manufactory at Rome, and that of tortoise-shell and musical strings at Naples, may also be noticed as both of them distinguished for their superiority. The king of Spain attempted to introduce a variety of manufactures into the Neapolitan territories; but all those branches, which required nicety and patience, entirely failed. A manufactory of fire-arms in the vicinity of the capital, succeeded beyond all others; and the Italian artificers speedily equalled, in this handicraft, the skill of their German instructors. Naples excels also in works of embroidery, in confections, and liqueurs. The velvets and damasks of Genoa and Venice still preserve their ancient reputation; and rich silk stuffs are manufactured to a considerable extent in Lucca, Florence, and Milan. There are manufactures of hats in the Ecclesiastical territory, where they possess a remarkable fine black dye for the purpose; and at Civita Vecchia are several establishments by the government, for making sail cloth, cordage, and different kinds of cotton stuffs, which are succeeding well, but still very inferior to those of France and Britain. There are also several glass-works in these states, which the government use every exertion to encourage and protect.

Commerce.

The commerce of Italy, both between its own provinces and with foreign nations, is extremely limited and fettered. Along the coast of the Adriatic, where the towns, though numerous, are all jealous of each other, restricted by their privileges, and averse from friendly intercourse, trade has long been in a very languid state. In the Neapolitan territories, it is still more severely cramped by feudal prerogatives, revenue exactions, and impolitic taxes; while nothing is done for its encouragement by the improvement of roads, harbours, or other public works. It is chiefly along the coast of the Tuscan sea that commerce can be said to possess a free scope for its operations, and that some remains of its ancient vigour in these quarters are still found to exist. The particular branches of traffic in the different towns and districts must be referred, with many other topics, to the separate articles in this work devoted to these places,* and the present short account be confined to the more general views of the subject. The principal exports of Italy are, silk, wool, and cotton in the raw state, cattle, corn, wine, fruits, and a variety of native products.

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* See particularly FLORENCE, GENOA, LEGHORN, NAPLES, PIEDMONT, VENICE.

The official value of the exports from Italy to Great Britain alone, in the year 1800, was—

Into England	l. 355,192	10	9
Into Scotland	2,544	11	11
Total . . .	l. 357,737	2	8

Consisting of books, drawings, &c.; barilla, brimstone; cork; cream of tartar, essence of lemons, manna, senna, liquorice-juice, and other drugs; juniper berries; perfumed oil; argol, galls, madder, sumach, valonia, and other dye-stuffs; anchovies; almonds, figs, prunes, nuts, currants, raisins; ordinary and sallad oil; cheese, 439 cwt.; chip and straw hats; silk, raw, thrown, and waste; rags 692 tons; lamb-skins, undressed; goat and kid skins, raw and dressed; brandy; marble; cotton; statues, valued at 1308*l*.

The value of its imports from Great Britain during the same year was—

	British Merchandize.					
From England . .	l. 423 241	8	4			
From Scotland . .	16 776	16	4			
				l. 440,018	4	8
	Foreign Merchandize.					
From England . .	l. 127,675	4	9			
From Scotland . .	1,039	17	6			
				128,715	2	3
			Total . . .	l. 568,723	6	11

Consisting of alum; wrought brass, iron and silver; plated ware; woollen goods of all sorts; cotton goods to a considerable amount; a few linens; earthen ware; glass; hard-ware; tinned plates; pilchards, 32,881 hhds.; red and white herrings; dry cod; tanned leather; wrought leather. Foreign goods; namely, cochineal, indigo, fustic, logwood, and other dye-stuffs; cinnamon, cloves, pepper, ginger, &c.; cocoa; coffee, sugar; bar and plate iron; Indian piece goods; ox-guts; rum; tar; tobacco; whalebone.*

There are imported also from France great quantities of ribbons, laces, and embroidered silks, particularly from Lyons and Tours, besides wines from Languedoc and Provence. A considerable part of the traffic with that country is carried on by means of mules over the Alps; and a new communication has been opened between Trieste and Mesola, to facilitate the commerce with Austria.

Arts and Antiquities.

The productions of the arts, and the specimens of classic antiquities, which abound in Italy, have furnished ample materials for volumes to describe;† and we can here only present a few general hasty notices on the subject, to excite rather than to gratify the curiosity of the reader.

Italy stands pre-eminent above every country in the world, both as to the composition and the execution of music; but this delightful art, in the hands of the modern Italians, has lost both its strength and dignity, and become almost exclusively devoted to the purpose of licentiousness, or, at best, of effeminacy. The people of this country evince an ardent and universal sensibility to the power of music; and the Neapolitans particularly are accounted the most refined and correct judges of the art.

In painting and sculpture, Italy furnishes the most abundant opportunities of improvement to the artist, or of gratification to the amateur. "The enormous collection of statues, inscriptions, busts, and bas-reliefs, amassed together in this palace, by the care of the late popes," says Barthelemy, referring to the Roman capitol alone, "exhausts admiration. We live in an iron country as antiquaries; it is in Italy alone that we must make researches. Figure to yourself vast apartments, I will not say ornamented, but filled,—filled even to thronging, with statues and all sorts of remains; a cabinet full of busts of philosophers; another of busts of emperors; gallery after gallery, corridors, stair-cases, in which nothing is to be seen but grand statues, grand inscriptions, grand bas-reliefs, consular calendars, an ancient plan of Rome in mosaic, colossal Egyptian statues in basalthus, or black marble. But why mention particulars? We find here ancient Egypt, ancient Athens, ancient Rome." Notwithstanding all that the French carried away, (and which, though now restored, yet, as sufficiently known, need not be specified,) Italy is full of such objects of art. The fresco paintings, especially of Pisa, Florence, and Rome, still remain uninjured, and also the master pieces of Bologna. Besides immense numbers of statues, relievos, and oil paintings in the churches and palaces, there are museums and galleries almost in every town. Of these, the most celebrated are the gallery in the Vatican; in the villa of Aldobrandini; in the villa of Borghese at Rome; and those of Florence and Milan. Portrait painting alone is a branch of the art which is rather in low estimation in Italy. The inhabitants in general regard such performances as engaging the admiration only of the person represented, or of the painter himself; and those who are able to pay the best artists, generally employ them on subjects more universally interesting. Among the works of the sculptor most worthy of attention, may be mentioned the statues of Modesty and of the Saviour, in the sepulchre of the family of San Severo at Naples—of Adonis and Venus, in the garden of Palazzo Berrio—of Hercules, by Glycon, in the university—of the celebrated Farnesian bull, in the royal garden—the basso relievos in the square of Puteoli or Puzzuolo—the fine sculptures of Puget at Genoa—the colossal statue of St. Charles Boromeo, on a hill near Arona, which is about 70 feet high, on a pedestal of 40 feet—and a bronze statue, about 17 feet in height, in the market place of Barletta, supposed to have been designed to represent the Emperor Heraclius.

The modern buildings of Italy are extremely numerous, and generally beautiful. The grand colonnade of the Vatican is one of the most extensive and beautiful specimens of the pillared portico in the world; and the galleries of Vicenza and Bologna, of the arcade style. The cathedrals of Florence and Milan excel in magnitude; and those of St. Georgio at Venice, and Sta. Giustina at Padua, are distinguished for internal beauty. The churches, and particularly the cathedrals, present striking instances of architectural elegance, and each of them contains a chapel of the holy sacrament, which is almost universally of exquisite workmanship and splendid decorations. One-half of the Italian churches are imperfectly finished on the outside, in consequence of their founders wanting funds to complete their plans, and the buildings having thus been carried on at different periods. The palaces also are frequently, in their exterior, deficient in strict architectural beauty, but well furnished with marbles, statues, and paintings. It has, however, been said of Italy, with truth, that no country possesses so many specimens both of good and of bad architecture. Among the most noted of the modern structures may be mentioned—at Rome, the churches of St. Peter, St. Clement, St. Martin, St. Sylvester, St. Lawrence, St. John Lateran, St. Paul; the palaces of the pontiff in the Quirinal Lateran and Vatican; of the families Barberini, Odescalchi, Farnesi, Bráschi, Borghese. Medici, Ruspoli, Orsini, Giustiniani, Altieri, Ciciaporci, Corsini, Costaguti, Doria in Corso, and Spada Colonna; the piazzas of Ravenna, Colonna, Monte Citorio; the villas Albani and Borghese. At Naples (where the churches are deficient in architectural taste, but superior in the riches which they contain) the cathedral of St. Paul, and of Spirito Santo; the sepulchral chapel of the family of San Severo; the theatre of San Carlo, the most spacious and magnificent in the world; and innumerable palaces, which, like the churches, are encumbered with ornaments. At Genoa, the palaces of Durazzo and Doria, the Hospital and Albergo Dei Poveri, and the moles of the harbour. At Venice, the churches of St. Marco, Salute, de Redemptore, St. Georgio Maggiore, the chapel of the Virgin, and Mausoleums in the church of St. Giovanni and Paolo; the ducal palace, the Piazzo of St. Marco, the bridge of Rialto, and the arsenal. At Padua, the abbey of St. Giustina, planned by Paladio; the church of Il Santo, with its beautiful chapel; the town-hall, the largest in Europe, being 312 feet in length, 108 in breadth, and 108 in height; and the castle of Obizzi in the vicinity of the town. At Verona, the churches of the Franciscan Friars, and St. Zeno; the beautiful chapel of St. Bernardino, Gran Guardia, and Museo Lapidario. At Vicenza, where Palladio was a native and builder, the public edifices display great taste, of which the most distinguished are the palaces della Ragione, and del Capitaneo, and many others of unusual magnificence, superior in design, though inferior in magnitude, to those of Genoa; the gate of the Campus Martius, the villa of Marchesi, the triumphal arch leading to the church on Monte Berrio, and the Olympic theatre, constructed in imitation of the ancient theatres. At Florence, the cathedral, inferior in magnitude only to the Vatican, the churches of St. Lorenzo, Sta. Maria Novella, and Santo Croce; the mausoleum of the Medicean family; the Ponte della Trinita, one of the most beautiful bridges in Europe; and the gallery of paintings, next to that of the Vatican. At Pisa, the church of Santa Maria della Spina, a curious specimen of the Gotico-Moresco style of architecture, and the cathedral, which is a still finer structure in the same style, with its baptistry, belfry, and cemetery. At Cremona, the church of St. Pietro al Po, the baptistry near the cathedral, and the chapel set apart for the preservation of relics. At Bologna, the church of St. Salvador, and especially La Madonna di S. Luca, the fountain of the great square, and the brick towers del Asinelli and de Garisendi, remarkable only for their height, and deviation from the perpendicular. At Milan, the cathedarl, extraordinary for its magnitude, and the number of its statues; the college of Brera, Ospedale Maggiore, and the Lazaretto. At Turin, the churches of Corpus Domini, S. Lorenzo, S. Philippo, Neri, Sta. Christina, S. Roco, and the university. The theatre of Parma, which is formed on the same plan as that of Vicenza; the chapel and cathedral of Forli, the work of Michael Angelo; the bridges of Cesena, and of Pesaro; the cathedral of Senegaglia; the abbey of Chiaravalla, about four miles from Pavia; the abbey of Vallombrosa; the cathedral of Barletta, remarkable for its antique columns of granite; the cathedral of Bari, the steeple of which is 263 feet high; and the palace of Caserta, which surpasses in size and solidity every royal edifice in Europe, its two principal fronts being 787 feet in length, the other two 616, and both of them five stories in height.

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* See M'Pherson's *Annals of Commerce*, vol. iv.

† See particularly Mignan's *History of Rome*; Dutens *Itineraire des Routes de l'Europe*; *Remarks on the Antiquities of Rome*, by Andrew Lumsden, Esq.; and Forsyth's *Remarks on Antiquities, Arts, and Letters, during an excursion in Italy.*

There are magnificent heaps of the remains of antiquity on the seven hills of ancient Rome, at Pæstum, Beneventum, Agrigentum and Selinus; but these objects are not frequent; and, excepting the temple of Tivoli, the amphitheatre and gates of Verona, and two or three triumphal arches, little more appears but vast masses of brick. Until the fifteenth century, the ruins throughout Italy were employed as quarries for modern buildings, particularly for fortifications, without the slightest reverence or reflection; but, in later times, the inhabitants, on the contrary, frequently contribute large sums to preserve and repair the monuments of antiquity in their neighbourhood. The most remarkable of these remains, still visible in Rome, are, the Roman Forum, the Coliseum, the Cloaca Maxima, a work of Tarquinius Priscus, the circus of Caracalla, the Agger Tarquinii in the garden of Villa Negroni, the palace of Mæcenas, the arch of Constantine on the Palatine, the mausoleum of Cecilia Metella, the church of St. Agnes, erected by Constantine; the obelisks (especially at the entrance of the Curia Innocenziana, in the Piazzo del Popoli, in the centre of the Colonnado of St. Peter, and near St. John Lateran); the aqueducts on the Viminal, (now fontana felice,) on the brow of the Janiculum (aqua Paola), and the fontana de Trevi, the most magnificent in the world; the temples of Minerva Medica, of Vesta, Faunus, Fortuna Virilis, and the Pantheon; the baths of Diociesian, Titus, and Caracalla; the tombs of Cestius, Corvis Bibulus, and those of Augustus and Adrian in the Campus Martius. In the environs of Naples are, the amphitheatre and other remains near Puzzuolo, particularly the basso relievos in the square of the temple of Jupiter Serapis in the suburbs, and the old mole; a temple and various villas on lake Averno; the subterraneous vallies on the opposite side, called Grotto della Sibella; various ruins round the bay of Baiæ; a subterranean edifice, called Piscina Mirabile, under the promontory of Baulis; the caverns of the promontory of Micenus; above all, Herculaneum and Pompeii, especially a small villa near the site of the last mentioned town. Of those which attract the notice of the classical traveller in various parts of the country, may be particularly specified, the remains of the Via Appia, across the Pontine marshes; of the Via Emilia, between Placentia and Parma; of the Via Flaminia near Pesaro; the amphitheatre of Verona, capable of containing 20,000 spectators; the amphitheatres on the bank of the Potenza, beyond Sambuchetto, at Aquinum and Casinum; at Capua, gates of Verona, which are built of marble of Spoleto; at Fano, a triumphal arch of Augustus; one of the gates of Beneventum; a triumphal arch of Trajan, and one of the most magnificent remains of Roman grandeur to be found out of the city of Rome; a triumphal arch on the mole of Ancona; and the portico of Santa Maria de Minerva at Asisium; bridges, of Rimini, of Augustus over the Nar near Narni, of Torre tre ponte, and three between Benevento and Monte Sarchio, built of immense blocks of stone, the remains of the Appian Way; temples, of Jupiter Clitumnus at La Vene, and one to the north of Pæstum, of the kind called *pseudo dipteros*, the finest monument of ancient architecture; aqueducts, near the Garigliano at Mola, and behind the castle of Spoleto; villas, of Adrian near Tivoli, and of Pollius at Capo di Puolo; baths, near the church of S. Lorenzo in Milan; specimens of the most ancient Tuscan walls at Fondi, at Cartona, and at Cori near Velletri; antique granite columns in the cathedral of Barletta; various ruins on the site of the ancient cities of Capua, Cannæ, Canosa, Minturnæ, Metapontum, at the mouth of the Basiento, Terracina, the ancient Formiæ near Castellone, Mola, Volterra, Fiorentino, Aquinum.

Language—Literature and Sciences.

The origin of the Italian language has long been a subject of much curious research among the learned. Three hypotheses have been formed for the solution of the problem. The first, supported by Leonard Aretin, and afterwards by Bembo, supposes the Italian to be coeval with the Latin itself, and to have been, at all times, the dialect of the common classes, while the other was the chosen vehicle of learning, and of public documents. The second, suggested by the Marquis Maffei, supposes the Latin, without the aid of any external cause, to have gradually corrupted itself, by receiving from time to time into the regular forms of composition, all the idioms of the illiterate vulgar. The third, maintained by Muratori, considers the Latin language to have been successively adopted by the barbarous conquerors of Italy, but to have received from each a portion of their own inflexions, phrases, and pronunciation. The two former, as more flattering to national feelings, are chiefly supported by native authors; but most other critics adopt the last mentioned. Nevertheless, the whole of the three causes enumerated may have contributed to produce the final result; and it may not be easy to decide which of them all has exercised the most extensive influence. It is unquestionable, that some of the oldest inscriptions, of a date long prior to the perfection of the Latin language, bear a striking resemblance in certain points to the modern dialect. It is highly probable, that even from the time of Julius Cæsar, the Latin, as spoken by the people at large, was gradually deteriorated long before the subjugation of Italy to the barbarians; that the number of provincials, whom he brought to Rome in support of his cause, and the acting of plays in various languages on their account, greatly contributed to the corruption of the Roman tongue; that the suspension of literary pursuits, and the destruction of public seminaries, during the disastrous times of the empire, left the orthography and the pronunciation to be chiefly regulated by the ear; and that the effeminacy of the Romans themselves may have extended its influence even to their language, multiplying its smoother sounds, and retrenching its rougher combinations. Finally, the change of meaning, and the introduction of new terms, may be ascribed to the influence of the several invading hosts; to the prevalence of the Greek language in the south of Italy, which continued to be united to the Greek empire long after the fall of the western power, and where it is still spoken in some villages in greater purity than by the inhabitants of the Morea; to the introduction of the Sclavonian dialect by a colony of Bulgarians established in the southern provinces by the Greek emperors, about the middle of the seventh century; and to the vicinity of the Arabic, when the Saracens had possession of Sicily and several sea-ports of Calabria, during the ninth and tenth centuries.

The Latin language, however, though with little elegance, yet still genuine in respect of its grammar, continued to be spoken in Rome about the beginning of the seventh century, as appears from the letters of that period preserved by Cassiodorus, and from the sermons of Gregory the Great, addressed to his ordinary congregation in that city. Even during the four following centuries, all the public records, and all the writings of the learned now extant, were written in Latin, more or less corrupted. But, from the seventh century, the alteration of the language proceeded with great rapidity; and, in the ninth century, the clergy were required to preach "in Rustica Romana Lingua." The first regular inscription of the modern language is found on the front of the cathedral of Ferrara, of date 1135; and the first written specimens are the verses of a few obscure Sicilian poets, about the beginning of the thirteenth century. But the most singular circumstance in the history of the Italian language is the rapidity of its improvement. Though the last of all the modern dialects in order of birth, it was the first which served as a vehicle to productions of human genius; and while the world was scarcely conscious of its existence, it burst upon them at once in all the splendour of maturity. It was brought nearly to its present standard by Dante, or at least by his successors Petrarch and Boccace; and, what is scarcely less remarkable, it has continued in the same state, almost wholly unvaried, from the age of these distinguished writers to the present day. For the space of five centuries, the Italian authors (and they have been sufficiently numerous) have continued to write in one uniform dialect. Sweetness is the characteristic feature of the language; and it appears as if purposely formed for the service of musical genius; but it is only the Roman pronunciation that displays all the graces of which it is susceptible.

The first efforts of the Italian, as of most other languages, were poetical; and, in this department, its literature drew more directly from the Provençal, than the Roman sources. In the fourteenth century, both the poetry and the prose of Italian composition were carried to a height of excellence which they never have passed; the former by Dante and Petrarch, the latter by Boccace. During the fifteenth century the national literature of Italy remained stationary, and its language even retrograded, while the study of ancient learning made great progress in that country. Under the patronage of Lorenzo de Medici, a new impulse was given to the Italian muse, which produced the heroic romances of Ariosto and Francesco Berni, and the more serious epic of Tasso; and from that period, its poets have not been inferior in number and celebrity to those of any other country in Europe. Its dramatic writers have not been numerous, but sufficient to prove the power of the language in that department of literature: its dignity and vigour in the tragedies of Alfieri: its graces and ease in the comedies of Gherardo di Rossi: its tenderness, delicacy, and simplicity in the pastorals of Metastasio.

Italy is peculiarly rich in history. Every republic and almost every town has its historian, most of whom display information and talent sufficient to render their limited subjects both instructive and amusing. Among the most eminent in this department may be ranked Paolo Sarpi, whose history of the Council of Trent is distinguished for its depth and energy; Cardinal Pallavicini, who writes on the same subject with great ease and dignity; Guicciardini, who unites in his history of Florence the penetration of Tacitus with the fulness of Livy; Giannone, esteemed for the partiality of his statements, and the elegance of his style; Machiavelli, an imitator of Tacitus, in the conciseness of his narrative, and strength of his expression. To these may be added Angelo de Costanzo, the historian of Naples: Bembo, Morosini and Paruta of Venice; Adriani and Ammirato of Florence; Bernardino Corio of Milan. In general history, Tarcagnota, Campagna, Davila, and Bentivoglio; and especially, in the 18th century, may be specified the judicious Muratori, whose works are distinguished for erudition, selection, and sound criticism, comprising all the documents of Italian history and antiquity, with the best reflections which they are capable of suggesting. Italy has produced more antiquarians than all Europe together, of whom may be chiefly mentioned Muratori, Maffei, Mazzochi, Carli, and Pacaudi. It has many excellent writers on political economy, extracts of whose productions have been published in 50 volumes 8vo; and in essays, journals, reviews, as it led the way, so it is still not far behind any other country in the world. It has been considered as deficient in science; but those who are well versed in its literature enumerate a multitude of astronomers, mathematicians, geographers, and natural philosophers, from Galileo to the present day. "Les sciences," says Barthelemy, in his travels, "sont plus cultivées à Rome qu'on le croit en France. Je vous dirai sur cela, quelque jour, des details que vous etonneront." There are in fact, in the different states in Italy, a greater number of scientific institutions, distinguished by their ardour of research, and regularity of publications, than in any other equal portion of territory in Europe; and the Italian philosophers discover no ignorance of the most recent inventions and improvements of their transalpine fellow-labourers. They possess all the most valuable qualities of an inquirer after knowledge; and, if not renowned for original discoveries, are found to display an uncommon degree of elegance, acuteness, and ingenuity, in their physical disquisitions. The Memoirs of the Academies of Mantua, Milan, Padua, Turin, and especially of Verona, are all eminent productions. Those of Bologna and Florence are particularly distinguished for scientific researches; and the Royal Institute at Naples is noted for its productions on mathematics. The Italians are doubtless deficient in theological learning, a circumstance for which some would account by the absence of all occasion for controversy. The following native writers may be mentioned in addition to those already named, both as examples of individual excellence, and as sources of the best information in regard to Italian literature in general; namely, Tiraboschi's *Storia della literatura Italiana*, which comprises the whole history of the ancient and modern learning of the country, and is considered as one of the most interesting works of modern times; Abate D. G. Andres *dell' Origine, di Progressi, et dello stato di ogni Literatura*, a masterly and comprehensive production; Denina *Revoluzioni d'Italia*, characterised, by those best acquainted with the subject, for its manly perspicuity and political sagacity; and the work of the same author, *Sopra le vicende della Literatura*, which is at once a compendious history and masterly review of general literature. In Great Britain, Italian literature has been much and most unjustly depreciated, partly from its not being known, and probably, in no small degree, also from the authority of the French critics, who have generally contrived to make it be considered as undeserving of attention; but by the publications of Mr. Roscoe, and the author of the *Pursuits of Literature*, its attractions have been better known and understood.

Population—Manners and Customs—National Character.

The population of Italy, which, in the time of Pliny, was estimated at fourteen millions, is equally great, or rather is considerably augmented, even in its present state of depression. All the cities, and almost all the great towns, with most places of any celebrity, still exist nearly under the same names as in ancient times. Many of them have regained, and several exceeded, their former prosperity and population; and if a few have entirely perished, others have risen in their stead. In the year 1784, Italy, Sicily, and Sardinia, were supposed to contain from sixteen to eighteen millions of inhabitants; and in 1793, the amount was calculated to be no less than twenty millions.

The manners and customs of the Italians are very different and discordant in the several provinces, and not easily brought under any general description. Their dress, though not very dissimilar to that of the adjoining nations, is extremely diversified; and, in the south particularly, all kinds of costumes are observable. The attire of the females is generally very unbecoming; and, in Naples, is composed principally of black silk, with enormous black hoods. In point of food, the people are more uniform. The lower classes live commonly on soups, garden stuffs, milk and cheese. Turkish corn, different sorts of pulse, and great quantities of sea-fish, are used in the southern provinces. Macaroni boiled, sprinkled with cheese, sometimes mixed with the liver of chickens, is the national dish, and forms a principal part of every repast. It is frequently prepared in strings about a yard in length, and let down into the throat in a very awkward manner, with the arm extended. The verrina is also a celebrated dish, consisting of the paps of a sow, which epicures, always cruel, have unhappily conceived to be most delicate when cut from the living animal. Among the more remarkable peculiarities of Italian diet, may be mentioned dormice, which in ancient Rome were fattened in warrens, and are still accounted excellent game in the southern districts; horse flesh, which is publicly sold in the shambles at Bari and Francavilla, and is named by the wits among the populace *capro ferrario*, "shod deer;" and dogs, which, at Lecce and Casalnuovo, are a favourite food of the lower classes. Italian cookery, in roasting and boiling, is said to resemble the English; and the chief difference consists in the abundant use of oils in place of butter. But the Italians, though not inattentive to good eating, are not accustomed to give feasts; and are universally temperate in the pleasures of the table, particularly in the article of drink. Their repasts are short, and in their opinion too hasty for conversation; but they devote their evenings, and no small portion of the night, to society; holding conversations, as they are termed, for the space of four or five hours, and presenting their company with large glasses of lemonade, or small cups of chocolate, in place of supper.

There are perhaps no people in the world, of whose national character more opposite and inconsistent sketches have been given, than of the modern inhabitants of Italy. It is utterly impossible to reconcile the varying testimonies of different travellers on the subject, or to collect the leading features of one generally applicable description. The cause may probably be found, not merely in the different degrees of judgment, candour, and opportunity, possessed by the writers; but in the real diversity of character, which exists in the country, where the inhabitants live under so many different forms of government, and in such diversified circumstances of conditions. "The oaths and curses, (for instance,) so frequent in the mouths of the vulgar," says Swinburne, "change entirely at the first step one makes out of the Roman into the Neapolitan territories. The Romans, having the fear of the inquisition before their eyes, vent their choler in obscure words or pious ejaculations; but the swearing of the Neapolitan, who is under no such restraint, borders upon blasphemy." Nay, even in the different provinces of the same state, diversities are observable in the manners and dispositions of the inhabitants. The North Calabrese (according to the testimony of the last mentioned writer, founded upon the authority of a learned native,) have a great deal of German solidity in their disposition, supposed to arise from the colonies transplanted thither under the Suabian princes; while the most evident traces of Grecian manners and turn of mind are found in the southern Calabrese and the Neapolitans; and the Piedmontese approach in like manner to the French character. We must therefore content ourselves (after specifying a few points which appear to be best authenticated, and almost universally allowed) with extracting the testimonies of the more intelligent observers on the subject of the Italian character in general.

Among the Neapolitans the upper ranks are ignorant, licentious, dissipated, and inveterately addicted to the most ruinous gallantry; the gentlemen of the church and the law tolerably well educated; the middle class possessed of considerable worth; and the lower populace good humoured, open-hearted, passionate, but not malicious, and so fond of drollery, that a joke will frequently serve to check their most violent fits of anger.

The Tuscans are, in every view, the most worthy and industrious part of the nation. The wealthier individuals are fond of learning, and friendly to strangers. The peasantry sober in their manners, and even distinguished above the other Italians in respect of their personal appearance.

The Romans possess neither the worth of the Tuscans, nor the good-natured buffoonery of the Neapolitans. The nobles are polite to foreigners, but the trades-people and populace are savage and fraudulent, retaining much of the ancient haughty character, and proud of their descent from the conquerors of the world.

The higher ranks throughout Italy are extremely hospitable, so that a good letter of recommendation may carry a traveller from house to house all over the country. Persons of rank among themselves, usually pass in their journies from one villa to another without making use of the inns, which are consequently possessed of very inferior accommodations. The inhabitants, in general, are full of civility to strangers; and are remarkable for honesty to one another, so that, even in Calabria, the houses are left entirely open during the absence of the family on their daily avocations. The Italians, in general, are described as dirty in their dress, cookery, and persons.

" The Italians," says Semple, referring to the country between Leghorn and Naples, " are a singular mixture of eagerness and cunning, of mildness and violence, of superstition and irreligion. They are vehement in their gestures on trivial occasions; but, at the very time that they appear absorbed in the violence of passion, they are full of duplicity, and grow cool in a moment, if they see any advantage in doing so. They affect to speak with great mildness and appearance of regard, even to an absolute stranger, and yet suddenly break out into violent fits of passion. They will talk lightly of the church, and turn their priests into ridicule; but, after uttering an irreligious jest, a sacred awe seems to drive them to the altar, where they receive the sacrament from the very hand which they have ridiculed. No people that I have yet seen descend so low in order to excite compassion. If they gain their object by any means, they are satisfied; and, in order to effect this, they fawn upon strangers in a manner which quickly becomes tedious, and even disgusting. They feel with greater accuracy than they reason; and are more apt to mislead themselves when they take time to deliberate, than when they act from the impulse of the moment. The mildness of their climate inspires them with cheerfulness, and they give themselves up with ardour to every pleasure, even the most trifling; yet their looks are composed, and even grave, and their walk has nothing in it which indicates levity. In the observance of the matrimonial engagements, no people can be more lax; nor is there any country where jealousy is so little known, nor indeed where it would be so very useless."

A more favourable view is conveyed by the following sketches of Dr. Moore. " In the external deportment, the Italians have a grave solemnity of manner, which is sometimes thought to arise from a natural gloominess of disposition. Though, in the pulpit, or the theatre, and even in common conversation, the Italians make use of a great deal of action; yet Italian vivacity is different from French; the former proceeds from sensibility, the latter from animal spirits. The inhabitants of this country have not the brisk look and elastic trip which is universal in France; they move rather with a slow composed pace; their spines, never having been forced into a straight line, retain the natural bend; and the people of the most finished fashion, as well as the neglected vulgar, seem to prefer the unconstrained attitude of the Antinous, and other antique statues, to the artificial graces of a French dancing master, or the erect strut of a German soldier. I imagine I perceive a great resemblance between many of the living countenances I see daily, and the features of the ancient busts and statues; which leads me to believe that there are a greater number of the genuine descendants of the old Romans in Italy than is generally imagined. I am often struck with the fine character of countenance to be seen in the streets of Rome. I never saw features more expressive of reflection, sense, and genius; in the very lowest ranks there are countenances which announce minds fit for the highest and most important situations; we cannot help regretting that those to whom they belong have not received an education adequate to the natural abilities we are convinced they possess, and placed where these abilities could be brought into action."

" The present race of women of high rank are more distinguished by their other ornaments, than by their beauty Among the citizens, however, and the lower classes, you frequently meet with the most beautiful countenances. I will give you a sketch of the general style of the most beautiful female heads in this country. A great profusion of dark hair, which seems to encroach upon the forehead, rendering it short and narrow; the nose generally either aquiline, or continued in a straight line from the lower part of the brow; a full and short upper lip; the eyes are large, and of a sparkling black, and wonderfully expressive. The complexion, for the most part, is of a clear brown, sometimes fair, but very seldom florid, or of that bright fairness which is common in England and Saxony.

" In the midst of all the idleness, (of Naples,) fewer riots or outrages of any kind happen than might be expected in a town where the police is far from being strict, and where such multitudes of poor unemployed people meet together every day. This partly proceeds from the national character of the Italians, which, in my opinion, is quiet, submissive, and averse to riot and sedition; and partly to the common people being universally sober, and never inflamed with strong liquors, as they are in the northern countries. If these poor fellows are idle, it is not their fault; they are continually running about the streets, as we are told of the artificers in China, offering their service and begging for employment; and are considered by many as of more real utility than any of the classes above mentioned.

" The Italians are the greatest loungers in the world; and, while walking in the fields, or stretched in the shade, seem to enjoy the serenity and warmth of their climate with a degree of luxurious indulgence peculiar to themselves. Without ever running into the daring excesses of the English, displaying the frisky vivacity of the French, or the invincible phlegm of the Germans, the Italian populace discover a species of sedate sensibility to every source of enjoyment, from which, perhaps, they derive a greater degree of happiness than any of the other. The frequent processions and religious ceremonies, besides amusing and comforting them, serve to fill up their time, and prevent that ennui and those immoral practices which are apt to accompany poverty and idleness.

" The stories which circulate in Protestant countries concerning the scandalous debauchery of monks, and the luxurious manner in which they live in their convents, whatever truth there may have been in them formerly, are certainly now in a great measure without foundation."—"From the inquiries I have made in France, Germany, and Italy, I am convinced that this is usually the case with those peasants who belong to convent lands (holding them on easy terms); and very often, I have been informed, besides having easy rents, they also find affectionate friends and protectors in their masters, who visit them in sickness, comfort them in all their distresses, and are of service to their families in various shapes."

"Though my acquaintance with the Roman Catholic clergy is very limited, yet the few I do know could not be mentioned as exceptions to what I have just said of the Protestant (as men of learning and ingenuity, of quiet, speculative, and benevolent dispositions). It is a common error prevailing in Protestant countries, to imagine that the Roman Catholic clergy laugh at the religion they inculcate, and regard their flocks as the dupes of an artful plan of imposition. By far the greater part of Roman Catholic priests and monks are themselves most sincere believers, and teach the doctrines of Christianity, and all the miracles of the legend, with a perfect conviction of their divinity and truth."—"The accounts we receive of their gluttony are often as ill-founded as those of their infidelity. The real character of the majority of monks and inferior ecclesiastics, both in France and Italy, is that of a simple, superstitious, well-meaning race of men, who for the most part live in a very abstemious and mortified manner, notwithstanding all that we have heard of their gluttony, their luxury, and voluptuousness."

"The nobility, especially of Naples, are seldom called to the management of public affairs; have little temptation for their ambition, either in the civil or military establishments; are generally regardless of literature, and devote their lives to gaming, gallantry, music, the parade of equipage, the refinements of dress, and other nameless refinements.

"In attendance on public worship," says Mr. Eustace,[*] "the Italians are universally regular; and, though such constant attendance may not be considered as a certain evidence of sincere faith, yet every reader of reflection will admit, that it is incompatible with either infidelity or indifference. These latter vices are indeed very rare in this country, and entirely confined to a few individuals of the higher class, and to some officers in the army."—"Nor is the devotion of the Italians confined to public service. The churches are almost always open; persons of regular life and independent circumstances generally visit some one or other of them every day; and individuals of all conditions may be seen at all hours on their knees, humbly offering up their prayers at the throne of mercy."—"No country exhibits more splendid examples of public benevolence, or furnishes more affecting instances of private charity than Italy; and whoever has visited and examined in detail the hospitals of Rome, Naples, Genoa, Venice, and Milan, will readily admit that Italy has the honourable advantage of surpassing all the kingdoms of Europe in the number and magnificence of her charitable foundations."—"In many of them the sick are attended, and the ignorant instructed, by persons who devote themselves voluntarily to that disgusting and laborious task, and perform it with a tenderness and a delicacy, which personal attachment, or the still more active and disinterested principle of Christian charity, is alone incapable of inspiring." There are also benevolent institutions, confraternities or sodalities, "formed by the voluntary agreement of a certain number of charitable persons, who unite together, in order to relieve more effectually some particular species of distress; so that every want, and every misfortune, are certain of meeting with corresponding assistance from some band or other of generous *brethren.*" "In the vast tract of country included between the Alps and the Appenines, and subject to the visitation of the Archiepiscopal See of Milan, in every parochial church the bell tolls at two o'clock on every Sunday in the year, and all the youth of the parish assemble in the church; the girls are placed on one side, the boys on the other. They are then divided into classes, according to their ages and their progress, and instructed either by the clergy attached to the church, or by pious persons who voluntarily devote their time to this most useful employment. In other parts of Italy, the children are catechised regularly, and almost invariably in the parish church by their pastor." "The Italian common people are, to say the least, full as well acquainted with the truths, the duties, and the motives of religion, as the same class in England; and instances of very gross ignorance seldom occur, unless in the superabundant population of great towns, and of overgrown capitals." Translations of the Bible, "when considered as tolerably accurate, are allowed, and encouraged; and an Italian translation exists, penned with great elegance, and recommended to public perusal by no less than Papal authority." "The peasantry of the north of Italy were, previous to the French invasion, universally taught to read and write; and equal in point of information to the peasantry of the most flourishing countries in Europe." "The middling classes are generally very well acquainted with every thing that regards their duty, the object of their profession, and their respective interests." "But even where the ordinary share of information is wanting, the deficiency is not so perceptible as in more northern countries. The Italian is acute and observing. These two qualities united, supply in some degree the place of reading; and give his conversation more life, more sense, and more interest, than are to be found in the discourse of transalpines of much better education." "The Italian nobility have always distinguished themselves by cultivating and encouraging the arts and sciences. Many, or rather most of the Italian academies were founded by gentlemen, and are still composed principally of members of that class. The Italian nobility has produced more authors, even in our own days, than the same class has ever yet done in any country. Moreover, a taste for the fine arts, sculpture, painting, architecture, music, is almost innate in the Italian gentry—a taste scarcely separable from an acquaintance with the two great sources of information, antiquities and history." "To accuse the Italians of cowardice, is to belie their whole history. Even in the late invasion, the peasantry themselves, in some parts of the Neapolitan, and particularly of the Roman state, made a bold and generous, though ineffectual resistance. Not courage, therefore, but the motives which call it forth, and the means which give it effect, that is, discipline, hope, interest, &c. are wanting to the Italians." "In many of the great towns, due respect is not paid to the matrimonial contract, especially in Venice and Naples, where cicesbeism exists in all its profligacy among the higher classes; but the middling classes and the peasantry are in Italy as chaste as persons of the same description in any, and more chaste than they are in many countries." "The industry also of the Italian peasantry may be traced over every plain, and discovered on almost every mountain, from the Alps to the straits of Messina." "They obey the call of nature in reposing during the sultry hours, when labour is dangerous and the heat is intolerable;" but "to compensate for this suspension, they begin their labours with the dawn, and prolong them till the close of evening; so that the Italian sleeps less and labours more in the twenty-four hours than the English peasant." "The Italian is neither vindictive nor cruel; he is hasty and passionate." "An unexpected insult, a hasty word, occasion a quarrel; both parties lose their temper: daggers are drawn, and a mortal blow is given: the whole transaction is over so soon, that the by-standers have scarce time to notice it, much less to prevent it. The deed is considered, not as the effect of deliberate malice, but of an involuntary and irresistible impulse; and the perpetrator, generally repentant and horror-struck at his own madness, is pitied, and allowed to fly to some forest or fastness. Yet the remedy is easy and obvious; a prohibition under the severest penalty to carry arms of any description. This remedy has been applied with full success by the French, while masters of the south; and by the Austrians, while in possession of the north of Italy." "But actual murder and deliberate assassination are very uncommon among them;" and "even robberies are rarely met with at present."

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[*] As our readers must prefer original testimonies on the contested points of the Italian character and condition, we here continue, as far as possible, to quote the language, though obliged to abridge the remarks, of the writers referred to.

Governments.

No country has exhibited more various forms of government, or given birth to more powerful empires and flourishing republics, than Italy: "Gravidam imperiis, belloque frementem." From the 10th to the 17th century, the greater cities rose into independence and republics; and their history is not inferior to those of Greece, in the virtues which the members of such states usually display. The smaller republics have in later times been annexed to the more powerful. Florence, Pisa, and Scienna, have been enslaved by their Dukes; but enjoyed a considerable portion of tranquillity and property previous to the French revolution. The modern Italians are by no means deficient either in the love of liberty, or the feelings of patriotism; but their country is too much subdivided, and by the intrigues and influence of foreign powers, kept in a state of too great dissension, to allow its inhabitants any opportunity of exerting their natural magnanimity, and availing themselves of their natural advantages as one people. The political arrangements of the northern states and principalities, and the re-establishment of the Neapolitan and Ecclesiastical governments, have been already mentioned; but, for an account of their respective politics, we must refer to the articles allotted to them separately. It may only here be observed, that, in those two last mentioned states, the government is absolute, and above all controul. In the latter, the sacred character of the sovereign makes the supreme authority be exercised with mildness, and submitted to with respect; and there are some appearances of its being the intention of the present Pontiff, as it is strongly the wish of the Roman public, to elect a senate, to share in the administration of affairs. In the former, despotism prevails in its most degrading forms and ruinous effects, with little prospect of amelioration, except where the progress of knowledge, and the example of other more enlightened governments, may communicate.

The police throughout Italy is extremely defective, especially in the two last mentioned states; of which the one is indulgent and the other indolent—the papal magistrates forgiving, the Neapolitan overlooking, the greatest criminals. During the recent unsettled state of the country, the depredations of armed banditti have been frequently and fatally experienced by the traveller; and in some cases these outrages may fairly be ascribed to the apathy of the rulers. The plunderers, who inhabit the frontiers of the Pontine marshes, are no other than the inhabitants of the neighbouring villages, who are employed in their usual labours during the greater part of the year, but, at other seasons, enlist under the banners of a few chiefs for the pillage of travellers. After making a predatory attack, they disperse immediately, and, resuming their usual occupations, appear as peaceable subjects under the protection of their curate and mayor, whose indulgence and connivance are suspected to originate in no very honourable reasons. A few of the leaders are generally known; and, being exposed to the constant search of the gens d'armes, are occasionally apprehended and executed; but the evil is not thereby repressed. In the vicinity of Naples, the brigands are said to have been lately dispersed by the singular plan of the government taking into its service two of the principal leaders, who have engaged to make all their followers quiet subjects.

The poor are extremely numerous in Italy; and, in the southern provinces particularly, the most importunate mendicants beset the passengers at every turn. Their numbers may be ascribed in a great measure to the stagnating commerce, declining manufactures, and narrow policy of many of the states; and, as no legal provision is made for their support, their claims are brought more obtrusively before the eye of the public. The sufferings of the Italian poor, however, are greatly mitigated by the mildness of the climate, as far as regards the want of comfortable lodgings and clothing; and their other necessities are fully supplied by the distributions at the numerous convents, and the aids afforded by charitable institutions, as well as the alms of private individuals. "Having now," says Dr. Moore, "crossed from the Adriatic to the Mediterranean, and travelled through a considerable part of Italy, I acknowledge I have been agreeably disappointed in finding the state of the poorer part of the inhabitants less wretched than, from the accounts of some travellers, I imagined it was; and I may, with equal truth, add, that, although I have not seen so much poverty as I was taught to expect, yet I have seen far more poverty than misery. Even the extremity of indigence is accompanied with less wretchedness here, than in many other countries. This is partly owing to the mildness of the climate and fertility of the soil, and partly to the peaceable, religious, and contented disposition of the people."

The Church and Religion.

The established Catholic or Romish faith and worship prevails exclusively over all Italy; and no where is its authority and jurisdiction more complete. Over this church of Italy the Pope presides as primate, with the same prerogatives which accompany that title and station in other countries. But besides the peculiar office, which merely expresses his relation to the Italian ecclesiastical constitution, he is also the chief pastor of the Catholic church over the whole world; and thus possesses, in the opinion of that church, a spiritual supremacy and influence in every country, where any portion of it exists. In this character, he is regarded not only as bishop of Rome, metropolitan, and primate of Italy, Sicily, &c. and a patriarch of the West, enjoying all the privileges, and subject to all the controul, of other bishops, primates, or patriarchs, in their respective districts; but also as the successor of St. Peter, sitting as the first pastor of the Catholic church, by divine right and appointment, and holding the primacy of honour and jurisdiction over the whole Christian church. To refuse him this name and honour, is deemed an act of spiritual rebellion; but, at the same time, the precise rights and prerogatives connected with it have never yet been defined; and the exertions of pontifical power in general are regarded, at least by modern Catholics, as only of human institution, which it would be neither heresy nor schism to resist. For an account of the progress of this usurpation, and its subsequent connection with a temporal sovereignty, we refer our readers to the article ECCLESIASTICAL HISTORY, chap. i. and must be considered at present as merely stating the modern views and practice of the Catholic church on the subject of its spiritual head. To this topic, also, we must only allude by the way, and confine our account of the Roman Pontiff to his office, as head of the church of Italy and Bishop of Rome. He is, however, at the same time, a temporal prince, and sovereign of a considerable portion of the country; and thus comes to be noticed both under the political and ecclesiastical branches of this article. It is, nevertheless, to the latter of these characters, that his dress, titles, equipage, &c. are adapted; and, in his own court, he is exclusively addressed by the appellations of Holiness, or Holy Father. His robes resemble those of a bishop in pontificals, excepting the stole and the colom, which is white instead of purple. His vestments, when he officiates in church, do not differ from those of other prelates, and it is only on extraordinary occasions that he wears the "tiara," or triple crown. Both in public and private, he is encircled with all the forms of majesty, and approached with the greatest reverence. A prelate in full robes is always in waiting in his anti-chamber; and, when the apartment opens, he is seen sitting in a chair of state, with a small table before him. The person who is introduced to this presence-chamber, kneels first in the threshold, again in the middle of the room, and, lastly, at the feet of the Pontiff, where he is allowed to kiss the cross embroidered on his shoes, or is raised by his hand, and, after conversing a short time, commonly receives a slight present of beads or medals, as a memorial, and then retires with the same ceremonies of kneeling. In public, a large elevated silver cross is carried before his Holiness as a sacred banner, the church bells ring as he passes, and all men kneel in his sight. His whole life is spent in ceremony and restraint; and no dignity is more cumbersome and continued than that under which he is placed; always encumbered with the same robes, surrounded by the same attendants, confined within the same circle of ceremony, and never possessing one hour of relaxation. After a morning spent in business, a walk in the gardens of the Quirinal or the Vatican, a visit to a church or a hospital, are his only exercises. Even his repasts are solitary, short, and frugal; and the expence of his table, in the present value of money, never exceeds five shillings a day. His person and conduct are under perpetual restraint and inspection, and the least deviation from strict propriety, or even from customary forms, would be immediately noticed, and censured in pasquinades. Leo X. gave great scandal by shooting; Ganganelli, by riding; and when Benedict XIV. went to see the interior arrangement of a new theatre before it was opened to the public, there appeared next morning the following inscription on the door by which he had entered, "*porta sancta*, plenary indulgence to all who enter." This strict decorum in the Papal court, so different from the splendour and gaiety which it exhibited in former centuries, has been ascribed by the Catholic writers to the influence of the celebrated Council of Trent.

The College of Cardinals form the council of the Pontiff, and the senate of modern Rome; and are also the officers of state, entrusted with the management of the church at large, and of the Roman territories in particular. They are seventy-two in number, including the six suburban bishops; but some of the hats being generally kept in reserve, in case of any emergency, the number is seldom full. All the Catholic powers are allowed to recommend a certain number; but the nomination rests solely with the Pope. Their grand assembly is called the consistory, where they appear in all their splendour, and the Pope presides in person; but less for the purpose of discussing than witnessing the ratification of measures already adopted in the cabinet of the Pontiff. Their principal prerogative is exercised in the conclave, where they are confined within the Vatican palace till they agree in the election of a Pope. The large halls are then divided into temporary apartments, of which each cardinal has four, with two attendants; while, in order to exclude all undue influence from the assembly, the different entrances are guarded by the senators of Rome, conservators, patriarchs, archbishops, and bishops, in the city at the time. The tickets, containing the votes of the cardinals, are put upon the communion plates, and then into the chalice; and the pope, as soon as elected, is placed on a chair upon the altar itself, where he receives the adoration or homage of those who are present. These two ceremonies the more enlightened Catholics themselves consider as bordering on profanation; but, perhaps, their intoxicating influence is meant to be counteracted by another, which, to ensure its effect, is repeated three times in succession. As the new pontiff advances towards the high altar of St. Peter's to be placed upon it, the master of the ceremonies, kneeling before him, sets fire to a small quantity of tow placed on the top of a gilt staff, and, as it blazes and vanishes into smoke, addresses his Holiness in these words: "Sancte Pater! sic transit gloria mundi."

All the great cities, and some even of a secondary rate, have archbishops; while almost every town, especially if it be of ancient name, is the see of a bishop; a circumstance which confirms the fact, that primitive bishops were more like the first ministers of a parish than a diocesan. Besides the cathedrals, there are several collegiate churches, which have their deans and chapters. Every bishop has his diocesan college for the purpose only of ecclesiastical education; in this seminary, under his own inspection, with the assistance of a few of his more eminent clergy, the candidates for orders in the diocese must attend three years in a course of preparation for their clerical functions, which course consists in hearing lectures on the Scriptures, and the scholastic systems of ethics and theology.

The parochial clergy are numerous; pluralities are never allowed; and residence is strictly enforced. These regular clergy are described as generally exemplary and active in the discharge of their duties; but though their number has been considerably diminished by the alienation of church property during the French domination, they are acknowledged to be still too numerous, especially the lower orders of them. It is pleaded, at the same time, that the population of the country is great, and all of the established religion; that the priests are usually also the schoolmasters of every place, occupied in the instruction of children, and other departments of education; that, by the forms of their church, they have a great multiplicity of services to perform, especially in visiting the sick, and administering the communion, which by many is received often, and by all at least once in the year. There is said also to be a class of persons in Italy who assume the clerical habit as a respectable dress, which gives them easier access to good company, but who are no way engaged in the service of the church, and whose manners often bring an undeserved reproach upon the whole body.

The irregular clergy, so called from taking upon themselves certain rules and statutes not connected with the clerical profession, are still more numerous, and exhibit a great variety of costumes. They may be divided into two great classes, namely, monks and friars, who are bound in common by the three vows of poverty, chastity, and obedience, but who live under very different regulations. The monks, under various appellations, follow almost universally the rule of St. Benedict, which is rather a treatise of morals than a set of statutes, enjoining various virtues, but prescribing only a few regulations respecting the employment of time, the order of the psalms, the practice of hospitality, the duties of the officers of the abbey, the pursuit of manual labour, and the use of the library. These are said to have adhered more rigidly to the ancient practice, (except in dropping manual labour, and applying, or professing to apply, themselves rather to science and tuition,) and to have taken little share in political or theological contests. To the monks may be added the canons regular, who take upon themselves the life and engagements of a convent, while they bear the dress and discharge the duties of ordinary prebendaries. Several other congregations of clergy live together in communities, without taking vows, and devote themselves to the instruction of youth and the education of the poor; such as the Theatines, Hieronymites, &c. a useful and unobjectionable class, who have produced many individuals eminent in literature. All these are supported by a regular settled income, derived from landed property or public grants, which contributes much to their general respectability, and distinguishes them from the second class of irregular clergy, who subsist upon alms and donations, and are denominated Mendicants or Friars. These form a multitudinous and multifarious body, under a great variety of subdivisions, dresses, and observances; but the most prevalent are Franciscans, Dominicans, Carmelites, and Augustines. They were all intended to act as assistants to the clergy in their parochial duties; but the auxiliaries have become the most numerous, and have encroached upon the prerogatives of the main body. In towns particularly, they draw the people away from the ancient liturgical service, to shews, images, and other abuses; while it is only in the distant and retired parts of the country that they are subservient and aiding to the parochial pastors. Between the Alps and Appennines particularly, and also in most parts of Italy, the lower classes are said to be well acquainted with religious duties, and the young of every parish are catechized in the churches by pious persons, under the inspection of the priests. An Italian translation of the Bible, not indeed very easily procured, is allowed and recommended; but the greasest jealousy is shewn of every other version of the Scriptures being circulated among the people. Even Catholics, however, are compelled to acknowledge, that many abuses and absurdities prevail in the religious system of the country, particularly the multiplicity of ceremonies, the number of holidays, the infinity of monastic establishments, the extravagant and idle forms of devotion, the unmeaning and improper ornaments of the churches, the superstitious reverence for absurdities, and the introduction of theatrical exhibitions and music into places of worship. See Eustace's *Classical Tour in Italy*; Swinburne's *Travels in the two Sicilies*; Spallanzani's *Travels in Italy*; Condamyne's *Tour in Italy*; Martin's *Tour through Italy*; Moore's *View of Society and Manners in Italy*; Starke's *Letters from Italy*; De Salis' *Travels through various Provinces of the Kingdom of Naples*; Forsyth's *Remarks on Antiquities, Arts, and Letters, during an excursion in Italy*; Lumsden's *Remarks on the Antiquities of Rome*; *Histoire Literaire d'Italie*, par P. L. Ginguené; *De la Literature du midi de l'Europe* par J. C. L. Simonde de Simondi; *Tableau de l'Agriculture Toscane*, par J. C. L. Simondi; *Lettres ecrites d'Italie, en* 1812, &c. par Frederic Sullin de Chateauvieux; *Italia et Sicilia Antiqua*, Cluverius; *Descrittione dell' Italia*, Alberti; *Analyse d'Italie*, d'Anville; *Vetus Latium*, Corradino; *La Via Appia riconosciuta, e descritta*, Pratilli; *The Grand Tour*, by Nugent; Keysler's and Misson's *Travels*. (q.)

ITHACA is an island in the Ionian sea, celebrated as the kingdom of Ulysses, and for having been the scene of some principal events in the poetry of Homer. It is still denominated *Ithaca* by the higher ranks of the inhabitants, and *Thiaki* by the lower; it appears in the Venetian charts under the appellation of *Val di Compare*, which, being quite unknown to both, has proved the source of considerable perplexity to geographers. This island is situated between Santa Maura and Cephalonia, from each of which it is separated by a channel about two miles in width, and it lies nearly opposite to the middle of that part of the coast of Albania stretching from the gulf of Arta to the gulf of Lepanto. Ithaca is of the most irregular form; and resembles two islands united by a very narrow stripe of land. It extends 18 miles in length from north-west to south-east, but is penetrated by a bay five miles wide, called Porto Molo, dividing it almost into two islands, and leaving a narrow isthmus about half a mile across. The island is no where above five miles in breadth, and its superficial area probably does not exceed 80 square miles. There are several harbours along the coast, as Vathi, Skinos, and Aito, all in Porto Molo; and on the north side, Chioni, together with Port Frichies, not far from the commencement of a long peninsula terminating the extremity of the island in Cape St. John.

Ithaca, in common with the neighbouring islands, is subject to earthquakes, which rarely do much damage, and violent squalls prevail in the deep channel between it and Cephalonia, which deter small vessels from attempting its navigation, except in steady winds.

Water is scarce: that of Vathi is brackish: the largest brook, Melainudros, flowing into the sea at Frichies, comes from a spring of the same name. The residue of the rains is preserved in cisterns, which are sometimes excavated in the rock, or the inhabitants draw their supplies from wells.

This island consists of a single narrow ridge of limestone rock. Its surface is exceedingly unequal, scarcely presenting 100 yards of continuous level ground, and every where rising into rugged eminences, of which the highest are the mountains Stephanos and Neritos, on opposite sides of Porto Molo. Although a small portion can be devoted to agriculture, yet the grain obtained is sufficient for the consumption of the inhabitants, and affords an inconsiderable quantity for export to Cephalonia and Zante, where the natives of the latter store it up, owing to its superior quality. There are pleasant gardens here. In different parts terraces are formed for the cultivation of plants; almonds, olives, and grapes, are among the fruits, the last of which hang in the greatest luxuriance from vines, growing where scarcely a particle of earth can be seen, and are of that particular species called currants in Britain. We read of various fruits in the garden of Laertes, and the same still remain indigenous around the village of Leuka. Ithaca seems to have been celebrated for trees in the time of Homer, and there is yet a wood of arbutus and prickly-leaved oak, intermixed with wild olives, juniper and mastic, on a hill towards the southern extremity. The larger quadrupeds are brought hither from the Grecian coast. Some of the islets in the neighbourhood of the island are devoted to pasturage, but not during the heat of summer, as they contain no water. Pliny asserts that hares died when they were carried to Ithaca: at present they are coursed with a particular species of greyhounds.

The total population of the island, according to a return obtained by the French in 1807, amounted to 8000, who are dispersed in the town of Vathi and four or five villages. Vathi stands in a fine district, where almond trees and groves of oranges afford fruit, shade, and fragrance, to the inhabitants. It is situated close to the port, extending along its eastern, and part of its southern and northern shores, and consists of about 4[illegible] houses, with a population of [illegible], or, according to some, of only 2000 souls. Of late years it has been greatly improved, and the street containing the government house, together with other public buildings, now assumes a regular appearance. From the frequency of earthquakes, the bell towers have been erected at a distance from the churches. The religion of the Greek church is professed here, and the clergy are under the direction of a proto-papas, dependent on the archbishop of Cephalonia. There is no church of the Latin rite in Ithaca, nor any nunnery; but churches and chapels are numerous; and there are four monasteries. Some of these are of late erection; and one, dedicated to the archangel Michael, among the mountains, was lately inhabited by no more than a single monk, who subsisted on alms. In Vathi and elsewhere, the inhabitants dance before their houses on the evening of religious festivals; and a modern traveller informs us, that he saw the figure of one dance, said to have been first used by the youths and virgins of Delos, commemorating the return of Theseus from his expedition to the Cretan Labyrinth, though it has now lost much of that intricacy supposed to illustrate its windings. No regular inns are to be seen in Vathi, but a place of entertainment has been recently established for mariners. About fifty vessels of all denominations belong to the port, which trade to every part of the Mediterranean; yet the only exports are about 500,000 pounds of currants, which were formerly carried to the London market; an inconsiderable quantity of grain; and a little wine, in appearance and flavour somewhat intermediate between port and claret, but which is reputed the best of all produced in the Ionian isles. The manners of the inhabitants of Vathi are engaging and polite, and strangers are received with much hospitality. Most of them are able to converse in Greek and Italian. They can speak French with almost equal fluency. The towns next in size to Vathi seem to be Oxoai, where there is a school, as well as in the former, under the inspection of the proto-papas, or head priest, and Anoai, which its inhabitants are deserting for the village of Chioni.

While this island was in the hands of the Venetians, its government was vested in a Cephalonian nobleman, elected by the council of Argostoli, the chief town. Although not lucrative, the appointment was an object of ambition among the Cephalonians, and never bestowed on any one who had not previously filled the highest offices; and he was replaced annually. His authority was limited chiefly to matters of police; he had to make reports on what proceedings were necessary to the proveditore of Cephalonia, whose instructions he was bound to observe. By the later regulations of the Ionian republic, no native of the island can be named; and the governor is changed every second year. He is entitled to a residence in the palace, and is assisted by a secretary and other public officers.

No vestiges whatever remain to prove the ancient celebrity of Ithaca. Its situation and natural aspect utterly preclude it from having ever been of any political importance; it even seems to have been totally deserted; for, according to some authors, it was twice colonized from Cephalonia in modern times; and on one occasion, the Venetians granted as much land to each settler as his circumstances would enable him to cultivate.

Nevertheless, late travellers affirm, that the descriptive parts of the Odyssey, relative to Ithaca, must have been made by Homer on the very spot, for they think that they can be actually recognized. Foundations lately discovered on the hill of Aito, on the narrow isthmus above alluded to, are apparently those of a city of the highest antiquity. Some of the stones forming the vestiges of the walls are of very large dimensions, and their arrangement is such as exclusively belongs to the earliest periods. A modern author remarks, that the city on the hill of Aito was situated "upon an isthmus, but in the time of Homer it certainly was known by the name of the island." It has been usually affirmed, however, though without any other grounds than mere conjecture, that Vathi occupies the site of the ancient Ithaca. The foundations yet visible on the hill of Aito, it is supposed, may correspond with the description given of the house of Ulysses, which, from its position, commanded a view of the opposite sides of the island. A second city, supposed Alalcomene, mentioned by Plutarch, is said to have stood between Port Polis and Frichies, on a neck of land, cut as narrow as the isthmus of Aito. Not far from Oxoai, there is a rock called Homer's School, which preserves the vestiges of very ancient masonry, and has had niches, which probably have contained native offerings. When it received this name is unknown; but it is recorded, that several cities having disputed the honour of giving birth to Homer, Adrian consulted an oracle, by which Ithaca was named. The most conspicuous antiquities now extant, are such tombs or sarcophagi as are usually found near the remains of the oldest cities in other parts of the Grecian territories, though so simple and void of ornament, as to preclude any opinion being formed regarding their real æra. Coins and medals also are frequently dug up here, but those having the name of Ithaca itself are rare; and, according to the inhabitants, are found only between the ruins on the hill of Aito and Porto Molo. M. Bosset describes several of these, which he says have evidently been struck in commemoration of Ulysses. Yet, notwithstanding all that has been written regarding Ithaca, the antiquities now extant may belong to a period long posterior to that in which Homer has laid the scenes of his poetry; while they may still be very old. Traditions are not wanting in the island of Ithaca regarding Ulysses, and there are even individuals among the inhabitants, who are believed to be his descendants. East Long. 21° 40′, North Lat. 38° 47′. (*c*)

JUDAISM. See JEWS.

JUDÆA, a district of Asia Minor, which is described both by ancient and modern geographers under a great variety of names, and with great diversities of extent. In the most extensive application of the name, it comprehends the whole country possessed by the Jews, or people of Israel; and included, therefore, very different portions of territory, at different periods of their history. Upon the conquest of the country by Joshua, it was divided into twelve portions, according to the number of the tribes of Israel; and a general view of their respective allotments (though the intermediate boundaries cannot be very precisely ascertained) may convey some idea of its extent at that period. The portion of the tribe of Judah comprised all the country between Edom, or Idumea, on the south, the Mediterranean on the west, the Salt Sea on the east, and an imaginary line on the north, from the northern extremity of the Salt Sea to the Mediterranean.—The portion of Simeon was included within that of Judah, and formed the south-west corner of the country, comprehending the towns of Bersaba, Gerar, Rapha, Gaza, Ascalon, and Azotus.—The portion of Benjamin was situated to the north of Judah, near the centre of the kingdom, bounded on the east by the river Jordan, and containing part of Jerusalem, Jericho, Bethel, Rama, &c.—The portion of Dan lay to the north-west of Judah, between that of Benjamin and the Mediterranean, reaching as far north as the latter, and containing Accaron and Jamnia.—The portion of Ephraim stretched along the northern limits of Dan and Benjamin, between the river Jordan on the east, and the Mediterranean sea on the west, containing Sychem, Joppa, Lydda, Gazara, &c.—The portion of the half tribe of Manasseh was situated north of Ephraim, between the river Jordan and the Mediterranean, reaching as far north as Dora, at the foot of Mount Carmel.—The portion of Issachar stretched northwards from Manasseh, and westwards from Jordan, as far as Mount Tabor.—The portion of Asher comprehended the maritime tract between Mount Carmel, as far as Sidon.—The portion of Zabulon, bounded by Asher on the west, and Mount Tabor on the south, joined, on the east, the portion of Naphtali, which occupied the borders of the lake Gennesareth, or sea of Tiberias.—The portion of Reuben lay to the eastward of the river Jordan, bounded on the south by the torrent of Arnon, and on the north by the river Jabok.—The portion of Gad, also on the east of the Jordan, stretched from the Jabok towards the north, where it was bounded by the other half tribe of Manasseh, which occupied the country east of the lake Gennesareth, to the northern limits of the country. The whole of this extent between Cœle Syria on the north, and Arabia Petrea on the south, the Mediterranean on the west, and Arabia Deserta on the east, may be considered as situated between 31° 10′ and 33° 15′ of north latitude, about 140 miles in length, and nearly 100 in breadth. Reckoning from Dan to Beersheba, which are often mentioned in sacred Scripture as including the more settled and permanent possessions of the Israelites, its length would not exceed 120 miles. But, if estimated from its boundaries in the reigns of David and Solomon, and several succeeding princes, its extent must be enlarged more than three-fold, including both the land of Palestine, or of the Philistines, on the south, and the country of Phœnice on the north, with part of Syria to the north-east. All this extent was originally comprehended in the land of promise, (Gen. xv. 18. Deut. xi. 24.) and was actually possessed by David and Solomon, (1 Kings ix. 20. 2 Chron. viii. 7.) It is described in numerous passages of the sacred writings, as all comprised in the holy land, from Hamath on the north, to the river of Egypt on the south, and from the Great, or Mediterranean sea on the west, to the deserts of Arabia on the east; a tract of country at least 460 miles in length, and more than 100 in breadth.*

After the death of Solomon, when the kingdom of the Hebrews had attained its greatest extent, it was divided, in consequence of a revolt of ten tribes, into two distinct sovereignties, named Israel and Judah; the former of which had its seat of government in Samaria, and the latter in Jerusalem. The territories of both were gradually curtailed and laid waste by the revolt of tributary princes, and the incursions of powerful neighbours; and both were at length completely overthrown, that of Israel by the king of Assyria, about 720 years before Christ; and that of Judah by Nebuchadnezzar, about 114 years later.

After a captivity of 70 years, the Jews, who had been the subjects of Judah, having received permission from Cyrus to return to their native country, they not only occupied the former territories of that kingdom, but extended themselves over great part of what had belonged to the ten tribes of the kingdom of Israel; and then, for the first time, gave the name of Judæa to the whole country over which they had again established their dominion. The same name was given to that kingdom, as possessed by Herod the Great under the Romans; but, in the enumeration of the provinces of the empire, it was recognized only by the name of Palestine. All traces of its ancient division among the twelve tribes were now abolished, and it was distributed into four provinces, viz. Judea Proper in the south, Galilee in the north, Samaria in the centre, and Peræa on the east of the river Jordan.

Judæa Proper, situated in 31° 40′ North Latitude, was bounded on the north by Samaria, on the west by the Mediterranean, on the east by the river Jordan, on the south by Arabia Petrea; and comprised the ancient settlements of Judah, Benjamin, Dan, and Simeon, with Philistæa and Idumea. It is divided by Josephus into eleven toparchies, and by Pliny into ten; but these subdivisions are little noticed by ancient writers, and their boundaries are very imperfectly ascertained. The principal places in the north-east quarter of the province were, Jerusalem the capital, which was entirely destroyed in the reign of Hadrian, and replaced by a new city named Ælia, a little farther north, which is now the site of the modern Jerusalem; Jericho, the city of palm trees, about 19 miles eastward of Jerusalem, and eight from the river Jordan; Phasælis, built by Herod in memory of his brother, 15 miles north-west of Jericho; Archelais, built by Archelaus, 10 miles north of Jericho; Gophna, 15 miles north of Jerusalem in the road to Sichem; Bethel, 12 miles north of Jerusalem, originally called Luz; Gilgal, about one mile and a half from Jericho; Engeddi, 100 furlongs south south-east of Jericho, near the northern extremity of the Dead Sea; Masada, a strong fortress built by Judas Maccabeus, the last refuge of the Jews after the fall of Jerusalem; Ephraim, a small town westward of Jericho; Anathoth, a Levitical town, nearly four miles north of Jerusalem. In the south-east quarter of the province were situated, Bethlehem or Ephrath, about six miles south from the capital; Bethzur, now St. Philip, a strong place on the road to Hebron, 10 miles south of Jerusalem; Ziph, a small town between Hebron and the Dead Sea; Zoar, at the southern extremity of the Dead Sea, near the situation of Sodom; Hebron, formerly Kirjath-Arba, a very ancient town in a hilly country, 25 miles south of the capital; Arad, about 24 miles southward from Hebron, and near the Ascensus Avrabim, or Scorpion Mountains, on the border of Arabia Petræa; and Thamar, on the southern limit of the province, near the south extremity of the Dead Sea. In the north-west quarter, were Bethshemesh, or Heliopolis, a Levitical city, about ten miles west of the capital; Rama, six miles north from Jerusalem; Emmaus, a village eight miles north north-west from Jerusalem, afterwards called Nicopolis, in consequence of a victory gained by Vespasian over the revolted Jews; Bethoron, a populous Levitical city on the road to Lydda, a few miles north-west of Emmaus; Kirjathjearim, on the road to Joppa, nine miles westward from the capital; Lydda, now Lod, and called by the Greeks Diospolis, about 12 miles east of Joppa; Ramla, supposed to be the same as Arimathea, about five miles south-west of Lydda; Joppa, a maritime town, now Jaffa, about 12 leagues north-west of Jerusalem; Jabne, a walled sea-port town between Joppa and Azotus; and Ekron, a town on the north boundary of the Philistines.—In the south-west quarter of Judæa were, Gath, about 20 miles west from Jerusalem, near to which was the city of Eleutheropolis, a flourishing place in the second century; Makkedah, a strong place, eight miles north-east from Eleutheropolis; Bersabe, or Beersheba, about 26 miles south from Eleutheropolis; Gerar, between Beersheba and the sea coast; Azotus, or Ashdod, to the west of Eleutheropolis, within a few miles of the sea, and the seat of a bishop in the first ages of the Christian church; Ascalon, a considerable maritime town, above 43 miles south-west of Jerusalem; Gaza, 15 miles southward from Ascalon; and Rapnia, between Gaza and Rhinocorura, remarkable for a great battle in its neighbourhood, in which Philopater, king of Egypt, defeated Antiochus, king of Syria.

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* Joshua xv. 2, &c.; xix. 24, &c. 1 Chron. xiii. 5. 2 Chron. vii. 8. Ezek. xlvii. 16, 20. Amos vi. 14

Samaria, lying between Judæa and Galilee, in 3 °15′ north latitude, extended along the sea-coast from Joppa to Dora, and along the river Jordan from the rivulet of Alexandrium to the southern extremity of the sea of Tiberias, comprehending the territory of the tribe of Ephraim, of the half-tribe of Manasseh, and part of Issachar. Its principal cities were, Samaria, the capital of the kingdom of Israel, north of Sichem, and equally distant from Jordan and the sea-coast, afterwards named Sebaste by Herod, in honour of Augustus; Jezrael, or Esdraelon, about four leagues north from Samaria; Sichem, or Sychar, called by the Romans, Neapolis, eight miles south of Samaria, in a valley between the mountains Gerizim and Ebal; Bethsan, called by the Greek writers Scythopolis, about 20 miles north-east of Sichem; Cæsarea of Palestine, anciently called Turris Stratonis, greatly enlarged by Herod, and long the principal city of the province, about 19 leagues north north-west from Jerusalem; Dora, now Tartura, nine miles north from Cæsarea on the road to Tyre; Apollonia, now Arzuf, on the sea-coast, 22 miles south of Cæsarea; and Hadadrimmon, afterwards called Maximianopolis, about 17 miles eastward of Cæsarea.

Galilæa, in 33° north latitude, bounded on the south by Samaria, on the west by the Mediterranean, on the north by Syria, on the east by the river Jordan and the lake Gennezareth, comprehended the possessions of Asher, Naphtali, and Zabulon, with part of the allotment of Issachar. The northern division of the province was thinly inhabited by Jews, and was sometimes called Galilee of the Gentiles; but the southern portion was very populous. Its principal towns were, Capernaum, at the northern extremity of the lake of Gennezareth; Bethsaida, a considerable village a few leagues south of Capernaum; Cinnereth, south of Bethsaida, rebuilt by Herod Antipas, and named Tiberias; Tarichæa, a considerable town at the efflux of the river Jordan from the sea of Tiberias, 30 stadia south from the town of Tiberias; Nazareth, two leagues north-west of Mount-Tabor, and equally distant from the lake of Gennezareth and the sea-coast; Arbela, six miles west of Nazareth; Sepphoris, or Dio-Cæsarea, now Sefouri, a large and well fortified town, about five leagues north north-west of Mount Tabor; Zabulon, a strong and populous place, 60 stadia south-east of Ptolemais; Acre, or Accon, seven miles north from the promontory of Carmel, afterwards enlarged, and called Ptolemais by Ptolemy I. of Egypt, and in the time of the crusades distinguished by the name of Acre, the last city possessed by the christians in Syria, and was taken and destroyed by the Sultan Serapha of Egypt in 1291; Kedes, or Cydissus, a Levitical city at the foot of Mount Panuim, 20 miles south-east of Tyre; Dan, originally Laish, on the north boundary of the Holy Land, about 30 miles south-east of Sidon; Paneas, near to Dan, or according to some, only a different name for the same place, was repaired by Philip, son of Herod the Great, and by him named Cæsarea, in honour of Augustus, with the addition of Philippi, to distinguish it from the other town of the same name in Samaria; Jotapata, the strongest town in Galilee, about four leagues north north-east of Dio-Cæsarea; and Japha and Gischala, two other fortified places in the same district.

Peræa, though the name would denote any extent of country beyond Jordan, is more particularly applied to that district in 32° North Latitude, which formerly composed the territories of Sihon the Ammorhite, and Og, king of Bashan, extending from the river Arnon, (which flows through an extensive plain into the Dead Sea,) to the Mount of Gilead, where the Jordan issues from the sea of Tiberias; and which fell to the lot of the tribes of Reuben and Gad, and the half of Manasseh. This province was about 60 miles from north to south, and 40 from east to west. The principal places were, Penuel, on the left of the Jabbok, which forms the northern border of the country; Succoth, on the banks of the Jordan, a little farther south; Bethabara, a little below Succoth, where was a place of passage over the river; Amathus, afterwards named Assalt, a strong town below the influx of the torrent Jazer; Livias, between Mount Nebo and the northern extremity of the Dead Sea, a town which was so named by Herod, in honour of Livia the wife of Augustus; Machærus, a citadel on a steep rock, south of Livias, near the upper end of the Dead Sea; Lasa, or Calle-rhoe, celebrated for its hot-springs, between Machærus and the river Arnon; Herodium, a fort built by Herod, a few miles farther inland, as a protection against the Moabites; Aroer, a town of Moab, seven leagues east of the Dead Sea; Castra Amonensia, a Roman station, supposed to be the ancient Mephoath, seven leagues north-east of Aroer; Hesbon, or Esbus, the capital of Sihon, anciently famed for its fish-pools, seven leagues east from the Jordan, three from Mount Nebo, and nearly in the centre of the province; Medaba, now El-Belkaa, three leagues south-east of Hesbon; Jazer, or Tira, a Levitical city on a small lake, five leagues north-east of Hesbon. To the south of Peræa lies a territory called Moabites, the capital of which was Rabbath Moab, afterwards named Areopolis; and to the south-west of which was Charac-Moab, or Karak, a fortress on the summit of a hill, at the entrance of a deep valley.

To the north of Peræa were situated several districts, which, as forming part of the kingdom of Judæa under Herod the Great, require to be briefly noticed in this account, and which do properly come under the general name of Peræa, as being situated on the eastward of the river Jordan. These were Galaadites, or Gileadites, in 32° 20′ North Latitude, now Zarca, east from Jordan, and north from the Jabok, containing the cities of Ramoth-Gilead, Mahanaim, Jabesh-Gilead, at the foot of Mount Gilead. Batanæa, anciently Basan, now Bitinia, in 32° 25′ North Latitude, formerly celebrated for its oaks and pastures, was situated to the north of Galaadites, and contained the cities of Adrea or Edrei, Astaroth, and Bathyra.—Gaulonitis, a narrow strip of land between Batanæa, and the shore of the Sea of Tiberias, stretching northward to Mount Hermon, and containing Gamala, a strong town near the southern extremity of the Sea of Tiberias; Argob, between this sea and mount Hippos; Julias, supposed to be the same as Chorazin, and by others to be Bethsaida and Seleucca, a fortified place on the east border of Lacus Samochonitis.—Auranitis, or Ituræa, a mountainous and barren track north of Batanæa, and bounded on the west by a branch of Mount Hermon, contained Bostra or Bozra, about 50 miles east from the sea of Tiberias, bordering on Arabia Petræa, afterwards enlarged by Trajan, and named Trajana Bostra. And Trachonitis, in 33° 15′ North Latitude, between Hermon and Antilibanus, eastward from the sources of Jordan, and containing Baalgad, Mispah, Paneas, or Cæsarea Philippi, and Ænos, nearly 25 miles east of Paneas, and as far south south-west of Damascus. There remains to be noticed the Decapolis, or confederation of ten cities in the last mentioned districts, which having been occupied during the Babylonish captivity by heathen inhabitants, refused to adopt the Mosaic ritual after the restoration of the Jews, and found it necessary to unite their strength against the enterprizes of the Asmonean princes. One of them, namely, Scythopolis, already described in the account of Samaria, was situated to the west of Jordan; but the other nine were all to the east of that river, namely, Gadara, or Kedar, a strong place on a hill, the capital of Peræa in the time of Josephus, about 60 stadia east from the Sea of Tiberias, and much frequented for its hot-baths; Hippos, sometimes called Susitha, 30 stadia north-west of Gadara; Dium, or Dion, of which the situation is unknown, but conjectured by D'Anville to have been about seven leagues eastward from Pella, a considerable town, supplied with copious fountains, on the river Jabok, 14 miles south south-east of Gadara, and celebrated as the place to which the Christians retired, by Divine admonition, before the destruction of Jerusalem; Canatha, south-east of Cæsarea, and between the Jordan and Mount Hermon; Garasa, afterwards Jaras, three leagues north-east from the upper extremity of the Sea of Tiberias, and much noted during the crusades; Rabbath-Ammon, the capital of the Ammonites, south-east of Ramoth, and near the source of the Jabok, on the confines of Arabia, afterwards called Philadelphia by Ptolemy Philadelphus, from whom it had received considerable improvements, of which the ruins are still visible; Abila, four leagues east from Gadara, in a fertile tract between the river Hieromax and Mount Gilead; and Capitolias, a town in Batanæa, five or six leagues east north-east of Gadara.

Several chains of lofty mountains traverse the Holy Land in a longitudinal direction; and the country in general may be denominated hilly. Some of the most celebrated of these ridges are Gilboa, about six miles westward of Scythopolis, in the province of Samaria; Hermon, a group of hills north-west of the same town, which environ the sources of the Jordan; Ephraim, in the south-west corner of the province; Carmel, a woody and fertile ridge of hills, extending southward from Carmel promontory towards Sichem, where it assumes the name of Gerizim; Tabor, an insulated hill, north from the ridge of Hermon, about 15 miles west from the sea of Gennezareth, the summit of which is flat, and about twenty-six stadia in circumference; Scala Tyriorum, the ladder of the Tyrians, the termination of an elevated ridge of mountains along the coast to the north of Ptolemais; Gilead, extending nearly from the southern extremity of the sea of Tiberias, in a south-east direction, towards Arabia, and covered with a species of trees, which yielded a kind of gum, esteemed greatly as a remedy for wounds; Abarim, a mountainous ridge between Jordan and Hesbon, composed of many hills under different names, as Nebo, where Moses died, Pisgah, Peor, &c. But, though the country is mountainous, it is not abundant in streams. A few rivulets water the plains and vallies; but there is only one river that deserves the appellation, namely, the Jordan, or Nahr el-arden, which originates in Mount Hermon, a branch of Antilibanus, about 120 furlongs north of Cæsarea Philippi. Running southward, it flows through the lake Gennezareth, or Sea of Tiberias, and then traversing an extensive plain named Aulon, falls into the southern extremity of the Lacus Asphaltites, or Dead Sea. A few torrents may be mentioned, which flow chiefly during the rainy or winter season, particularly the Kison, which springs from the south side of Mount Tabor, and, after receiving several brooks, traverses the plain of Esdraelon, and falls into a gulf between Mount Carmel and the point of Acre; the Arnon, which flows past the principal city of Moab, in a south-west direction, then, turning north west, falls into the Dead Sea; the Jabok, which, flows in a westerly course into the Jordan, a little below the Sea of Tiberias; the Hieromax, now Yermuk, which passing Gadara, falls into the Sea of Tiberias; and the Cedron, which flows close by the east side of Jerusalem The inland lakes are, Phiala, a small basin near Hermon, which has no perceptible outlet, and has been regarded as the fountain of the Jordan; Lacus Samochonitis, or Merom, now Bahr-el-houbi, at the conflux of the two branches of the Jordan, between Paneas and the lake of Gennezareth, about 60 stadia in length, and 30 in breadth, but greatly contracted in dry seasons; the Sea of Tiberias, or Sea of Galilee, or lake of Gennezareth, about 13 miles in length and five in breadth; and the Lacus Asphaltites, or Dead Sea, now Almotanak, about 70 miles in length and 18 in breadth. (See ASPHALTITES.) For the ancient history of Judæa and its inhabitants, see JEWS; and, for its modern state, see PALESTINE. See D'Anville's *Ancient Geography*, Shaw's *Travels in Barbary*, &c. vol. ii.; Clarke's *Travels*, vol. ii. preface; Well's *Scripture Geography*. (*q*)

IVES, St. or St. Iies, anciently *Pendihas*, is a burgh and sea-port town of England, in the county of Cornwall. It is situated near the north-east angle of St. Ives Bay, in the Bristol Channel; but the harbour is almost choaked up by the shoals of sand driven in by the north-west wind. The town consists principally of one long street, dividing itself into two smaller ones at the south end. The church, which is low, though spacious, has a nave and two ailes; and is often covered with spray in high tides and tempests, from its proximity to the sea. Slate and pilchards are the principal articles which are exported. The pilchards are caught in the bay in large quantities; and when they appear in great shoals, all the inhabitants lend their assistance, and even the church is deserted when they happen to appear on Sunday. The town is governed by a mayor, a recorder, 12 capital, and 24 inferior burgesses. St. Ives sends two members to parliament, and the number of voters is about 180. Whenever any person dies at St. Ives worth ten pounds a year, ten shillings are given to the vicar. There is a good grammar-school here, founded by Charles I. In 1811, the burgh and parish contained

Inhabited houses	712
Families	748
Do. employed in trade and manufactures	144
Males	1532
Females	1749
Total population	3281

See the *Beauties of England and Wales*, vol. ii. p. 501; and Polywhele's *History of Cornwall*.

IVES, St. is a market town of England, in the county of Huntingdon, and is said to derive its name from *Ivo*, a Persian bishop, who preached here about the year 600; and to whose memory the monks of Ramsey founded at St. Ives a Benedictine Priory. The town is situated on the river Ouse, over which there is a handsome stone bridge, with four pointed and two semicircular arches. There are three principal streets irregularly arranged; and though the town is modern, there are no buildings deserving of notice. The parish church is a tolerably neat structure: it consists of a nave, chancel, and ailes, and has a handsome tower, with a spire. The spire of this church has been twice blown down. The Baptists have two places of worship here, and the Presbyterians and Quakers one each. Several breweries and malt kilns have been established. The inhabitants are chiefly employed in agriculture. In 1811, the town and parish of St. Ives contained

Inhabited houses	474
Families	507
Do. employed in trade and manufactures .	237
Males	1203

Females	1224
Total population	2426

See the *Beauties of England and Wales*, vol. vii. p. 479.

JUGGERNAUTH, or JUGGUNNATHA. (*Jagatnat'ha*, the Lord of the World.) A celebrated place of Hindoo worship, in the district of Cuttack, on the sea-coast of Orissa. It is situated in North Latitude 19° 49′; and east Longitude 86° 5′; and stands close to the sea shore, a few miles north-east of the Chilkalake, and immediately adjacent to the town of Pursottom. The town and temple are encompassed with low sand hills; and the surrounding country is extremely sterile. The pagoda itself is a shapeless mass, and is no way remarkable, except as an object of Hindoo veneration. The idol is a carved block of wood, with a frightful visage, painted black, and a distended mouth of a bloody colour. He is dressed in gorgeous apparel; and his appellation is one of the numerous names of Vishnu, the preserving power of the universe, according to the theology of the Brahmins. On festival days, the throne of the idol is placed upon a stupendous moveable tower, about 60 feet high, resting on wheels, which indent the ground deeply as they turn slowly under the ponderous machine. He is accompanied by two other idols, his brother Balaram, and his sister Shubudra, of a white and yellow colour, each on a separate tower, and sitting upon thrones of nearly an equal height. Attached to the principal tower are six ropes, of the length and size of a ship's cable, by which the people draw it along. The priests and attendants are stationed around the throne on the car; and occasionally address the worshippers in libidinous songs and gestures. Both the walls of the temple and the sides of the car are covered with the most indecent emblems, in large and durable sculpture. Obscenity and blood are the characteristics of the idol's worship. As the tower moves along, devotees, throwing themselves under the wheels, are crushed to death; and such acts are hailed with the acclamations of the multitude as the most acceptable sacrifices. A body of prostitutes are maintained in the temple for the use of the worshippers; and various other systematic indecencies, which will not admit of description, form a part of the service. A number of sacred bulls are kept in the place, which are generally fed with vegetables from the hands of the pilgrims; but, from the scarcity of vegetation, are commonly seen walking about, and eating the fresh ordure of the worshipping crowds. In the temple, also, is preserved a bone of Krishna, which is considered as a most venerable and precious relic, and which few persons are allowed to see.

This temple of Juggernauth is esteemed the most sacred of all the religious establishments of the Hindoos; and the concourse of pilgrims by whom it is annually visited is immense, particularly in March, when the Dole Jattrah takes place, and in July, when the Ruth Jattrah is celebrated. The natives themselves, when speaking of the numbers present at these festivals, usually say, that a lack of people (100,000) would not be missed. Dr. Carey is of opinion, that, on the lowest calculation, 1,200,000 attend every year, of whom an incredible proportion, (some suppose nine out of ten,) die by the way, from want, fatigue, or disease. One fact is certain, that at 50 miles distance, the approach to the spot is known by the quantity of human bones which are strewed by the way. Many old people take the journey on purpose to die within the sacred precincts. The sand plains around the town are in some places whitened with the bones of the pilgrims; and there is a spot at a little distance, called by the Europeans Golgotha, where the dead bodies are usually cast forth, and where dogs and vultures are seen continually feeding upon them. Multitudes are crushed to death by the pressure of the crowd; and at one time, as mentioned by some of the missionaries who were present, 150 were killed around the temple gate. The vicinity of the sea, and the arid nature of the soil, contribute to prevent the contagion which might otherwise be produced by such a number of putrid carcases.

A considerable revenue arises from the tax paid by the pilgrims; which, after defraying the expences of the temple, goes to the government. In 1734, the Rajah of Pursottom carried away the idol Juggernauth beyond the boundaries of Orissa, and placed it upon a mountain, and thus caused a loss in the revenue of the provinces, of nine lacks of rupees per annum. In 1803, when the province was wrested from the Mahrattas by the British, they succeeded to all the rights of the preceding sovereign, and consequently to the revenue derived from the resort of pilgrims to Juggernauth, but the tax was never levied during the administration of the Marquis of Wellesley; and it was not till after his departure from India, in 1806, that a law was made by the supreme Council of Bengal for regulating the management of the temple, and the taxation of the pilgrims. The sum realized, during the first year, amounted to 117,490 sicca rupees; and the annual expenditure for the support of the worship, is computed at 56,000, to provide for which, besides established endowments, consisting of lands and villages, an allowance of 20 per cent. on the net receipts from the tax is granted by the British government. In 1809, the superintendence of the temple, and the controul of the priests, were vested in the Rajah of Khoordah, who was directed to follow the recorded rules of the institution, or the ancient established usage. Various sects of devotees and religious persons are, by long custom, exempted from the payment of the tax; and likewise all the inhabitants who have been born, or have resided with their families for the space of ten years within the district of Cuttack, between the rivers Byturnee and Ganjam, which is the holy land of Juggernauth. All pilgrims, also, in a state of actual poverty, or declaring their condition according to certain ceremonies, are allowed access to the temple for three days; and all the individuals who carry water from the Ganges to pour it over the idol, or who have resorted to the town of Juggernauthpoor for purposes of trade, escape the tax. Those who are liable to the assessment are arranged in four classes; and all, who are entitled to visit the interior of the temple, are at liberty to enrol themselves in the class which they prefer, upon paying the prescribed rate of tax. The first, called the Laul Jattries, upon paying ten rupees if they come from the north, and six if from the south, have free access to the temple for thirty days. The second, called the Neem Lauls, upon paying five rupees if from the north, and three if from the south, have access for ten days. The third, called the Bhurrungs, upon paying two rupees, whether from the north or south, have access during four days. The fourth, the Punj Tirthees, comprehending the low castes, are not allowed to enter the temple; but, upon paying two rupees, are permitted to perform the customary ceremonies on the outside for sixteen days. In order to prevent persons from eluding payment by a clandestine or forcible entrance, a strong barrier is constructed of prickly bamboos; and a guard of soldiers is placed at the gates, to exclude every passenger, except those who duly pay the tax. At times, however, when a large body happens to collect, they attempt to force their way; and a crowd, merely of women, children, and old men, trusting to the physical weight of their mass, have been known to make a charge on the armed guard, who are seldom willing on such occasions to oppose their bayonets. Both for the accommodation of these numerous travellers, and also in a military point of view, a road from Calcutta in the direction of Juggernauth had long been an object highly desirable. In 1810, Rajah Sookmoy Roy, an opulent Hindoo inhabitant of Calcutta, offered to contribute one and a half lack of rupees (16,000*l.*) towards the accomplishment of this object, on condition that the road, when completed, should bear his name; and though he himself died soon after the payment of the money into the treasury, the undertaking has been prosecuted in conjunction with his heirs. Juggernauth is 311 miles distant from Calcutta, 500 from Nagpoor, 512 from Benares, 719 from Madras, 910 from Delhi, and 1052 from Bombay. See Campbell's *Journey over land to India*; Buchanan's *Christian Researches*; Rennel's *Memoirs of a Map of Hindostan*; *Christian Observer*, vol. xii.; *Baptist Missionary Periodical Accounts*, No. xxiii.; and Hamilton's *East India Gazetteer*. (*g*)

JUGURTHA, a celebrated Numidian Prince, was the grandson of Masinissa, the faithful African ally of the Roman people, and appears to have been born about 152 years before the Christian æra, and 600 after the building of Rome. He was the illegitimate son of Manastabal, the youngest son of Masinissa; and, after his father's death, was educated in the family of his uncle Micipsa, king of Numidia. He was handsome in his person, endowed with great bodily strength, and superior to all his companions in every athletic and military exercise. He was possessed also of great natural talents, and by his gallant, yet modest, demeanour, rendered himself greatly beloved in his younger years. He was highly honoured at first by his uncle Micipsa, as promising to prove an ornament to his kingdom; but became at length an object of his dislike, as too dangerous a rival to his own sons in the affections of the Numidian people. In this apprehension, the king was desirous to put him privately to death, had he not been afraid that such an act might excite a sedition among his subjects; and therefore contented himself with sending his nephew to command the Numidian auxiliaries in the Roman army, in the hope of his falling by the chance of war, and his own adventurous spirit. But this measure, devised for the destruction of Jugurtha, contributed to advance his reputation and influence. By his ability in council, his courage in battle, his strict obedience to order, and his success in every enterprize, he acquired the esteem of the Roman army, and returned to Micipsa with a high recommendation from the general under whom he had served, the younger Scipio Africanus. Micipsa, thus finding his former scheme less practicable than before, applied himself rather to gain the affections of his nephew, and to secure him as the friend and protector of his children. In this view he adopted him into his family, and left him, by his will, joint heir in the kingdom with his two sons, Adherbal and Hiempsal. The latter of these, soon after the old king's death, expressed so openly his contempt of Jugurtha, and his displeasure on account of his being associated in the kingdom, that the most bitter enmity was excited between them, which speedily led to the death of Hiempsal, who, according to Sallust, was secretly assassinated by order of Jugurtha; but, according to the epitome of Livy, was vanquished and slain in battle. A civil war between Jugurtha and Adherbal was the consequnce of this event; but the latter was soon obliged to yield in the struggle, and fled for protection and justice to Rome. Jugurtha, well acquainted with the venal character of the Roman senators, easily succeeded, by ample presents of money, in procuring a division of Numidia between himself and Adherbal, and in securing farther the best of its provinces for his share. Confident, from this success, that he should find ways and means to avert any serious interposition from Rome, he resolved to render himself sole master of the kingdom; and, having put himself at the head of his army, compelled Adherbal, in a few days, to shut himself up in the town of Certa. By his former arts, he contrived to prevent any actual interference from Rome till he got the unfortunate Adherbal into his hands, whom he instantly put to death by means of torture. A Roman army was forthwith dispatched to Africa, with orders to bring the perfidious Numidian, to answer for his conduct before the majesty of the Roman people; but Jugurtha experienced little difficulty in rendering both the commissioners of the senate, and the commanders of the troops, favourable to his cause. Repairing afterwards to Rome, upon the assurance of safety to his person, and in obedience to a requisition from the senate, he found occasion for all his intrigues to prevent the kingdom of Numidia from being transferred to Massiva, another nephew of Micipsa; and, when all other means were likely to fail, he took care to have his rival removed by assassination. Permitted to leave Italy, in consequence of the safe conduct which had been promised, he was followed into Africa by the Consul Albinus, whose brother, Aulus, having been entrusted with the command of the army, he artfully circumvented, in such a manner as to force him to conclude an ignominious treaty of peace, and to pass his soldiers under the yoke. The celebrated Roman commanders, Metellus and Marius, were successively employed against him; but, for the space of three years, he baffled all their exertions, after reducing their armies to the greatest extremities, and returning more formidable after every defeat, proving himself their equal in military valour and skill, while they were not much his inferiors in duplicity and barbarity. When his Numidian adherents had either perished in his service, or deserted his interests, he still made head against the Roman legions, by assembling under his command the savage tribes of Gætulia, with a few auxiliaries from Mauritania. Even at the last, he was betrayed by his allies, rather than conquered by his enemies. Having been invited by his father-in-law, and confederate in arms, Borchus of Mauritania, to join with him in a friendly conference with the Roman generals, and having come unarmed, according to agreement, his attendants were basely massacred in cold blood, and he himself delivered up bound into the hands of his implacable enemies. Being carried to Rome, he and his two sons were led through the city in chains, at the triumph decreed to Marius for the conquest of Numidia; and, after the conclusion of the procession, was thrown into a dungeon, where he was starved to death. See Sallust's *Jugurthine War*; *Epitome of* Livy, book lxvii.; Plutarch's *Lives of Marius and Sylla*; and Florus' *History of Rome*, book ii. (*g*)

IVICA is an island of the Mediterranean, under the dominion of Spain, the largest of those denominated the *Pityusæ*, a name of doubtful etymology, derived by some of the ancients from their abounding in pines, and by others from certain earthen vessels fabricated by the inhabitants. Ivica lies 16 leagues from the promontory of Denia, the nearest part of the Spanish coast, and is separated by a channel above two miles wide from the island of Formentera. It extends seven leagues in length by 3½ in breadth, and has two harbours, one known by the same appellation on the south-east, and St. Anthony on the north-west. The climate is mild and salubrious, the cold always very moderate in winter, while the summer heat is tempered by breezes from the sea. No venomous animal is found in the island.

Ivica is in general high and mountainous, and bordered almost around its whole extent by precipitous rocks. The coast sinks so rapidly, that, within a mile of the shore, the depth of water is twenty or thirty fathoms. On the south-west it declines more gradually, but on the north the sea is very deep. Fertile vallies of agreeable appearance are interspersed among the hills, and the soil requires nothing but the industry of man to render it productive. The hand of nature does every thing here. Grain of different kinds is easily obtained: abundance of olives, grapes, almonds, and water-melons of superior quality, grow either wild, or almost entirely without cultivation; and the excellence of the figs was celebrated so long ago as the time of Pliny. But the richest parts of the ground remain unoccupied: no more grain is raised than what is absolutely requisite for the necessities of the inhabitants, who are swayed to a surprising extent by prejudices. Agriculture is therefore very far behind. Oil and wine are so negligently made, that not above half the advantage results that should be derived from the fruits employed. The inhabitants have even threatened the safety of persons, more experienced and liberal than themselves, who were desirous of introducing improvement. Game is plentiful, and the ordinary domesticated animals are common.

The inhabitants are for the most part of middle size, tawny complexion, and endowed with much personal activity. They are of a mild disposition, though possessing distinguished courage when it is roused, as has been seen in their conflicts with the Barbary corsairs. But they are exceedingly indolent, and testify an extraordinary aversion to labour. One of the governors of Ivica endeavoured to cultivate mulberries, and to introduce the breeding of the silk-worm. The experiment succeeded, and some very fine and beautiful silk was obtained. But this new and productive source of benefit was soon lost by the extreme apathy of the inhabitants. They speak a jargon of the Spanish language with a guttural accent; and the dialect of the women is almost unintelligible.

Nothing remarkable appears in the costume of these people, except that the female islanders are partial to yellow. They likewise entertain a remarkable predilection for their hair, which is preserved to an astonishing length; and, not content with this profusion, it is far from uncommon for women in the country to wear a cow's tail in addition to their natural tresses.

Though little attention be paid to agriculture, the industry of the Ivicans is somewhat excited by the fisheries and the collection of salt. They are very expert seamen, and about 60 vessels of different sizes are to be seen in the principal port. Various kinds of fisheries are practised, and diversified according to the seasons, and the presence of the particular species of fish. In winter there is both net-fishing on the coast, and the deep-sea fishery with lines. The chief capture of the former is a small fish, not highly esteemed, the *sparus smarus* of ichthyologists, but in such quantities as to employ one-half the fishermen, and afford a very seasonable supply of food. The deep-sea fishery is conducted at the depth of about 100 fathoms, and obtains greater variety. In summer, nets are stretched to the island of Formentera, for the capture of one species, and in autumn for that of another, called *lampuga*, which is in vast abundance. Part of the fish thus taken is salted, and some exported, but not enough to balance the import of salted cod, considerable quantities of which are consumed in the island.

Many hundreds of the islanders are occupied during August in collecting salt, produced by evaporation from ponds or marshes, which is carried in loads by mules to the coast, where it is taken in by foreign vessels. It is almost the sole export, together with a little wool; for the exportation of grain, fruit, and oil, though the principal natural products of the island, is injudiciously prohibited by government. The inhabitants, therefore, want every stimulus to exertion. They seek no more from agriculture, than to satisfy their exigencies; and bad seasons expose them to famine, while every superabundance of harvest is allowed to rot in the granaries. All the arts practised by them also are restricted to what necessity demands, and their main object is shelter. Their costume is rude, and their dwellings void of ornament. In traversing the island, a stranger would believe himself transported to a country where civilization is in an early stage. Except in the immediate neighbourhood of the villages, or leading to different ports where the salt is embarked, the roads are scarcely passable.

The island is partitioned into five districts: 1. The Plain of the City; 2. St. Eulalia; 3. Balanzat; 4. Pormany; and, 5. The Salines. The first is the most important, and contains the town of Ivica, which consists of about 200 houses, together with a cathedral, six churches, a convent, and barracks for troops. It is commanded by a small fortress, occupying an eminence on the coast, to the east of which are the suburbs, consisting of 420 houses. The total population of the place amounts to about 2600 or 2700 persons. This town is the seat of a governor, and was formerly a bishop's see. Its port is spacious and convenient, and sheltered from all sides: but although presenting good anchorage at present, it is gradually choking up with the ballast discharged by the vessels coming hither to load with salt. Historians ascribe the foundation of the town to the Phœnicians, between six and seven centuries before Christ, and it is supposed to have been formerly more extensive. The fortress was erected by Charles V. of Spain, and repaired by Ferdinand VI. Nothing of particular consequence is exhibited by the rest of the districts: that of Salines derives its name from the salt which is collected from it. There is a regular body of militia here, each district affording a quota, which altogether amounts to 1650 men. The island contains 2570 houses, and its total population is about 10,850 souls.

The history of Ivica does not afford matter of peculiar interest. It was anciently called Ebusœ, and from hence the Carthaginians, long before the Christian æra, attempted the conquest of other islands in the Mediterranean. It was reduced by the Spaniards in 1234; and at a much later period, namely 1706, it surrendered to the British fleet, commanded by Sir John Leake. Ivica has generally followed the fortunes of Majorca and Minorca, which have sometimes been captured by the naval force predominant in the Mediterranean. The position of the castle is in East Long. 1° 29′ 12″. North Lat. 38° 53′ 16″. (*c*)

JULIAN, the Roman Emperor, usually called the Apostate, was the younger son of Constantius, the brother of Constantine the Great, and was born at Constantinople on the 6th of November, A. D. 331. After the death of Constantine, in 337, Julian and his brother Gallus were with difficulty saved (by the care of Mark, bishop of Arethusa,) from the massacre of their family; and were afterwards spared through the policy or pity of their uncle Constantius, who had succeeded to the empire. As soon as the growing years of these unhappy youths excited the jealousy of the emperor, they were secured in the strong castle of Macellum, near Cæsarea, where they were carefully educated under the best masters, and attended with all the honours of young princes. Their religious education was directed by Eusebius, bishop of Nicomedia, who was related to his pupils on the side of their mother; and, till Julian reached the twentieth year of his age, he prosecuted the studies rather of an ecclesiastic than of an emperor. He was actually admitted to the inferior offices of the priesthood, and publicly read the Holy Scriptures in the church of Nicomedia. But he seems to have early associated in his mind the Christian principles in which he was instructed with the state of subjection in which he was held; and manifested, on various occasions, a strong predilection for the religion, as well as the literature, of the Greeks. After the exaltation of his brother, Gallus, to the dignity of Cæsar, he was left more at liberty to gratify his own inclinations; and the crowd of sophists, who were attracted by his taste and liberality, soon succeeded in completing his conversion to the tenets of polytheism. In the twentieth year of his age, he was secretly initiated in all the mysteries of paganism; and, with all the enthusiasm of a new proselyte, already anticipated the revival of the ancient religion of the empire. Suspected by the emperor of having participated in the disaffection of his brother Gallus, he was in great danger of sharing the same fate; and having been conveyed as a prisoner to Milan, he was kept for the space of seven months in daily apprehension of an ignominious death; but, by the earnest intercession of the Empress Eusebia, he was restored to liberty, and permitted to pursue his studies at Athens. Soon afterwards, by the same friendly influence, he was invested with the title of Cæsar, espoused to Helena, the sister of Constantius, and appointed to the government of the countries beyond the Alps, in the 25th year of his age. In this command, though hitherto a stranger to arms, he displayed all the qualities of an experienced soldier; and, by a succession of signal victories, completely checked the inroads of the barbarians in the west. Constantius, jealous of the reputation, and desirous to reduce the strength of so formidable a rival, required the legions of Gaul to join the expedition, which he was himself engaged in conducting against the Persians. These troops, reluctant to leave their own country in a defenceless state, or perhaps stimulated by the adherents of their leader, broke out into open mutiny, refused to march, and proclaimed Julian their emperor, in the 29th year of his age. The philosophical general long professed the most determined opposition to the offered sovereignty; but his pretending to yield at last, in consequence of having been solicited by the genius of the empire, and encouraged by a sign from Jupiter, sufficiently proves the fraud or the fanaticism of his conduct. Constantius, having indignantly rejected all the explanations and proposals of Julian as his colleague in the empire, the latter made a resolute and rapid march into Illyricum, where, by the sudden death of his rival, he was left sole emperor of the Roman world about the end of the year 361. As soon as he saw himself in full possession of the sovereignty, he threw off all his former disguises, and openly professed himself the votary and high pontiff of the Pagan divinities. But, while he established the ancient worship as the religion of the state, he proclaimed a free toleration to the Christians, and recalled those who had been banished by the Arian counsels of his predecessor. With all this show of philosophical moderation, he soon evinced his ardent aim to accomplish the entire subversion of the Christian faith, and the complete restoration of the rites of polytheism. He applied himself, amidst all the hurry of his preparations for the Persian war, to vindicate his preference of paganism by writing a refutation of Christianity; commanded many of the treatises in defence of the Gospel to be destroyed; excluded its adherents from all offices in the service of the state; prohibited them from teaching in the public schools; required, by a public edict, that they should no longer be called Christians, but Galileans; connived at the fury of the populace, and the brutality of his governors, who kindled in many provinces the flames of persecution; and dismissed the complaints of the oppressed accusants with the scoffing remark, that their religion required them to suffer without retaliation or repining. With a view to shake the fundamental evidences of the Christian revelation, by convicting its prophecies of error, he attempted to re-assemble the Jews, and to rebuild their temple—a scheme which (according to the testimony of many contemporary writers, and even of the heathen historian and friend of Julian, Ammianus Marcellinus,) was miraculously defeated by eruptions of fire-balls from the foundation. Other Christian writers, however, of that age, and particularly Jerome, who lived in the vicinity of Jerusalem, are entirely silent on the subject; and it must still be regarded as a doubtful point, whether any such supernatural event took place. Nor is there any necessity, on the part of the Christian, to establish a specific miracle in the case. Julian's avowed designs in favour of the Jewish people were rendered abortive; and whether by a miraculous interposition defeating the execution of them, or by other events preventing them from ever being attempted, is of little consequence in the argument. By whatever causes, natural or supernatural, the predicted desolation of the Jewish people and temple has, in the course of providence, been perfectly fulfilled, and stands to this day a plain and incontrovertible point of fact. But the schemes of the emperor for the revival of paganism proving less efficacious than his expectations and his flatterers had promised, he threatened to adopt more decisive measures, after he should return from the Persian expedition, which he had resolved to conduct in person. After residing eight months at Constantinople, and about the same space of time at Antioch in Syria, where he completed his military preparations, he proceeded with the greatest ardour against the Persians; but, pushing his advances into the hostile country with greater courage than caution, he was at length compelled to retreat upon his reinforcements. Harassed on all sides by the pursuing army, he was often called upon to animate his fainting troops by his personal exertions. Having, in one of these hasty skirmishes, entered the field without his cuirass, he was pierced by a dart; and, being carried to his tent, very calmly breathed his last in the midst of philosophical discussions with his friends, and ostentatious assertions of his own virtues. He died on the 26th of June, 383, in the 32d year of his age, after reigning as sole emperor about 20 months.

The character of Julian has been very variously represented, but certainly possesses none of that extraordinary merit with which some writers have invested it. He was remarkable for the most rigid temperance, and exemplary chastity; for the mildness and clemency of his general conduct, and, at the same time, for his undaunted military courage; for his love of learning and application to study, amidst the utmost attention to public affairs; for his taste and facility in literary composition, and his intimate acquaintance with the enthusiastic tenets of the modern Platonic philosophy. But numerous facts in his private history, resting on the testimony of his warmest admirers, and even of his own writings, prove him to have been a stranger to true philosophy, and even to have been a slave to the rankest fanaticism. He boasts, with all the affectation of Diogenes, of his contempt for personal cleanliness, the length of his nails, the inky blackness of his hands, and the vermin of his shaggy beard. He was a vain and incessant talker, and fond, even to puerility, of popular applause. He was an ardent votary of the art of magic, and chose even his ministers of state by divination. He was addicted to the most abject practices of the grossest superstition, not only multiplying sacrifices to a degree which burdened the revenues of the empire, but mingling publicly in the temples with the licentious crowd of priests and female dancers, bringing the wood, blowing the fire, handling the knife, slaughtering the victim, thrusting his bloody hands into the bowels of the expiring animal, drawing forth the heart or liver, and earnestly reading the imaginary signs of future events. Nor was all this the mere effect of policy to recommend ancient rites, but actual belief and delight in the senseless ceremonials; for he observed, in private, numerous fasts and rites in honour of the gods and goddesses, with whom he maintained a perpetual intercourse, fancying (we use the words of Gibbon) "that they descended on earth to enjoy his conversation; that they gently interrupted his slumbers, by touching his hand or hair; that they warned him of every impending danger; and conducted him, by their infallible wisdom, in every action of his life; and that he had acquired such an intimate knowledge of his heavenly guests, as readily to distinguish the voice of Jupiter from that of Minerva, and the form of Apollo from the figure of Hercules." His philosophy was little better than fanaticism, and his genius at times bordered on lunacy; but he was, nevertheless, (with the exception of his measures against the Christians,) a good and wise emperor; and there was, in his character, to use the words of Fleury, "such a mixture of good and bad qualities, that it is easy to praise and blame him, at the same time without deviating from the truth." His works consist chiefly of a satire against the city of Antioch, entitled *Misopogon,* his treatise against the Christian Revelation, epistles, and several orations or discourses. An edition of them in Greek and Latin was published by Spanheim, in two vols. fol. in 1696; and an English translation, with copious notes from different authors, in two vols. 8vo. by the Rev. John Duncombe, in 1784. See Mosheim's *Church History,* vol. i.; Lardner's *Jewish and Heathen Testimonies;* Gibbon's *Roman History,* vol. iv.; *La Vie de Julien,* par l'Abbe Bleterie; and, *The Life and Character of Julian, illustrated in Seven Dissertations,* by Des Voeux, &c. (*q*)

JULIER, is the name of a lofty mountain, situated in the Grisons, in the northern chain of the Alps of the Engadine, or valley of the Inn. The passage over this mountain is accomplished in three hours; and as there are neither precipices nor avalanches, it is extremely safe and easy. At the highest point of the passage is an ancient monument, called the Julian Columns, which are columns four feet high, and made of the rough granite of which the mountain is composed. They are supposed to have formed part of an altar on which the ancient Celtic inhabitants had been accustomed to sacrifice a boar to the sun, whom they worshipped under the name of Thor. On the Julier, the granite passes to true sienite. On the northern side of the mountain, there is a fine formation of greenish black serpentine which shelves along the top of the ridge to Septimer. Mines of iron seem to have been formerly wrought in this mountain by the Counts Gelses of Altdorf.

JUMNA. See India, vol. xii. p. 62.

JUNGFRAU, *or the Virgin,* is a stupendous mountain of Switzerland, in the northern chain of the Alps, which, by the trigonometrical measurements of M. Tralles, is found to be elevated 12,872 feet above the level of the sea. This mountain, however, is only the seventh in respect to altitude among the Alpine ranges, being exceeded by Mont Blanc, Mont Roter, Ortelen, Cervin, Finster-Aarhorn, and the Col de Laniere. It rises from the valley of Lauterbrunnen, which extends about five leagues in length, by about only a quarter of a league in breadth, in the canton of Berne, and receives a number of torrents from the surrounding rocks, whence its name is supposed to be derived. But this valley owes its chief celebrity to the cascade of Staubach, precipitated from heights of 800 feet, opposite to which is the Jungfrau, rearing its summit 10,422 feet above the village of Lauterbrunnnen. It is only from certain positions, however, that the appearance of this enormous mass can be properly contemplated; when immense glaciers are seen branching out into the vallies and the gorges of the mountains, but principally on the side of the Valais, where that of Aletsch descends, along a line of eight or nine leagues, nearly reaching the Rhone. The Jungfrau is surrounded on all sides by frightful rocks and precipices; and its summit, which is completely hemispherical, is covered with perpetual snow. Almost in its centre terminate the crests of the three mountains of the Valais, of Lauterbrunnen, and Grindelwald. As the base of the Jungfrau exhibits calcareous strata, it is conjectured that they are continued to the summit. The debris washed down from the heights are calcareous, among which petrifactions are sometimes discovered. The calcareous formation rests on the primitive rock, and the disposition of the strata may be seen in a cleft, where, although the highest surface of the primitive rock, and the calcareous beds resting upon it, are inclined to the north, the primitive strata are perfectly vertical, or slightly inclined to the south; but this can be recognized only in the most obvious sections. Several caverns penetrate the base, of which that called Korbaline is the most remarkable. The view of the Cime, or top, of the Jungfrau is particularly grand, when the traveller approaches it, in ascending the valley of Lauterbrunnen. There is perhaps no mountain in the world that presents so magnificent an outline.

Some of the most lofty Alpine mountains have been ascended by enterprising travellers; but the difficulties by which the Jungfrau was every where environed, were long supposed to render it inaccessible. Two brothers named Meyer, however, lately resolved on the attempt; and having made the necessary preparations, in procuring guides, attendants, a ladder and ropes, left Aarau on the 29th of July, 1811, and passed the valley of Lætschen. After a long ascent, they spent the first night on the place where the glacier of Lætschen joins that of Aletsch. Here, amidst the most barren rocks, some insects of the genus *podura* were seen under the stones upon the snow. The following day they made various Alpine discoveries in the union and position of different glaciers, but the reflection of the snow was such as rendered it necessary to hang a black veil before their eyes. Their attendants becoming alarmed at the difficulties of the ascent, they were dismissed, and the adventurers passed a second night on the ice. Next morning they resumed their exertions, and after a painful journey, guided by the direction of a wreath of snow, they at length gained the summit. The heavens now appeared of a deep azure, pure and cloudless; and none of those painful sensations described by Saussure and others, were felt by the Messrs. Meyer. They elevated a black flag on the summit, and descended the mountain in safety. (*c*)

JUNIUS, *Letters of,* a series of political letters which appeared in Woodfall's *Public Advertiser,* from the year 1769 to 1772. These Letters,—written in a style at once vigorous and classical, displaying an extensive and minute acquaintance with the measures of government, and the character and conduct of the politicians of that day, distinguished by force of argument, eloquent declamation, and powerful invective, and by a zealous and steady assertion of popular rights—attracted a great degree of attention at the period of their appearance; and, having been frequently reprinted in a collective form, have been stamped with a character of celebrity which no similar productions, perhaps, have ever attained. The interest, too, which these popular philippics have excited in the public mind, has been kept alive, and greatly strengthened, by the impenetrable cloud of mystery which still continues to envelope their anonymous author. When we consider all the circumstances, indeed, this mystery must appear to be a very singular fact in literary history. The unprecedented boldness with which this invisible author assailed the most exalted characters in the state; the freedom and the poignancy of his personal sarcasms, together with the early popularity of those papers which appeared under his fictitious signature, must necessarily have exposed him to the hatred and resentment of rank and power; and it is natural to suppose, that the ingenuity of multitudes must have been employed to discover his haunts, and to drag him into light. But Junius contrived to baffle all the efforts of his contemporaries to penetrate his obscurity. The same motives for the prosecution of this inquiry no longer exist; but an irresistible curiosity has prompted many ingenious men to attempt to unravel the mystery, hitherto, we think, without success. Nearly half a century has elapsed since the publication of these celebrated Letters; every witness whose evidence could be supposed capable of throwing light on this subject, has been examined; printer's repositories have been ransacked; specimens of hand-writing have been produced and compared; ingenuity has been exhausted in the discovery of probabilities, and the deduction of moral certainties; yet, all is conjecture, more or less plausible; and no one can with justice boast, that he has succeeded in detecting Junius.

These Letters have been too long before the public, and their style and character are too well known, to render it necessary for us to enter into any critical disquisition on their merit. We shall, therefore, only attempt to present our readers with a summary account of the various hypotheses which have been entertained with regard to the probable author of these celebrated papers; not by any means with the view of making way for a new candidate of our own, nor with the hope of bringing the controversy to a satisfactory conclusion; but solely for the purpose of examining the validity of those claims which have been advanced; of pointing out the defects in the evidence brought forward in support of each of the claimants; and, lastly, of ascertaining those requisites which appear to us to be essentially necessary to every future candidate.

There is scarcely a contemporaneous character of note, whose pretensions are not excluded by some obvious contradiction, to whom these celebrated Letters have not, at one time or another, been ascribed; and the confidence with which some of those claims have been maintained, which have since been disproved and abandoned, must induce us to subject every new hypothesis to a rigorous examination.

To those who have attentively perused the Letters of Junius, it must, we think, have appeared, that Junius was a man of a cultivated mind; skilful in the use of his native language, and well versed in the history, laws, and constitution of his country, although not a lawyer by profession. It is pretty evident, also, both from his public letters, and particularly from his private correspondence with his printer, that he was a man of easy and independent, if not affluent circumstances; that he was in habits of confidential intercourse, if not with the members of the cabinet, at least with persons who were intimately familiar with the court; and, consequently, that he had opportunities of becoming acquainted with its secret transactions; and that he had attained such an age, as allowed him to boast, without vanity, of an ample knowledge and experience of the world. From the dates of his various authenticated papers, it is likewise clear that he must have resided almost constantly in London, or its vicinity, during the years 1767, 1768, 1769, 1770, 1771, and part of 1772; for although the first of his series of letters under the signature of Junius appeared in the *Public Advertiser* on Saturday, the 21st of January, 1769; yet it has been ascertained, in the most satisfactory manner, that he carried on a correspondence in that paper, under various other signatures, from the month of April, 1767. The last political letter, under the signature of Junius, was that addressed to Lord Camden, which appeared in the *Public Advertiser* for January 21, 1772; and the last private letter which he is known to have addressed to his printer, Mr. Woodfall, is dated January 19, 1773.

We agree, then, with the author of the Preliminary Essay to Woodfall's edition of the Letters (1812), that the claimant who cannot produce, at least, the characteristics alluded to, is in vain brought forward as the author of the Letters of Junius.

The principal persons to whom the Letters of Junius have been at different times attributed, are the following: Charles Lloyd, a clerk of the treasury, and afterwards a deputy teller of the exchequer; John Roberts, also a clerk in the treasury, and afterwards, successively, private secretary to Mr. Pelham, when chancellor of the exchequer, member of Parliament for Harwich, and commissioner of the Board of Trade; Samuel Dyer; William Gerrard Hamilton; Dr. Butler, late Bishop of Hereford; the Rev. Philip Rosenhagen; Major-General Charles Lee; John Wilkes; Henry Flood; John Dunning, Lord Ashburton; Lord George Sackville; Hugh Macauley Boyd; Mr. Glover, author of *Leonidas*; M. De Lolme; the late Duke of Portland; and Sir Philip Francis.

Of the first nine candidates in the above list, we intend to say nothing, as we consider their pretensions to have been already sufficiently disproved; and shall, therefore, in so far as relates to them, merely refer our curious readers to the works mentioned at the end of this article.

The claims of Dunning, Lord Ashburton, to the honours of Junius, were formerly considered as superior to those of any other candidate. He possessed all the requisite talents, learning, and wit; his age, and rank in life, his political principles, attachments, and antipathies, together with his usual residence, during the period in question, are all in favour of that hypothesis which assumes him as the author. Yet there are one or two circumstances in his situation, which render this hypothesis highly improbable. Dunning was solicitor-general at the time these letters first appeared, and for more than twelve months afterwards; and he cannot therefore be supposed to have been the author of the famous letter to the king. Besides, it is pretty clear, as we have already hinted, both from his public letters, and his private correspondence with Mr. Woodfall, that Junius was not a professional lawyer.

The talents of Lord George Sackville were well known; his political principles made him incline to the same side of the question which Junius espoused; and he was suspected, by Sir William Draper and others, at an early period, of being the real author of Junius. It is very remarkable, too, that from a private letter from Junius to his printer, in which he asserts, that a person of the name of Swinney had called upon Lord Sackville, and taxed him with being Junius to his face; it appears that Junius was in the knowledge of this fact a few hours after it happened. It would seem to follow, therefore, either that Lord George Sackville was Junius, or that Junius, at least, must have been in habits of intimacy with that nobleman. On the other hand, his Lordship is said to have observed, on one occasion, to a friend of his: "I should be proud to be capable of writing as Junius has done; but there are many passages in his letters I should be very sorry to have written." And, moreover, in one of the letters of Junius, Lord George Sackville is roundly accused of want of courage.

Of all the candidates for the celebrity of Junius, there is none whose pretensions have been so obstreperously advanced as those of Hugh Macauley Boyd. This gentleman was born of a respectable family in Ireland, educated at the College of Dublin, and intended for the profession of the law. But, at an early age, he abandoned his legal pursuits; and having come over to London in the year 1766, he addicted himself to politics, and led an unsettled life, which continually involved him in pecuniary difficulties. He is known as the author of *The Freeholder*, which he wrote at Belfast, in the year 1776; of *The Whig*, a series of papers published in the *London Courant*, between November 1779, and March 1780; and the *Indian Observer*, published at Madras in 1793. The chief advocates for the claims of this gentleman are, Mr. Almon, Mr. Campbell, the editor of Boyd's works, and Mr. George Chalmers. We shall endeavour to give a concise statement of the arguments used by the last mentioned gentleman, omitting only such circumstances in the proof, as appear to us to be altogether trivial and inconclusive.

Mr. Woods, the player, who, at the period in question, was an apprentice with Mr. Woodfall, the printer, on seeing the *fac-simile* of Boyd's writing, in the year 1800, said he had no doubt that the hand-writing was the same as that of the letters of Junius. Mr. Almon, in the year 1769, having seen a manuscript letter of Junius, which Mr. Woodfall read at a meeting of Booksellers and printers, he suspected Boyd, and taxed him with being the author. Boyd, it is said, instantly changed colour; and, after a short pause, he said, "the similitude of hand-writing is not a conclusive fact." The evidence of Mrs. Boyd is brought forward to prove, that her husband commenced his correspondence with the Public Advertiser at the end of the year 1768; that he wrote occasionally in the same paper, during the years 1769 and 1770, under the signatures of Lucius and Brutus; that he was at great pains in accustoming himself to disguise his hand-writing; that he sent letters almost every week secretly to the *Public Advertiser*, and sometimes carried packets himself to some penny-post office, or asked her to carry them to Woodfall's letter-box; that he manifested much solicitude to see the letters of Junius, and was continually talking about Junius; that she would often hint to him her suspicion that he was Junius, to which he made no reply. The same lady states, that Mr. Boyd took a house at Ruston-Green, near Harrow, when Junius's controversy with Mr. Horne commenced; that he wrote a great deal while it lasted, and was constantly talking upon the subject. She farther says, that in November 1771, Boyd borrowed from a neighbour at Ruston Green, several law books and state trials, which he read with great attention, for the purpose, as she thinks, of supporting the charge of Junius against Lord Mansfield, which appeared on the 21st of January, 1772; and that about three weeks after the publication of that letter, Boyd went to Ireland. Mrs. Boyd moreover states, that on the very day on which the letters of Junius were republished, with a dedication, preface, and notes, Boyd presented her with a copy of the book; and that, in looking over the pages, she was much struck at seeing some anecdotes of Lord Irnham, Miss Davis, and Mr. Nisbet, one of her guardians, which she had communicated to him in confidence.

A few years after Boyd went to Madras with Lord Macartney, a paragraph appeared in the *General Advertiser*, which plainly alluded to him as the author of Junius. Mrs. Boyd immediately sent a friendly message to the printer, requesting that no more paragraphs alluding to Mr. Boyd might appear in the paper; and, at the same time, she wrote to Boyd, inclosing the paragraph, and urging him, if the imputation was not true, to contradict it without delay. But to this request, although frequently repeated, she never obtained a reply. To these circumstances it is added, that some persons, who were acquainted with Mr. Boyd in India, were of opinion that he was Junius; that Captain Neville, dining with Boyd at Calcutta, heard him say something, when they were both mellow with wine, which convinced him that Boyd was the writer of Junius. And the proof is closed by the evidence of Monsieur Bonnecarrere, to whom Boyd is said to have made a confidential declaration, that he was the real author of Junius' Letters.

Such is the amount of the evidence in favour of Hugh Macauley Boyd. The proofs have been brought forward with great confidence, and stated with much ingenuity; yet to us they still appear inconclusive, on the following grounds.

The evidence with regard to the hand-writing must go for nothing. Mr. Woods speaks from his recollection, at the distance of thirty years. Almon formed a conjecture, from a casual glance at a part of the manuscript of one letter of Junius; but Mr. Woodfall, who was well acquainted with the hand-writing of Boyd as well as of Junius, and had the very best opportunities of comparing them, denied that the Letters of Junius were written by Boyd. Besides, Boyd is said to have disguised his hand; the manuscript, therefore, which Almon saw, must have been written in this disguised hand; yet he is said to have immediately recognised in it the usual hand-writing of Boyd. In fact, upon an inspection of the *fac-similies*, it clearly appears that there is no resemblance at all, but rather the reverse. Boyd's alleged change of colour, and his reply to the accusation of Almon, are little to the purpose. We shall afterwards have occasion to show, and our readers will probably have already perceived, that Boyd was not at all displeased with the imputation.

That Boyd occasionally corresponded with the *Public Advertiser* is well known. But his correspondence commenced, it is said, in the year 1768 or 1769; whereas, the first authenticated letter of the author of Junius, under a different signature, appeared on the 28th of April, 1767, at a period when Boyd had not yet attained his 21st year. Upon a strict examination of dates, also, it would appear, that some of the letters of Junius must have been written during Boyd's visits to Ireland. But Junius must then have been resident in London or its vicinity. There is pretty good evidence, that a letter on the state of parties, published in an Irish paper, under the signature of *Sindercombe*, when Boyd was in Ireland in 1768, was the production of that gentleman. Now, on the 26th Dec. 1772, long after Junius had declined to continue his papers, this *Sindercombe* addressed a card to the *Public Advertiser*, calling upon Junius to renew his correspondence. But upon comparing this card with the private correspondence of Junius with Mr. Woodfall, about the same period, it will be evident that Sindercombe could not be Junius. Moreover, the last public letter of Junius appeared on the 21st of January, 1772; and Mr. Boyd is stated to have gone to Ireland about three weeks after that period. But during this absence of Mr. Boyd, Junius was engaged in an almost daily correspondence with Mr. Woodfall, relative to the new edition of the Letters.

With regard to Junius' knowledge of the story of Lord Irnham, our readers will have no difficulty in conceiving, that Junius might have easily acquired information about this matter, when they reflect on the rapidity with which he received intimation of Swinney's visit to Lord George

Sackville. There are many such instances of early information, both in his public and private letters. Besides, the story in question, although a sort of family secret, was known to several individuals, and might easily have been divulged and propagated. In fact, it had actually been published some years before it appeared in the note to Junius' letter.

We come now to the Indian evidence. There is no doubt, that, by some individuals, Boyd was suspected of being the author of Junius. But mere suspicions and private opinions are of little weight, in a question that must ultimately be decided by real evidence. The information of Captain Neville is much too vague; we are not told what the *something* was which Boyd said when mellow with wine, which produced the particular impression on that gentleman when in the same situation. The evidence of Monsieur Bonnecarière, indeed, is more to the purpose; but we own we are rather suspicious of such declarations as the one alluded to, when we reflect upon the whole conduct of Boyd in regard to his identity with Junius; and especially when we consider, that we have the very same sort of evidence in the claim advanced for General Lee, which has long since been abandoned. If our memory serves us, a similar declaration is also said to have been made by the late Mr. Suett, the player, in favour of his own claim, as the author of Junius.

In addition to the foregoing remarks on the weakness of the evidence in favour of Mr. Boyd's claim, we shall state a few considerations, which, to our minds, render it almost incredible that Boyd should have been the author of Junius. At the period when Junius commenced his correspondence with the *Public Advertiser*, Boyd had not attained his 21st year. Now, although we do not mean to deny that Boyd was a man of considerable ability, we have seen no proofs of such precocious talents and intuitive knowledge, as could have enabled him at that age to contend with the greatest wits, and best informed and most experienced men of the day. Mr. Chalmers is aware of the strength of this objection; but we do not think he has been successful in his attempt to obviate it. He has produced no previous compositions of Boyd, which could lead us to anticipate the future Junius; and the reference to Chatterton proves nothing. It is easy for a youth of ability to seize upon a common topic, to gather the floating chit-chat of the *quid-nuncs* of the day, and to vamp up a composition, abounding in spirited declamation, and pointed invective. But Junius was evidently a writer of a different description. He possessed a knowledge of the world derived from experience; an intimate acquaintance with the leading characters in the state, which could only have been obtained from an intercourse with them; and he must have been in possession of some sources of information, which were not accessible to ordinary scribblers.

Mr. Chalmers, however, has attempted to get rid of this objection in a different way. Being unable to carry Boyd up to the standard of Junius, he has endeavoured to carry Junius down to the level of Boyd. We have not room for any strictures on this branch of his argument. But the productions of both writers are before the public, who are perfectly well qualified to decide upon their respective merits; and we shall have occasion to say a few words upon this subject in the sequel.

There is one very obvious consideration resulting from the situation of Boyd, which appears to us to possess great weight in this question. It is quite evident, as we have already observed, that Junius must have been in easy, if not in affluent circumstances. In one place, he expressly affirms, that his "rank and fortune place him above a common bribe." When Woodfall was involved in a prosecution at the instance of the crown, Junius generously came forward with an offer to indemnify him for any pecuniary loss he might sustain on that account. And with the same spirit, when an edition of the Letters was published under his own correction, he positively declined Woodfall's offer of half the profits, accompanying his refusal with the following remarkable declaration: "As for myself, be assured that I am *far above* all pecuniary views, and no other person, I think, has any claim to share with you. Make the most of it, therefore, and let your views in life be directed to a solid, however moderate independence; without it, no man can be happy, nor even honest." Now, it is notorious, that Boyd was a needy adventurer, constantly involved in pecuniary distress, in consequence of his dissipated habits; and therefore not very likely to refuse the half of the profits resulting from the sale of his own edition of his Letters, repeatedly pressed upon him, and to which he was fairly entitled; much less was he in a situation to offer pecuniary assistance to his bookseller, having been actually compelled, at that very time, to fly to Ireland, through a fear of being arrested for debt, by which he had been long oppressed. It would require very strong evidence to convince us, that any man, in his sound senses, would, in Boyd's situation, have refused a sum of money, the fruit of his own talents and industry, to which he was fairly entitled, and which he might have accepted with honour.

The facts with regard to Boyd, seem to be these. He was from the first an enthusiastic admirer of the style and principles of Junius; a circumstance natural enough, considering his youth. We see, from the evidence of Mrs. Boyd, already referred to, that he was constantly talking about Junius in private; and his public conversation was continually directed to the same topic. In his own political papers, he is perpetually sounding the praises of Junius, and always striving to imitate his manner. Lord Macartney, who was in company with Boyd during a four months passage to India, informs us, that "Mr. Boyd had many splendid passages of Junius by heart, as also of Mr. Burke's parliamentary speeches; and was also a great admirer of Sterne," &c. In short, Junius was Boyd's great standard of political principle, and his model of composition. In his own political lucubrations, there is, as we have already mentioned, a constant and affected, though not always very happy imitation of the style and manner of Junius. In many instances, he copies his sentences *verbatim*, and sometimes blunders sadly through his metaphors. But it is impossible, we think, for a reader of any discrimination, to peruse the papers of both authors, without perceiving the manifest inferiority of Boyd. We do not mean to disparage the talents of this gentleman, or to assert that he could not write well; but we are satisfied, that he never attained the peculiar excellencies of Junius.

Boyd, moreover, seems rather to have courted, than to have been anxious to disclaim the imputation of being the author of Junius; as we may perceive from his ambiguous reply to Almon; and from his silence to his wife, when she mentioned to him her suspicions; although, at the same time, he seems to have used all the means in his power to impress such suspicions upon her mind. And how unlike to this conduct were the apprehensions which the real Junius betrayed in his private letters to Mr. Woodfall!

We shall only further observe, with regard to Mr. Boyd's claim, that it was at once rejected by all those who had the best opportunities of being acquainted with Boyd, and the best means of forming a correct opinion upon the subject. Mr. Woodfall constantly declared his belief, that Boyd was not Junius; and Lord Macartney, who "had frequent opportunities of sounding his depth, and of studying and knowing him well," expresses his opinion in the following words: "I do not say that he was incapable of writing to the full as well as Junius; but, I say, I do not by any means believe, that he was the author of Junius." And this was his lordship's deliberate opinion, after having perused Mr. Chalmers' *Appendix to the Supplemental Apology*.

Having thus discussed the claim of Mr. Macauley Boyd, we shall not detain our readers long with the pretensions of the remaining candidates.

The claim of *Leonidas* Glover was first advanced a few years ago, and is founded chiefly upon a memoir of that author's writing, containing a sort of journal of political transactions, from the year 1742 to 1757. The political principles of Glover are found to coincide pretty nearly with those of Junius; his talents and acquirements were undoubted: he was a man of ample fortune, a member of parliament, a popular man in the city, well acquainted with public characters, public measures, and ministerial intrigue. It is remarkable, too, that he declined taking an ostensible part in politics, just about the time when Junius first attracted public notice. He was well known, and much respected by Mr. Woodfall, the printer; who, in a letter addressed to Junius, says, after requesting instructions how to vote at the next general election, "I have no connections to warp me, nor am I acquainted but with one person who would speak to me on the subject, and that gentleman is, I believe, a true friend to the real good of his country; *I mean Mr. Glover, the author of Leonidas*." To this letter Junius returned no answer. Many other presumptive circumstances might be brought forward in support of this gentleman's claim; but as there is nothing at all, in his case, that approaches to direct evidence, we deem it unnecessary to prosecute the inquiry.

The claim of De Lolme, we believe, is not entirely new; but it has been recently revived, with "evidences multifarious, analogical, phraseological, autographical, argumentative, and circumstantial," by Dr. Busby, author of *A Translation of Lucretius*. For Dr. Busby's proofs, we must refer our readers to the work itself, of which the title is quoted at the end of this article.

An ingenious publication has lately appeared, in a series of letters, tending to prove that the late Duke of Portland was the author of the *Letters of Junius*. The hypothesis is founded chiefly on the injuries received by the duke from the ministry of that day, and the frequent allusions in the letters of Junius to the *Nullum Tempus* bill, and other subjects, in which the duke's interest was involved. The subject is treated with considerable ingenuity; but the evidence is altogether of a presumptive nature, and we must therefore refer our readers to the work itself, for a view of the arguments by which the hypothesis is strengthened.

The latest hypothesis which has been advanced upon this subject is that which ascribes the letters of Junius to Sir Philip Francis; and it will be found, we think, that the requisites we have demanded, at the commencement of this article, unite in him in a much stronger degree, than in any other candidate who has yet been started. Sir Philip was a clerk in the war office, from 1763 to 1772, in which last year he was dismissed. The last letter received by Mr. Woodfall from Junius, as we have already mentioned, is dated January 19, 1773; and the appointment of Sir Philip, as one of the new council at Fort William, took place in the month of June of that year. The claim advanced for him is chiefly founded upon the coincidence of these and other corresponding dates; on Sir Philip's acknowledged talents; his opportunities of information on the subjects discussed in the Letters; the similarity of his style to that of Junius; and likewise the similarity of his hand-writing to that of the *fac similes*. These, and many other minute circumstances, have been brought forward in evidence of this claim, which the reader will find stated at large in the works referred to; and, upon the whole, it appears to us to be by far the most probable which has hitherto been advanced. We must not conceal, however, that Sir Philip, in his answer to an inquiry respecting the truth of this conjecture, by the editor of the *Monthly Magazine*, speaks of it as "a silly, malignant falsehood." We must leave it to our readers to determine for themselves, whether they will consider this declaration as a positive denial of the imputation, or as a mere evasion. In the former case, they would certainly be inclined to pause, even in the face of the strongest evidence; in the latter, that evidence must be allowed its full weight; and we should then regard this long agitated question as nearly set at rest.

See Woodfall's edition of *Junius*, 1812; Mr. Malone's Preface to Hamilton's *Parliamentary Logic;* Mr. L. D. Campbell's *Life of Boyd*, prefixed to Boyd's works; Mr. Chalmers' *Appendix to the Supplemental Apology*, and *The Author of Junius ascertained*, London, 1817; *Memoirs of Sir N. Wraxall; Memoirs by a celebrated Literary and Political Character*, London, 1814; and *An Inquiry concerning the Author of Junius, with reference to the Memoirs*, &c.; *Arguments and Facts, demonstrating that the Letters of Junius were written by John Lewis De Lolme* &c. by Thomas Busby, Mus. Doc. 1816; and *Letters to a Nobleman, proving a late Prime Minister to have been Junius*, &c. 1816; *The Identity of Junius with a distinguished Living Character established* London, 1816; *A Supplement to Junius identified, &c.* 1817; and *Edinburg Review*, No. lvii. p. 94 (z)

JUNK-SEILON, or JAN SYLON. See JAN SEILAN.

JUNO, in the ancient heathen mythology, was the daughter of Saturn and Rhea, or Ops, the sister and wife of Jupiter, consequently the chief of the female deities, and therefore styled the queen of heaven. She was born in the island of Samos, where she continued to reside during the period of her virginity.

The character of Juno is represented in no very amiable light. Her haughty and rebellious disposition is said to have subjected her, in some instances, to the displeasure and chastisement of her husband. She was excessively jealous; but, as it would appear, not without reason; and she punished, with an unrelenting severity, Europa, Semele, Io, Latona, and the other ladies with whom Jupiter indulged himself in the pleasures of illicit love.

Juno was the mother of Vulcan, Mars, and Hebe. She was worshipped under the name of Lucina, having been considered as presiding over marriages and births. She is usually represented in a chariot drawn by peacocks, with a sceptre in her right hand, and a crown on her head. Homer describes her in a chariot adorned with precious stones, the wheels of which were of ebony, and which was drawn by horses with reins of gold. In her temples at Corinth, she was represented on a throne, with a crown on her head, a pomegranate in one hand, and in the other a sceptre, with a cuckoo on its top.

As the queen of heaven, her usual attendants were Terror and Boldness, Castor, Pollux, and fourteen nymphs; but her principal attendant, and peculiar messenger, was Iris, or the Rainbow, the daughter of Thaumas and Electra.

A particular festival, called *Junonalia*, was celebrated by the Romans, in honour of Juno, and is fully described by Livy, lib. vii. dec. 3. (z)

IVORY is the bony substance of the teeth of animals, but is applied particularly to the tusks of the elephant. Those of the hippopotamus, wild boar, several phocæ, and the horn or tooth of the narwhal, pass by the same name. The tusk of the elephant is of a circular or oval shape, some inches thick at the root, and several feet in length, if full grown. It is hollow for a considerable space from its insertion into the jaw, and always tapers to an obtuse extremity. Most tusks are curved, generally more so in proportion to their size; for the smallest brought to this country are perfectly straight. Naturalists, however, conceive that the curvature of the tusk is not a decisive characteristic of the species of the elephant, but only constitutes a variety. Perhaps this is a point meriting further investigation; and it should be attended to, that those called mammoth's tusks, found on the shore of the Icy Sea, are said to be spiral, forming about a volute and a half, throughout their length. The size of the hollow is various in proportion to the tusk. It is of a conical figure, circular or elliptical, commonly corresponding to the exterior outline of the whole; and, indeed, it is to be observed, that all the lines and layers, observed in a transverse section, have a relation to the external circumference of the tusk. Thus it is probable, that these peculiarities depend on the original conformation of the pulpy nucleus occupying the cavity. In small tusks, the upper part of the hollow is totally lost in the solid, being scarcely perceptible, or forming only a dark shade. In those of larger size, it diminishes to an aperture of a line or less in diameter at its termination on the outside at a short distance from the tip. It is technically called the nerve on assuming the latter appearance, and sometimes is encircled by so dark a shade as greatly to injure the ivory. Tusks are most esteemed which have least hollow.

Nothing can be more diversified than the dimensions of the tusks of the elephant, and hence the dealers in ivory distinguish them by names according to their size. If weighing under 14 or 20 pounds, they are called *crevelles*, or, as the workmen say, *scrivelis*, many not exceeding a foot in length. None brought from the south-west coast of India exceed four feet, it is said; but some of an extraordinary bulk are obtained in other countries. In Roman history, we read of tusks ten feet long; and Mr. Pennant speaks of others equally large, brought from the coast of Mozambique, in modern times. Tusks of eight or nine feet long are repeatedly mentioned; and Hartenfels, in his work on elephants, instances one, of the wonderful length of 14 feet, in the possession of a merchant in Venice. Very large tusks are six, seven, or even nine inches thick, according to Camper, who observes, that one about seven feet nine inches long, nine inches thick, and weighing 208 pounds, belonged to a merchant of Amsterdam. No general conclusions regarding the weight are deducible from the size. Tusks have been known to weigh 325 or 350 pounds. Some fossil tusks are also very ponderous. One is described by Bryene, in the *Philosophical Transactions*, 136 inches 5 lines long on the exterior of the curve, whose circumference was 18 inches 5 lines at the root on clearing the socket, and which weighed 137 pounds. The largest, found on the shores of the Frozen Ocean during the Russian voyage of discovery in 1787, were eight feet seven inches long following the volute, but only four feet and an inch in a straight line, very nearly 18 inches in circumference at the thickest part towards the root, and weighing 115 pounds avoirdupois. Cuvier supposes, that tusks grow during the whole life of the elephant; and as the extremity is always wearing off, the real length is uncertain. But that learned author, on inspecting their sections, would have been sensible, that many want very little if any portion of the extremity, although others be greatly blunted, or even broken over by some uncommon degree of violence. The largest tusks are said to be brought from Africa, and the straightest from Asia; and it is thought that those least curved afford the best ivory. Nevertheless, we do not consider these points as established; and we are disposed to doubt whether the quality of the ivory is indicated by any external appearances, or whether much dependence can be placed on any, except very simple rules, for judging of it.

Ivory is hard and elastic, and is considerably more transparent than white paper of equal thickness. The outside is covered by a cortical substance, softer than the rest; brown or almost black externally, by which also the cavity is lined. In general, it is nearly a line thick, though sometimes scarcely perceptible on approaching the tip. The ivory, in both cases, is coarser; that is, the grain is larger and more perceptible in the vicinity of the bark, softer, and, as we think, more readily discolours on exposure to the air. It progressively becomes finer on receding from the external cortical part; and where there is no sensible bark on the cavity, it seems to have attained the greatest perfection. Hardness and whiteness are the only properties desirable. But that is most prized which exhibits a kind of diaphanous appearance when first cut asunder. The outside is always to be rejected, as also portions near the nerve.

The structure of elephants' ivory exhibits no important differences. The disk of a transverse section always presents a number of granulated lines in a zigzag direction, which gradually become more delicate on approaching the interior, until they totally disappear from the naked eye. M. Cuvier affirms, that this character, common to all elephants' ivory, and depending immediately on the pores of the pulpy nucleus of the tusk, is not to be found in the tusks of any other animal. We shall remark, in general, that the texture of the ivory of different animals which we have examined, is very different. On reducing a transverse section of a portion of very fine ivory to the thickness of 100th part of an inch, we found innumerable concentric circles surrounding the cavity, disposed, as it were, in bands of irregular breadth. At this thickness, the ivory required a high polish to expose them; and they were indistinct without the aid of a magnifier. But on reducing a piece greatly thinner, and through which common printing would easily be read when laid upon a page, they were readily seen with the naked eye. Very minute lozenges were observed to be formed by intersecting curves, and many striæ or radiations, in which were minute square masses more opaque. Instead of the conical intersection, the grain near the bark exhibited waved white lines among the browner part. A longitudinal section of ivory presents somewhat of a lamellated aspect; of uniform colour in a fine tusk, but sometimes more distinctly marked, and with yellowish edges in others. The texture resembles that of wood; and, on examining a thin plate, it will be found to be extremely similar to the general appearance of ash, consisting of alternate irregular darker and lighter streaks. By reducing it to extreme thinness, they become infinitely less perceptible, and the ivory assumes a bluish transparency. It may be thence understood, that the tusk is formed of innumerable concentric circles, so intimately united as to constitute one solid and consistent whole. When in a state of decomposition by lying long in the earth, it separates into thin concentric, conical plates; and sometimes, though very rarely, we have observed a portion separate in this manner from recent ivory. Mr. Corse Scott is of opinion, that the age of an elephant might be deduced from the number of layers; but it is not certain that they grow regularly year by year; and besides, they appear different in a large and thick section than in one which is very thin. The nature of this annular formation is particularly conspicuous in what is called the tooth of the whale, which is probably a real tooth. The cortical part is very thick, and much whiter than the rest, and it is of about equal hardness. That of a section of an inch and a half in diameter we found to be an eighth of an inch thick, of a homogeneous surface to the naked eye, but seen to consist of the thinnest layers on the application of a magnifier. Instead of the granulated appearance and intersecting curves of elephants' ivory, the whole is disposed in numerous concentric rings, exactly resembling those which surround the pith of a tree, proceeding from the centre to the circumference. They are of unequal breadth, and seem arranged in grains, with an intermediate transparent ring. Very fine and delicate radiations also proceed from the centre to the circumference, and a play of light is produced, which gives the surface somewhat the appearance of the cat's eye. Observations on plates of ivory are greatly facilitated by the application of oil or water, which produce such transparency as to expose the internal and also the superficial structure.

The teeth of the sea horse, morse, or *trichecus rosmarus* of Linnæus, afford the hardest and whitest of all ivory. Some are reported to be two or three feet in length, and to weigh thirty pounds, though usually they do not exceed two or three. They are short, and very much curved. A large hollow occupies the wide end, as in the tusk of the sea cow and the elephant; the centre or nerve is of a dark triangular shade. A rough glassy enamel covers the cortical part, of excessive hardness, and which strikes fire with steel: It can scarcely be removed with a file, and blunts a tool of the highest temper. The texture of this ivory nearly resembles that of the former in concentric layers; but they are as fine as human hairs, and, in a transverse section, are hardly perceptible by the naked eye. When brought into view by magnifiers, and a favourable light, they are exceedingly numerous, but of irregular diameter. Little is exposed by a longitudinal section, unless when very thin; and then appear what may be supposed the successive layers, proceeding diagonally from the core.

We shall conclude our observations on the nature of ivory with an account of the tooth or horn of the narwhal, one of the cetaceous tribe. The largest are ten feet long, and some inches thick at the lower extremity, forming a slender cone of a spiral figure. This tooth consists of ivory of the finest description, equally hard as elephants' ivory, and susceptible of a higher polish. But we do not know that all of it is of the same character; and a prejudice against its ordinary use subsists among workers in ivory. Its texture is singular, differing in most respects from all other ivory. On giving the highest polish to a transverse section of about an inch and a half in diameter, the cortical part proved of a very dull white, somewhat of a greenish cast, of a hard horny consistency, and about an eighth of an inch broad. Interposed between it and the substance of the tooth there appeared a bright white circumferential line, narrower and much harder than the bark. The surface was beautiful, quite homogeneous to the naked eye, with a few of the faintest concentric circles more transparent than the rest. Nothing more is perceptible, without reducing the thickness of the ivory, and resorting to the microscope. This being done, the faint circles of a section, about a 60th part of an inch in thickness, prove to consist of three lines, that in the middle darker than the others. Innumerable radiations of a fine feathery appearance proceed from around the central cavity, and terminate somewhat within the circumferential line, but again becoming more conspicuous in what we have denominated the cortical part. These are not unlike the spiculæ shooting out during the crystallization of certain salts. But all are tubular, and the fact is demonstrated, on subjecting a very thin longitudinal section to a magnifier of considerable power. We have not witnessed this peculiar conformation in any other ivory, though it is not improbable that the striæ or radiations above alluded to in that of the elephant and whale's tooth may be analogous to it. No porosity was discovered in a longitudinal portion of the former, reduced so thin as to be bent double with ease. On throwing a particular light on the surface of the narwhal's ivory, an irregularity is visible from the tubular formation, consisting of innumerable minute horizontal cavities. This peculiar structure merits farther examination, in which suitable attention should be paid to portions from various teeth. It is obvious, from what has been said, that the bony process of the narwhal is more probably a tooth than a horn.

Considerable anomalies are seen in the structure of the different kinds of ivory, and every tooth seems to have something peculiar to itself, especially in the arrangement of the concentric circles. In so far as our observations go, the most transparent is the hardest, which is particularly exemplified in the pellucid rings above alluded to. Thus, on reducing a plane surface of ivory by any ordinary mechanical operation, they will remain prominent, though the rest yield under it. The line interposed between the bark and the substance is also the hardest of the whole. We have seen the tusks of phocæ free of enamel, and having a thick bark, with fine ivory, which we were unable to trace to any of the ordinary species. Circumstances may render it difficult to ascertain the fact, especially if the ivory be not recent. On examining a small portion of an elephant's tusk lately discovered in Ayrshire, it proved somewhat harder than recent ivory. The exterior consisted of an extremely thin coat of a deep brown colour, surrounding a portion of a broad circular ring, wherein very numerous concentric lines were visible. Within this appeared what seemed common ivory. But the fragment was small, which rendered its peculiarities less obvious; and these consisted chiefly in the concentric lines.

Ivory is found, by analysis, to consist of the phosphate of lime, and a gelatinous substance. The yellow colour acquired by exposure to the air, is supposed to arise from the combination of the gelatinous matter with the oxygen of the atmosphere. It is said that oxygenated muriatic acid will restore the original whiteness. Some ivory is exceedingly white from the beginning, and some whitens in drying. It is discoloured by being frequently handled, though the keys of an organ or piano most commonly used are said to retain their whiteness longer than the others. The colour may be renewed by removing the external surface, provided the discoloration be only superficial. Artists distinguish ivory into white and green, the former being characterized by a whitish or lemon-coloured bark. When cut up, it is of a faint olive or greenish hue, but soon becomes of a beautiful white.

Ivory is applied to a vast variety of purposes in the arts. Its hardness and texture adapt it for many works where wood would be speedily destroyed, and to which metal is unsuitable. The most elegant sculptures are executed in ivory, not only of images, but even of landscapes after nature; whereof the finest parts can only be compared to lace. It is universally employed for every kind of turnery, of which admirable specimens are brought from foreign countries; such as several hollow spheres, included within each other, successively, even to the number of 14, 15, or more; while the outside is carved in a variety of figures in open work. From its elasticity, it is used exclusively for making the balls employed in games of skill; as billiards; and also in those for demonstrating the doctrines of collision. It is sometimes formed into baskets of considerable size, elaborately wrought; and we have heard of furniture composed exclusively of ivory, inlaid with gold. The scales of almost all mathematical instruments are made of it; for which, if properly and sufficiently seasoned, it is in many respects superior to brass, and fine ivory is almost always used for miniature paintings. One of the purposes to which it is most extensively and usefully applied, is comb-making; in which seventy teeth may be cut to the length of an inch, all executed by a saw; and the ivory of the sea horse has superseded every other kind in the fabrication of artificial teeth. Artists, attracted by the beauty of this substance, have endeavoured to apply it to purposes for which it does not seem adapted; as in the construction of wind instruments. Ivory flutes, for example, are inferior to those made of wood; but whether this arises from the proper proportions of the materials not being yet ascertained, or whether the suitable vibration of the instrument or the included column of air be not produced, is probably not determined. The ancients employed ivory more extensively in some respects than the moderns. It was formed into large statues by them, and we read in Scripture of the ivory throne of Solomon, ornamented with gold. The modern kings of Denmark, indeed, are said to have a magnificent throne, constructed of the teeth of the narwahl. Heyne expresses his surprise, that ivory should be known so much earlier among the Greeks than the Jews; but it must be admitted, that nations are familiarly acquainted with numberless substances which never become the subject of written descriptions. Medicinal virtues are ascribed by the Japanese, to the tooth of the narwahl; they believe that it contributes to elevate the spirits; to strengthen the memory; nay, that it will contribute to the prolongation of life. Hence it bears a high price among them, and the sale of a single tooth has been known to realize a fortune to the owner. No such properties are ascribed to ivory in Europe; where, besides its use in the arts, we believe the only purpose to which it is applied, is making a weak glue from the shavings. The Dutch were wont to procure whole cargoes of the teeth of the narwahl in Europe, for export to Japan, while their commercial relations subsisted with that island.

Ivory is wrought with saws, files, and various edge tools: the former must be narrow in the plate, and frequently moistened with water, to make them operate freely. Some artists are prejudiced against oil, from conceiving that it yellows the ivory; but if it is immediately to be reduced, oil can have no effect, as it does not penetrate the substance. It is affirmed, that the most delicate sawing should be performed under water; but this cannot be a universal rule, as we have observed that the simple contact of that element makes it warp, if thin. Ivory is polished with pumice stone and tripoli. It takes a very high polish with chalk and water, or oil, applied with a piece of leather, and afterwards rubbed hard with the latter substance when dry. The finest ivory is susceptible of the highest polish; and the artist never should forget, that nothing conduces so much to the beauty of his work as the polish of the materials. There is so great a difference in the quality of ivory, however, that pieces may be seen which scarcely can be recognized for the same substance.

In the rough state, ivory is a very considerable article of commerce, both in Asia and Africa. Many African tribes deal in it to a great extent, particularly those dwelling on what is called, by Europeans, the Ivory Coast. It is not explained how the whole quantity required is supplied; but we know that elephants are hunted for the sake of their tusks exclusively; and, probably, the rest are found in the woods where they die, or are destroyed by their natural enemies. Ivory is scarcer at present than it was in the course of the preceding century, either from the interruption of the commercial relations of several European nations with the Asiatic and African continents, or the greater devastation committed among the animals producing it. We have no data for computing the annual consumption, though it certainly is such as to excite our astonishment at the number of elephants that must perish, and the vast extent of country through which such herds must range in seeking subsistence. The largest importation into Britain, with which we are acquainted, was at the rate of 1576 cwt. annually, during the years from 1788 to 1799. This is much more than what was wont to be carried to France, where, in 1784, there were imported to Nantz and Bordeaux, 1179 tusks, besides 8164 pounds of ivory. Probably the smaller teeth, under a certain weight, are not denominated tusks; whence the distinction arises between tusks and ivory. Supposing that the ivory consisted of tusks, each weighing 40 pounds, there must have been 3940 tusks imported annually into Britain. Therefore, to supply Britain for a single year, at least 1970 elephants must have been destroyed. But that must be inferior to the real number; for it is not likely that the tusks weighed 40 pounds each. Labat estimated the quantity imported into France, at 50,000 pounds yearly. Thus, if the quantity consumed in Europe be joined to that of the eastern nations, by all of which ivory is used for various purposes, it will appear quite incredible how the race of elephants is not extirpated. The value of ivory is much increased of late years. At present, 1818, the retail price of the finer parts is eight shillings a pound in Edinburgh

The following Table shews the quantities of elephants' tusks sold at the East India Company's sales, for five years, from 1804 to 1808, inclusive:

Years.	Cwt.	Value.	Average per cwt		
1804	206	*L*5,430	*L*26	7	2
1805	185	4,759	24	14	7
1806	362	10.923	30	3	6
1807	205	4,491	21	14	8
1808	169	3,722	22	0	6

The importation of elephants' teeth into Great Britain, for twelve years, from 1788 to 1799, inclusive, was 18,914 cwt. or at the rate of 1576 cwt. annually.

See *Philosophical Transactions*, vol. xii. p. 1003.—xl. p. 124. for 1799, part i. p. 205. *Annales du Museum d'Histoire Naturelle*, vol. viii. p. 113. Bosman's *Description of the Coast of Guinea*, p. 244. Camper, *Oeuvres*. Thunberg's *Travels*. Heyne, *Super Veterum ebone, eburneisque signis ap. nov. Comment. Societ. Gottingen.* tom I; and Milburne's *Oriental Commerce*, vol. i. p. 63. (*c*)

IVORY COAST. See GUINEA.

JUPITER, (Ζευς Πατερ), the supreme deity, according to the mythology of the ancient Pagans, and the father and king of gods and men. He was the son of Saturn and Rhea, or Ops; and was born and educated upon mount Ida, in the island of Crete. The various fabulous accounts of his infancy are too extravagant and absurd to merit any notice. When he grew up, he is said to have deposed his father, Saturn, from the throne, and to have divided his kingdom with his brothers; to himself he reserved the air and the earth; Neptune obtained the sea, and Pluto the infernal regions He was afterwards engaged in a war with the Giants, the sons of Titan and the earth, whom he overthrew with his thunder, and confined them under the waters and mountains, whence they were unable to escape. He is said to have conferred such benefits upon mankind, that he became distinguished by the title of Jupiter, and obtained divine honours. He had four wives successively;

the last of whom was the celebrated Juno. He was the father of the Muses and the Graces, of Mercury, Apollo, and the other gods; and had a prodigious number of children by his numerous mistresses.

Jupiter was anciently worshipped under a great variety of names; derived from his attributes, from circumstances connected with his history, from the situation of his temples, &c. At Athens, he was chiefly worshipped as Jupiter *Olympicus*; at Rome, as Jupiter *Capitolinus*, from his temple on the Capitoline hill. He was also called Jupiter *Stator*, *Tonans*, *Feretrius*, &c. The Greeks also called him *Ammon*, or *Hammon*, which signifies *Sandy*. He first obtained this appellation in Lybia, where he was worshipped under the form of a Ram.

In his chief temple on the Capitoline hill, Jupiter was represented as sitting on a curule chair, with the *fulmen*, or thunder, or rather lightning, in one hand, and a sceptre in the other. In the figures of the ancient artists, this *fulmen* was always adapted to the character under which they meant to represent the god. When they intended to represent him as calm and beneficent, they gave him the comic *fulmen*, which consisted of a bundle of flames wreathed close together, and held down in his hand. The *Jupiter Tonans*, or Terrible Jupiter, on the other hand, was represented as holding up the *fulmen*, with two transverse rays of lightning, sometimes with wings at each side of it; and when some exemplary punishment was to be inflicted, they put into his hand a quantity of flames, all let loose in their utmost fury. The statues of the Terrible Jupiter were generally made of black marble; those of the Mild Jupiter of white. In the former, he was represented as standing, in a disturbed attitude, and with an angry countenance. In the latter, as sitting, with an air of tranquillity, and a serene countenance. Jupiter, as the chief ruler of the air, and the dispenser of rain, was sometimes represented as Jupiter *Pluvius*, in which character he appears seated in the clouds, holding up his right hand, or extending his arms on each side, and pouring down rain or hail from his right hand upon the earth, while the *fulmen* is held down in his left.

The ancient artists bestowed great pains in expressing the superiority of Jupiter, by the air of majesty which they gave to his countenance, particular attention being paid to the hair, the eye-brows, and the beard. The most celebrated statue of Jupiter was that in his temple at Olympia, by Phidias, which is particularly described by Pausanias; and of which many of the ancient writers speak in terms of rapture. The artist is said to have conceived the idea of this statue from Homer, *Il.* i. 528.

JUPITER. See ASTRONOMY.

JURA is the name of one of the Hebrides, or Western Islands of Scotland, which lies to the north-east of the island of Islay. It is about 26 English miles long, and in some parts eight miles broad, but its average breadth is only about four and a half miles. Hence it contains about 117 square miles, or 58,500 Scotch, or 74,888 English acres.

Jura is principally composed of large rugged crags. The ridges of mountains occupy the middle of the island, extending along its whole length, and rising higher and higher to the south-west, till they terminate in four similar peaked mountains, called the Paps of Jura, two of which stand close to each other on the western part of the island, and are seen at a great distance. The highest of these peaks, called *Beinn an oir*, or the "golden mountain," rises 2340 feet above the level of the sea, according to Dr. Walker. According to Sir Joseph Banks, the second highest, or *Beinn Shianta*, the "enchanted mountain," is 2420 feet high, and it is 60 feet lower than the former. The other two, which are much lower, are called *Beinn a chaolais*, the "mountain near the land," and *Corro-bheinn*, or "the rugged mountain." Beinn-an-oir is composed of large stones, covered with mosses at its base, while the stones above are bare and unconnected, so as to give it the appearance of a great cairn. The prospect from the summit is grand and extensive, and has been fully described by Pennant and by Mr. Macdonald. The Isle of Man and the Isle of Sky are seen at the same time, though the distance is about 220 miles.

To the north of Jura, in the sound between it and Scarba, lies the famous whirlpool of Corrybhreaccain, from Bhreaccain, a son of the king of Denmark, who perished amid its waves. The straight is about a mile broad, and the whirlpool is on the Scarba side. When the flood has entered the sound, the sea appears in great commotion at the place of the whirlpool. It boils and foams, and rolls away in successive whirls. At the fourth hour of the flood, the commotion reaches its maximum, and throws up, with dreadful ebullitions, every thing from the bottom. The roar of the waves is often heard at the distance of six or seven miles. At this time it is generally fatal to approach the gulf; but from the middle of the fifth hour to the sixth of the flood, and in neap tides from the fourth till the sixth, the commotion gradually subsides, and the smallest boat may pass in safety. After the return of the ebb, however, the same phenomena are repeated, increasing and diminishing at corresponding times, till the commotions again subside at the approach of the lowest ebb.

The only village on the island is called Jura. It is situated on the east coast, and is inhabited by fishermen. There is a safe harbour, called the Harbour of the small Isles, within six miles of the Sound of Islay; and several miles to the northward, there is a roadstead called Lowlandman's Bay.

Jura contains several barrows and castellæ; and near the Harbour of the small Isles is a considerable encampment, with a triple line of defence, and regular bastions towards the land. The population of Jura in 1811 was 1157. See Pennant's *Tour to the Hebrides*; Macdonald's *Account of the Hebrides*; and Jameson's *Mineralogy of the Scottish Isles*.

JURA and COLONSAY, is the name of the parish which includes these two islands, along with Oronsay, Scarba, Luga, Balnahauigh, and three small uninhabited islands on the north of Jura.

Colonsay is situated directly north of Islay, nearly at the same distance from it and from Jura. It is separated at high water from Oronsay by an arm of the sea, about a mile broad, and from 8 to 13 feet deep; but at low water they both form one island. The united length of Colonsay and Oronsay is about twelve miles, and their breadth varies from one to three miles. Their superficial extent is about 9000 Scotch acres, of which nearly 7000 is meadow or arable land.

In 1811, Colonsay contained 138 houses and families, and 786 inhabitants. See Macdonald's *Account of the Hebrides*.

JURA, is also the name of one of the departments of France, which takes its name from the mountainous ridge of Jura, which it comprehends. It is bounded on the north by the department of the Higher Saone; on the west, by those of the Cote d'Or, the Saone and Loire, and the Ain; on the south by the Ain; and on the east, by Switzerland and the department of the Doubs. The principal rivers which traverse it, are the Rhone, the Ain; the Bienne, which passes by Ste. Claude; and the Solvan, which passes by Lons-le-Saulnier. The climate of this department is cold, from the mountains being covered during a great part of the year with snow. The plains yield good crops of grain; but only barley, oats, and maize, are produced among the mountains. Iron is found in great abundance in the mountains. There are seven furnaces and thirty forges in the department. Wine is made in considerable quantities; and the wines of Arbois and Poligni, particularly the former, are much esteemed. The forests occupy 125,000 hectares, or 245 000 acres; of which the third belong to the nation, another third to individuals, and another third to the communes. The contributions in the year 1802, were 2,005,226 francs. The principal towns are,

	Population.
Lons le-Saulnier	6[illegible]41
Dole	8235
Poligni	52[illegible]3
Ste. Claude	3579

The population of the department is 289,865. Lons-le-Saulnier is the capital.

JURA, Jurassus, or, in the Celtic, *Jou-rag*, which signifies the "government of God, or Jupiter," is a chain of mountains on the south-west of Switzerland, which stretches from Mont Vouache, in Savoy, to the canton of Schaffhausen. Its direction is nearly south south-west and north north east, almost parallel to that of the Alps. Its length is from 90 to 100 leagues, and its breadth, in a north-west direction, from 15 to 18 leagues.

The ridge of Jura rises to the height of 3000 or 4000 feet from the plain of Switzerland, with a declivity often very steep, and presents at this elevation throughout the whole of its length an undulated line, above which there rises, in some places, rounded summits to the height of 600, 1000, or even 2000 feet above the rest of the chain. On the side of Franche Compté, the Jura is formed into several parallel ramifications, which diminish gradually in height, till they terminate in the plains of Burgundy. The following are the altitudes of the principal summits, as determined geometrically by Messrs. Pictet and Tralles:

	French Feet.
Dole	5082
Ditto, according to the measures of the French engineers,	5178
Montendre, above the valley of the Lake of Joux,	5170
Reculet, or the summit of Mont Thoiry,	5196

The principal passes in the ridge of Jura, are that of Fort Ecluse, where the Rhone runs in a deep channel between the fort and the foot of Mont Vouache; the passage of Esclées, at a little distance from Orbe, on the road of Pontarlier; that of the Cluse de Verrieres, in the principality of Neuchatel; that of the Pierre Pertuis, in the Valley of St. Imier; and the defiles of the Valley of Moutier, of Ballstall, and of Wallenbourg.

As the Ridge of Jura lies below the line of perpetual snow, it contains no glaciers; but blocks of ice, and columns of snow, are found in some deep caverns; such as those near St. George's above Rolle, and between the vallies of Travers and Brevine. The pastures on that ridge are drier than those of the higher Alps; but in some places, particularly in the canton of Basle, the meadows are as beautiful and fertile as those of the central chain. Some of the ramifications of Jura, particularly those in the neighbourhood of St. Claude and Champagnol, produce a great quantity of box-wood, some of the plants of which rise to the height of 20 feet. The mountains, which extend for four or five leagues round Poligni, are covered with lofty pines, which afford to the ship carpenters of Toulon the tallest masts for their vessels of war. The same forests furnish also the materials of numerous manufactures, which employ the inhabitants during the winter, and form a considerable branch of trade. The iron founderies, the forges, and the salt pits of Salins, Arc, and Senans, obtain here the wood and the charcoal which they require.

The brown bear still inhabits the wildest parts of the western chain of Jura; and it is not many years ago since it made great ravages among the cattle, and even descended into the plains. Wild cats, the flesh of which is eaten by the inhabitants, are also found in the forests of Jura.

The ridge of Jura is composed of compact limestone, of a greyish or yellowish brown colour, but always less deep than that of the Alps. Sometimes it has a lively yellow colour. The strata alternate with beds of marle and of clay. There is also found gypsum, beds of asphaltum, of the finest marble, sulphuretted springs, and salt springs. Those of Salins, Courbauson, Montmorot, near Lons le-Saulnier, Groson, Tormont, and St. Lanthein, near Poligni, all of which belong to France, are among the richest. A great number of beds of oolites are found in Jura.

The stratification of Jura is very singular. The inclination of the strata from south to north-west, their vertical position, the vaults which they form, and their junction in the form of the roofs of houses at the summit of the chain, are phenomena highly interesting to the mineralogist. The stretch of the strata is from S. S. W. to N. N. E.

Among the numerous petrifactions found in the calcareous formation, are 40 species of the *cornu ammonis*, 20 other species of univalve marine shells, 8 species of oysters, as many species of bivalve marine shells, and 40 species of corals. The rarest petrifactions are found on Mont Perouse, near Orgeler. Iron is found in such abundance in Jura, that it is capable of supplying all France. The iron mines in Franche Compté, and in the bishopric of Basle, have been wrought with activity; but Switzerland has not taken advantage of her portion of this treasure. Strata of brown coal occur, which owe their origin to entire forests which have been burned by the dreadful earthquakes to which Jura has often been exposed.

The innumerable masses of granite and of gneiss, which are scattered up and down on the eastern flank of this chain, even at the height of 2400 feet, form one of the most interesting facts in geology. One of these masses, which is found above Neuchatel, and which was measured by Professor Playfair in 1817, is 62 feet long, 32 feet wide, and nearly 17 feet high. As there is neither granite nor gneiss on this ridge, Saussure and Sir James Hall have supposed, that they have been carried away by some great flood, or *debacle*, across the lake of Geneva from the Savoy Alps; and it is a remarkable fact, that similar blocks are found in the lake of Geneva opposite to the mouths of the streams which descend from the Savoy hills. See Ebel's *Manuel du Voyageur en Suisse*, tom. iii.; *Traité sur la Structure de la Terre*, tom. ii. p. 90, 147. (for an account of the geology of Jury,) Zurich, 1808; Saussure's *Voyages dans les Alpes*; and Sir James Hall's paper in the *Transactions of the Royal Society of Edinburgh*, vol. vii. p. 142, 143, &c.

JURISDICTIONS, *League of the Ten*. See Grisons.

JURISPRUDENCE. See Law.

JURY, Juratores, or Jurati, (from *jurare*, to swear,) a certain number of men who are sworn to inquire into and try such matters of fact as may be referred to them, and to declare the truth upon such evidence as shall appear before them. They are sometimes called the *inquest*, from their being appointed to inquire into the truth of certain facts.

The trial by jury, both in civil and criminal causes, is of great antiquity in these kingdoms; and has always been justly considered as a most valuable institution for securing the life, liberty, and property of the subject.

Juries are of different kinds. 1. The *Grand Jury* is an institution peculiar to England. It generally consists of 24 gentlemen of the best figure in each county, chosen indifferently by the sheriff, who are sworn to the number of 12 at the least, and not more than 23, in order that 12 may be a majority. The sheriff of every county is bound to return a grand jury to every session of the peace, and to every commission of *oyer* and *terminer*, and of general gaol delivery. Their office is to inquire, present, do, and execute all things, which, on the part of our lord the king, shall then and there be commanded them. Before they proceed to business, the grand jury are instructed in the articles of their inquiry, by a charge from the judge who presides upon the bench. They then withdraw, to sit and receive indictments, which are preferred to them in the name of the king, but at the suit of any private prosecutor; and they are only to hear evidence on behalf of the prosecution. For the finding of an indictment is only in the nature of an inquiry or accusation, which is afterwards to be tried and determined; and the grand jury are only to inquire, upon their oaths, whether there be sufficient cause to call upon the party to answer it. After hearing the evidence, if the grand jury think the accusation groundless, they write on the back of the bill, "Not a true bill;" and then the party is discharged without farther answer. If they are satisfied of the truth of the accusation, they indorse upon it, "A true bill," and the indictment is then said to be found. But to find a bill, there must at least twelve of the jury agree. The indictment, when found, is publicly delivered into court.—2. The *Petit Jury*, so called to distinguish them from the grand jury, are persons who try the prisoner, and either find him guilty, or acquit him. The petit jury consists of 12, and their verdict must be unanimous.—3. The *Common Jury* are the jury returned by the sheriff, according to the directions of the statute 3 Geo. II. c. 25, which appoints, that the sheriff shall not return a separate pannel for every separate cause, as formerly: but one and the same pannel for every cause to be tried at the same assizes, containing not less than 48, nor more than 72, jurors. The names of these jurors being written on tickets, are put into a box or glass; and when each cause is called, the 12 persons, whose names shall be first drawn out of the box, shall be sworn upon the jury, unless absent, challenged, or excused.—A *Special Jury* is distinguished from a common jury. Special juries were originally introduced in trials at bar, when the causes were of too great nicety for the discussion of ordinary freeholders; or when the sheriff was suspected of partiality. He is, in such cases, upon motion in court, and a rule granted thereupon, to attend the prothonotary, or other proper officer, with his freeholder's book; and the officer is to take indifferently 48 of the principal freeholders, in the presence of the attornies on both sides, who are each of them to strike off 12, and the remaining 24 are returned upon the pannel.

In Scotland, in criminal trials, a number of jurymen, not exceeding 45, is cited. Of this number, fifteen are chosen by the judge to sit upon each trial, the prisoner being allowed to object to any of them upon good grounds. Clergymen and surgeons are exempted from the duty of jurymen, and butchers are excluded from the office.

Trial by jury, in civil causes, had gone very much into disuse in Scotland; but it has lately been revived by the institution of a particular court for trying issues in civil cases by jury.*

JUSSIEU. See BOTANY.

JUSTICES OF THE PEACE are persons appointed by the king's special commission, under the great seal, to keep the peace within certain limits.

The nature and extent of the office, powers, and duties of a justice of the peace are determined by the commission, and by several statutes which have created objects of his jurisdiction. To attempt a detail of these various objects would lead us into a wide field of discussion. Our limits will only admit of our making a few general observations.

In England, every person who acts as a justice of the peace must have a certain qualification; but in Scotland, no such qualification appears to be requisite. The institution of justices of the peace in Scotland is of comparatively modern date. Its introduction was attended with considerable difficulty, and the office was for some time exercised under several restrictions. But these restrictions were removed by the articles of union, which placed the office on the same footing in Scotland as in the sister kingdom. But, in the Scotch commission, there is not a *custos rotulorum*, as in England; and the distinction of the *quorum* has never been introduced in Scotland.

The jurisdiction of the justices extends to the preservation of the peace; to the cognizance of certain felonies and delinquencies; to the execution of various penal statutes, particularly regarding rural economy; to a numerous and important class of questions relating to the revenue; and to certain civil actions committed to them by the small-debt act.

A commission of the peace may be recalled at any time by the king; and it falls by the death of his majesty, although, from expediency, it is continued for six months longer, unless recalled by his successor. See Lambard's *Eirenarcha*; and Burns', William's, Hutcheson's, and Tait's works on the office of a justice of the peace.

JUSTIN (JUSTINUS), a Roman historian of some eminence, who lived, as is generally thought, in the second century, during the reign of Antoninus Pius; but this is uncertain. He composed, in elegant Latin, an epitome of the history of Trogus Pompeius. This work is still extant, in 44 books, and is entitled, *Historiarum Philippicarum et totius Mundi Originum et terræ Situs ex Trogo Pomphio excerptarum, Libri* xliv. It comprehends the actions of almost all nations, from Ninus, the founder of the Assyrian empire, to the Emperor Augustus. It would appear that Trogus called his work the *Philippic History*, because it treated chiefly of the Macedonian empire, founded by Philip, or concerning Philip and his successors. The original work of Trogus, however, is unfortunately lost; and the epitome of Justin is therefore the more valuable, because it is sometimes the only, sometimes the principal, authority for a number of interesting passages of ancient history.

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* In France, since the revolution, trial by jury has been introduced in criminal cases only, and the people are become so much attached to this form of proceeding, that none of the governments that have succeeded each other in that country, have ventured to abolish it. The forms of proceeding in trials by jury differ in some respects from those in England, but the French government have it in contemplation to improve this mode of trial, and make it as perfect as possible, and for that purpose have sent a learned advocate to England, to see how trials of this kind are managed in that country, and to report the result of his observations. It is probable, therefore, that changes will be before long introduced, which makes it useless for us to expatiate on the present form of proceeding.]

DUPONCEAU.

Professor Heeren, of Gottingen, has written two memoirs on the subject of this history, in the first of which he explains the general plan of the great work of Trogus Pompeius; and, in the second, he reviews each of the 44 books, according to Justin's extracts, and investigates the sources from which the narrative appears to have been derived.

The best editions of Justin are, the *Delphin* edition, in 4to.; and *Cum notis variorum et Gronovii*, in 8vo.

JUTHIA, or Judia. See Siam.

JUTLAND,[*] one of the most considerable provinces of Denmark, is situated between 55° 24′ and 57° 40′ of north latitude, and between 12° 40′ and 10° 20′ of east longitude from Greenwich. It is a large peninsula, surrounded on all sides by the sea, except on the south, where it is bounded by the duchy of Sleswick. It is 180 miles in length from north to south, and 75 from west to east at its medium breadth. The coasts, both on the east and west, are indented by numerous gulfs and inlets, which form safe and commodious harbours; and the gulf of Lymfiord particularly, which is navigable and full of islands, stretches across the province from the Cattegat to within three miles of the German Ocean. It is divided into four districts, namely,—1. Aalbourg in the north of the province, of which the principal towns are Aalbourg, a trading town on the south coast of Lymfiord gulf; Schagen, at the northern extremity of the peninsula; Hiorring, 30 miles north-west of the cape; Nyscoping, a little trading town on the island of Mors.—2. Wiburg, containing a town of the same name, the capital of the province, an ancient inland town, with 2000 inhabitants; Mariager, a small place on a gulf of the same name; Skeva, on the south border of the gulf of Lymfiord; and Hobroe, a pleasant trading town.—3. Aarhus, along the east coast, containing a trading town of the same name, with 4300 inhabitants; Randers, an old trading place on the river Guden, containing 4600; Ebeltoft, Horsens, and Scanderborg, small trading towns along the coast.—4. Rypen, the most considerable district of the province, extending along the western coast between Sleswick and the gulf of Lymfiord, containing Rypen, a tolerably well built town at the mouth of the Nilisaar; Holding, anciently a royal residence; Fredericia, or the Little Belt, where vessels pay toll; Warde, Rinkioping, Holtsbroe, Hierting, and Jelling, all of which are small places, more like villages than towns.

The northern shores of Jutland present a long line of sand-banks, fatal to mariners, and covered with the remains of shipwrecked vessels; and the eastern coast is bordered with the most picturesque succession of rocks. The country in general is low, sandy, and naked; most fertile towards the south; and on the east side covered with extensive forests of oak, fir, birch, &c. There appear in every part of the peninsula numbers of earthen tumuli, frequently about 20 feet high, and 300 in circumference at the base, evidently constructed by art, and found indiscriminately in the most desert and in the best cultivated tracts. The inhabitants are unable to give any account of their origin; but they are considered as having most probably been erected in honour of deceased chieftains, and as indicating a high degree of population in ancient times. There are many small lakes and marshes, but few rivers, in the province; and these few are, for the most part, only trifling rivulets, or wintry torrents. Almost the only river deserving the name is the Guden, which rises near Wiburg, becomes navigable at Randers, and falls into the Cattegat Sea. Several excellent springs are found in the peninsula; but, towards the north coast the water is brackish and unpalatable. There are no mountains, and the hills, which are composed of gravel or sand, are seldom above a few hundred feet in height.

The country people of Jutland spin a considerable portion of their wool, and knit the yarn into stockings for exportation, to the annual value of 16,000 rix-dollars. They also manufacture for their own use a kind of coarse cloth; which, like the highlanders of Scotland and Wales, they delight to render as gaudy as possible, by weaving together various coloured stuffs, particularly blue, red, and yellow. There are several manufactories of woollen cloth in the province; and one at Aalbourg has sometimes exported this article to the value of 60,000 rix-dollars per annum. In several villages, particularly around the town of Warde, a kind of black pottery is made of a fine bluish clay in their neighbourhood, and exported to a considerable amount, chiefly for Hamburgh and Holland. At Gerdumlund, a few miles from Aalbourg, are large works for preparing potash, alum, white-lead, and soap. There are also manufactories for hats, gloves, and fire-arms at Aalbourg; and at the same place, a gentleman, who had been in England, has recently established one for stockings, but is said to experience considerable difficulties from the apathy and sluggishness of his workmen.

The numerous gulfs which penetrate the province, tend greatly to facilitate the inland trade; but the mouths of the different harbours are not duly cleared of the mud and sand, which are apt to accumulate, especially when the ports are situated at the entrance of rivers. The staple commodity of Jutland is grain, chiefly rye and oats, with which 500 or 600 vessels clear out annually from Aalbourg alone, for the Danish isles and Norway.

Jutland contains above 400,000 inhabitants, on a surface of above 6300 square miles. The natives of the province are not a handsome race; but the men, though generally in-kneed, and slender limbed, are tall, and tolerably good-looking. The women, who are remarkably fair-haired, are not so handsome in proportion as the men, but uncommonly good humoured and obliging. The dress of the lower class among them is extremely unbecoming, and tends to detract from the beauty which they do possess. "They are not only wrapped up, but literally screwed or twisted in, from the hips to the nose, in innumerable volumes of cloth and linen; and, below the waist, they are of such a tremendous bulk, that, at a distance, they look like so many hogsheads;" (*Macdonald.*) The men dress much more suitably; but generally wear wooden shoes, of a great weight and clumsy shape, which give them a hobbling duck-like walk; which is said greatly to increase the difficulty of drilling them in the army, and which they are apt to retain even after being accustomed to shoes and boots. There is a general appearance of ease and comfort among the peasantry; and the price of labour is generally high, though the workmen are extremely sluggish, and do not perform two-thirds of what an English labourer would do with ease. In 1809, at Aalbourg common labourers received two shillings a day, and tradesmen frequently five, or even six; but, it must be admitted, that a time of war may have contributed to produce this high rate of wages. The language spoken in the province is, of course, the Danish; but persons of rank and education, and, in general, all the middling classes in the larger towns, speak German, and a few understand English and French. See Playfair's *Geography*, vol. iii.; Macdonald's *Travels through Denmark*, vol. i.; and *Tableau des Etats Danois*, par Catteau. (q)

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[*] The name is here restricted to what is usually called North Jutland, and the description of South Jutland referred to the article Sleswick.

JUVENAL, Decimus Junius Juvenalis, the celebrated Roman satirist, was born at Aquinum, a town of the Volscians, about the year 38 of the Christian era. Of his parentage, education, and the circumstances of his life, very little can be related with certainty. He was the contemporary of Martial, the epigrammatist, and is said to have been bred to the study of eloquence, which he seems to have cultivated rather with a view to his own amusement, than from any intention to prepare himself either for the schools, or the courts of law. He appears to have been well advanced in life before he betook himself to poetry, and produced those satires, which have carried his name and reputation down to our times. The first shafts of his satire seem to have been directed against Paris, a young pantomime dancer, and the favourite of Domitian, who was then at the head of the government. His compositions were, at first, secretly handed about among his friends; but becoming bolder by degrees, he incurred the severe resentment of Paris, who prevailed upon the emperor to send the author into a sort of honourable banishment to Egypt. This account, however, is doubted. That Juvenal was in Egypt is certain; but whether he was sent thither as a punishment, or went from motives of personal safety, or of mere curiosity, cannot be ascertained. The punishment, however, if he suffered any, had no other effect on him, than that of increasing his hatred of tyranny, and turning his indignation on the emperor himself, whose vices became, from that period, the object of his keenest reprobation.

In the year 95, when Juvenal was in the 54th year of his age, Domitian banished the philosophers from Rome; and to this period Mr. Gifford inclines to fix Juvenal's journey to Egypt. Nerva, who succeeded Domitian, recalled the exiles; and, from this time, there is little doubt that Juvenal was at Rome, where he continued his studies in tranquillity.

This is all that can be collected respecting the particulars of his life. He appears to have been easy in his circumstances. His little patrimony, which he never diminished by extravagance, was sufficient for all his wants.

Juvenal lived in an extremely degenerate age; and he appears to write with all the energy of virtuous indignation at the vices which surrounded him. His satires are chiefly distinguished by a lofty severity, eloquent declamation, and vigorous and glowing language. He is accused of being too rhetorical, and of betraying a degree of slovenliness, or want of care, in some passages. Some have brought a more serious charge against him—that of indecency. Yet, when we consider the monstrous vices against which his indignation is directed, we may cease to wonder at the strength of his expressions. His great aim appears to have been to alarm the vicious, and, if possible, to exterminate vice, by rendering depravity utterly loathsome.

The satires of Juvenal, sixteen in number, have been frequently translated into English. The two first versions were made by Barten Holyday, and Sir Robert Stapylton; the two latest and best by Mr. Gifford and Mr. Hodgeson; to which the reader is referred for farther information on the subject of this article. (z)

K.

KADIAK, Kodiak, or Kutchtak, is an island in the Northern Pacific Ocean, separated by Shelikof's Strait from the origin of the peninsula Alaska, near the entrance of Cook's Inlet, off the north-west coast of America. This is the largest of all the northern islands, stretching across the ocean between the Asiatic and American continents. It extends above 100 miles in length, from north-east to south-west, and is about 50 wide in the broadest part. Its figure is extremely irregular. In many places it is penetrated by spacious bays and deep inlets, which are guarded by long promontories; and towards the middle it seems almost divided into two islands. The interior is mountainous, or consisting of alternate hills and vallies interspersed with plains, and a portion of the coast is high and precipitous. Some of the latter, as well as the lower hills, consist of schistus, but the most lofty are chiefly granite, covered with very thin soil; and a large proportion of the island is barren.

Kadiak lies in an ungenial climate; and, in general, the snow remains on the ground until the end of April. Sometimes, however, the cold is not intense, and the winter is shorter, but either rain or snow prevails: Summer is also very wet and foggy. The island is subject to earthquakes, which are frequently violent. It is supposed, that the lofty mountains on the coast of North America shelter Kadiak from that extreme cold experienced in the same latitudes. Hence the animal and vegetable productions are more copious, and in greater variety, than in the Aleutian islands to the east. Fine timber grows, though not abundantly, in forests on the north-east coast of the island, consisting of larch, fir, alder, and other trees, but principally of different species of pine. Roots and berries are so plentiful, that both are collected, in great quantities, for winter provision. Raspberries are very large and white. The same roots growing in Kamtschatka are found here, though the saranna, which is a considerable article of subsistence, is of inferior quality. Barley was first sown in 1804, and produces long straw, but small ears. Pease and beans produce during summer, but do not ripen for winter. Potatoes thrive well.

Fish are numerous in the straits, the surrounding seas, and mouths of the rivers. Those most commonly caught for food, are herring, cod, and salmon; which are in such multitudes, that hundreds may be caught in a short time merely with the hands. Holibut grows to the immense weight of 612 pounds avoirdupois. Whales are extremely frequent in the vicinity. Phocæ are now diminished, from being the objects of uninterrupted pursuit; and the sea otter, which proved so profitable a capture for years, is almost extirpated. Bears often swim across the straits from Alaska, and are either shot or caught in traps. Probably some species are indigenous in the island; and their flesh, from the scarcity of cattle, is the only kind used in it. These animals are said to go into the river when full of fish, and dexterously catch them with their paws. But they eat only the head, and, in biting it off, throw the remainder ashore. The beaver, glutton, ermine, marmot, various species of foxes, the lynx, and rein-deer, are seen here. Black cattle have been introduced from the Russian settlements, and are yet anxiously preserved, to augment the stock for breeding. Sheep were brought hither in 1804. There are some goats, and numbers of hogs, which last are fed on fish. Land birds are not common in this country, but water fowl appear in vast multitudes. Insects are scarce: bugs, however, have been brought from the vessels anchoring near the island; and innumerable cockroaches came from one of those employed in the Russian Voyage of Discovery in 1805 or 1806, which afterwards entirely vanished.

The inhabitants of Kadiak are generally designated Aleutians; a tribe which they intimately resemble in figure, physiognomy, and manners, and possibly belong to the same origin. They are of low stature, broad visage, with jet black eyes, eye-brows, and hair. Their language seems to bear very little analogy to that of the Aleutians, which might lead us to infer that they originated from the American continent; or the Aleutians may have separated from the common stock at a more remote period.

The natives clothe themselves in a large frock made of fur, or the skin of sea-fowl; which latter is worn with the feathers outside during the day, and turned inwards at night. It is nearly of the same shape for both sexes. The lower part of their dress consists frequently of one piece, terminated by boots. Formerly the rich clothed and decorated themselves with the skins of sea and river otters; but tobacco, and other things, having now become necessaries of life, they are obliged to acquire them in exchange for their furs. They are extremely fond of ornaments, especially beads, which they wear in great profusion, either on their clothes, or suspending them from their ears, or the ends of a bone thrust through the septum of the nose. Amber is held in as high estimation as diamonds are in Europe. Some natives are punctured, but not regularly tattooed, like the inhabitants of the southern islands; and they often paint their faces in streaks, with red ochre and train oil. Several of the females have a hideous perforation of the under lip, as is seen among those of the Aleutian islands: It is, however, less common at present; and the fashion of tattooing different conspicuous parts of the body has also declined. All their native usages, indeed, are undergoing a rapid modification, from the settlers residing in Kadiak.

The dwellings of these people are partly sunk in the ground, having a small door made of framed seal skin fronting the east, a fire-place in the middle; and a hole in the roof, which serves the double office of admitting the light, and affording an exit to the smoke. The sides, partitioned off for sitting and sleeping places, are covered with grass mats, more coarsely fabricated than those of the islands to the west. A small apartment, used as a vapour bath, is attached to each dwelling, where any degree of temperature is obtained, by the steam of water poured on heated stones.

The food of the natives resembles that of the Aleutian islanders, and consists of fresh or dried fish, blubber, whale and seal oil, the flesh of seals and bears; roots, and berries preserved in oil. In time of scarcity, which seldom fails to occur in winter, and is almost unavoidable during spring, they live entirely on shell fish. Their establishments are, therefore, formed near some large bank, as the best situation for obtaining the means of subsistence. When a visitor enters a hut, he is first treated with a cup of cold water: after resting some time, there are put before him all the preceding provisions. It is expected that he should consume every thing with which the hospitality of the owner supplies him; and the more he eats and drinks, the greater is the compliment. Should he prove unable to do this, however, he must carry away the remainder of the meal. But the civilities of the host do not terminate here; for the bath being in the meantime heated, the stranger is conducted to it, and treated with a draught of the melted fat of seals or bears. As many of their manners and customs are analogous to those of the Aleutian islanders, the reader is referred to the articles Aleutian Isles and Fox Islands.

Polygamy is practised by such inhabitants of Kadiak as can afford to maintain a number of wives. No marriage ceremony takes place, except that of conducting the couple to the vapour bath, which is heated, and where they are left together. The parents of the female receive a present; and it appears that the husband always lives with them, and serves them, though he may occasionally visit his own relations. In certain cases, it is probable that wives are lent by the men to each other, and if, under such circumstances, women previously barren have offspring, they then become the property of the father. A degree of libertinism is practised by these people, which is scarcely exemplified in any country of the world. Incestuous connections prevail to the most unlimited extent: not only do brothers and sisters cohabit together, but even parents and children. After the death of the father, the eldest son alone is excluded from cohabiting with his own mother. They are besides addicted to vices still more odious; and effeminate wretches of the male sex clothe themselves like women, associate with them, and follow similar occupations; and what is still more extraordinary, so far from holding such conduct in detestation, mothers are gratified when their youthful offspring attract the atttention of the chiefs. When the islanders are reproached with their incestuous connections, they defend themselves by reference to the habits of the sea otters. On the birth of a child, it is washed, and named after the first beast or bird that occurs.

Their funeral rites are said to differ among different tribes. The bodies of their chiefs are embalmed with moss: and either a slave, a prisoner, or some of their most confidential labourers, being sacrificed, were lately buried along with them. Shelikoff affirms, that one is buried alive with the body. But the Russians have lately prohibited this barbarity. Mourning is expressed, by cutting the hair short, and daubing the face with soot; and on the death of either husband or wife, the survivor retires for a certain period to another settlement.

It is doubtful, whether the natives have ever had any religion, or more than very obscure notions of a good and evil being, to the last of whom slaves are sometimes, though rarely scacrificed. Their Russian visitors have endeavoured to convert them to their own faith; but they know little more than to make the sign of the cross; and some will allow themselves to be baptised three times, for the sake of getting a shirt.

Before their late subjugation, they were a very warlike people, and alike averse to the invasion and to the proffered friendship of strangers. "If you mean to preserve your lives," they replied to the conciliatory words of the Russians, "retire instantly from our shores, and do not again disturb our possessions." They advanced to battle, sheltered by a portable breast-work, twelve feet broad and eighteen inches thick, composed of interwoven osiers and seaweed. Besides this they had wooden shields, which are now laid aside. Their arms are the bow and arrow, darts, and lances. They poison their arrows with a preparation from henbane, so as to inflict a mortal wound. But at present, their weapons seem to be directed more against wild animals, than against enemies of their own species. They shoot salmon very dexterously while leaping out of the water; and employ darts and lances, pointed with poisonous slate, for killing whales. The different tribes were formerly engaged in almost incessant wars. Their prisoners suffer bad treatment, especially from the women; and the female part of them are all slaves, who are sold by one tribe to another for trinkets and utensils. Long after Kadiak was discovered by Europeans, the natives were exceedingly averse to have any dealings with them, and such was the firmness with which this determination was evinced, that three Russisn vessels were successively obliged to withdraw.

The chief occupation of the men is making boats and weapons, which are used in hunting and fishing: while the women are employed in sewing the skins together, with which the boats are covered: in drawing tendons from the legs of animals, for joining them; and in fabricating slings and fishing-hooks. All the thread employed consists of sinews, and some of it is as fine as silk. It is fashioned into the most beautiful twists and braids; and many specimens of sewing would do credit to the most skilful Europeans. Collecting roots and berries for winter store, is also the province of the females. The hunting excursions of the natives are for the benefit of the Russians, who reward them with cloth, ammunition, beads, toys, rum, tobacco, and snuff, for which they have an immoderate propensity. They are likewise taken on board American vessels touching here, along with their boats and implements for fishing and hunting, to be carried to the coast of California, where seals and sea otters are to be caught. Cargoes are generally completed in two seasons, when the Russian American Company receive a certain proportion of the furs, as a compensation for the assistance of the natives. Though the whole are educated in the art of hunting and fishing, the capture of whales belongs almost exclusively to certain families, and is handed down to those children who promise to be most expert at it. Their boats, or baidarkas, are for one, two, or three persons, the smallest being 14 feet 6 inches long, by 2 feet 4 inches wide, and the largest only 4 inches broader, and 26 feet 7 inches in length. The large baidarkas, which the Russians have appropriated, can carry 70 men.

Their sports and pastimes are analogous to those of the Oonalashkans, and the pursuits which they follow, uncontrolled, are divided according to the different seasons of the year. Hunting and fishing continue until the end of October, when they return to their winter dwellings. November is spent in visiting, and in dancing with masks and painted faces. They dance with a knife in the right hand, and a rattle made of hoops, to which a number of the red beaks of the sea parrot are suspended, in the left, producing an effect like castagnets. Their music is the tambourine, and their songs are warlike. The men are so fond of gaming, that they often lose all their property. Compared with the Oonalashkans, the inhabitants of Kadiak betray a considerable inferiority in every thing. But they are scarcely to be viewed as the same people with those generations who dwelt here even in the preceding century. Their customs are abrogated, and their numbers are greatly reduced.

These islanders are particularly indolent and inactive; they sit on the beach, gazing for hours together at the sea: no conversation prevails among them; and so little spirit for improvement, that ages may elapse, without their taking advantage of the benefits held up before their eyes.

The population of this island is very small, compared with its size; and it is doubtful whether it ever was great. How could numbers find subsistence under a rigorous climate, where agriculture was utterly unknown, and the only supplies obtained arose from the uncertain produce of the chase or fishing? Yet there can be no question that the population has declined. In the year 1805, by an accurate calculation, it was found to amount to about 4000 souls.

The opinions of the natives concerning their origin are extremely extravagant. They believe that one of their original parents was a dog, the other a female of rank, and that their ancestors were whelps, which peopled the island.

It is affirmed by some authors, that the Russians were acquainted with Kadiak in the year 1750. It was visited in 1762, by Stephen Glottoff, in the course of his voyages to the more remote Aleutian islands; and, in 1783, Gregory Shelikoff formed a settlement upon it. At that time, and previously, the inhabitants were called Kanagist, or Konaghi, though now it is said they denominate themselves Soo-oo-it. According to Shelikoff's account, a body of not less than 4000 opposed his landing; and, having afterwards had an encounter with them, he took above 1000 prisoners. Later narratives affirm, that his opponents did not exceed 400, instead of 4000. With much difficulty he succeeded in appeasing the natives, and by moderate measures induced the inhabitants of this and the neighbouring islands, to the number of 50,000, to acknowledge the authority of his nation. But, notwithstanding his endeavours to varnish over the conduct of the Russians, they are represented as having forcibly reduced the natives to obedience; having usurped their possessions; and either he, or his successors, made themselves masters of all their property, even to their large boats, leaving them only small ones. He is accused of horrible atrocities, such as ranging a number of the miserable islanders in a line, to try how many of their bodies a rifle ball would pass through. It is undoubted, that devastation has ever followed the footsteps of the Russians in the Pacific Ocean, and where they have established themselves, the natives are found in a state of abject slavery, daily diminishing in numbers.

Kadiak is the chief Russian settlement in the Northern Pacific, and the great depot of all the furs from the neighbouring islands, and the coast of America. On the north-east coast, there is a small town called Alexandria, with an excellent harbour, defended by a small fort. The houses are built of logs, and thatched with grass. Most of the windows are covered with the divided intestines of seals well oiled, and some with talc. There are a church, a school with about 50 native scholars, and a barrack for the Russian convicts, storehouses, and other buildings. When Shelikoff took possession of Kadiak, and subjugated the natives, he obtained a number of the daughters of the chiefs as hostages. About 200 were in the settlement in 1790; but the number seems to have decreased as the danger has lessened. Alexandria is the residence of a governor, who has the controul of the colonies on the coast of America. Measures have been taken for the instruction of the rising generation in reading, writing, accounts, and mathematics; but the means of providing subsistence for the pupils has been omitted. While remaining at home with their parents, they followed a similar course of life; by withdrawing them from it, scarcity has ensued. A late traveller sagely remarks, that being "educated and taught accomplishments after the European fashion, in a few years there will not be a young Aleutan remaining, who will go barefooted winter and summer, defying the cold, in pursuit of whales, sea-dogs, sea-lions, and sea-otters. What will the Company then do with their learned Aleutans?"

The settlements in the Northern Pacific are instituted for the benefit of a company of merchants in Petersburgh. A number of fur-hunters, many of them said to be abandoned characters, are in their employment; who, together with the subordinate officers, would soon bring the colony to ruin, were they not controuled. They have been accused of wantonly putting the natives to death in a barbarous manner. The stewards and overseers order as many of them as they choose for whatever services are required in hunting or fishing; and after tillage was introduced, they were compelled to draw the plough. The Russians, their wives, and children, are thence held in abhorrence;

and, whenever an opportunity offers, they are massacred in retaliation of the injuries inflicted by them. The prosperity of the settlement, therefore, advances slowly, whereas the highest benefits would result from adopting a wise and liberal system. Lat. 57° N. (*c*)

KAEMPFER, Engelbert, a learned German traveller and naturalist, was born at Lemgo, a town of the county of Lippe in Westphalia, on the 16th of September, 1651. He discovered an early attachment to the study of natural history, medicine, and various languages. After having completed his elementary education at different schools, he studied, during four years, at the university of Koningsberg in Prussia. His desire of travelling into foreign parts induced him, in 1683, to embrace the opportunity of accompanying the Swedish embassy to Persia, in the capacity of secretary; and he remained in that country for some years after the embassy returned to Sweden. Although he had as yet obtained no medical degree, he accepted the situation of a physician in Georgia; which, however, he soon afterwards relinquished, in order to visit other distant countries. With this view, he went on board the Dutch fleet, which was then cruising in the Persian Gulf, as a naval surgeon; and after visiting a number of the English and Dutch settlements, he came to Batavia in 1689. In the following year, he went, as physician to the embassy of the Dutch East India Company, to Japan, where he remained more than a year. In the beginning of 1692, he set out on his return to Europe; obtained the degree of Doctor of Physic at Leyden, in 1604; and then returned to his native country, where he was appointed physician to the Count Frederick Adolphus of Lippe.

During the course of his extensive travels, Kaempfer, actuated by an insatiable curiosity, had studied, with great attention, the natural and political history, manners, and customs of the different countries which he visited; and brought home complete journals, drawings, and various curiosities. He now began to digest his materials, and to communicate his discoveries to the public, in a work entitled, *Amænitates exoticæ politico-medicæ*, Lemgo, 1712, in 4to, of which, however, only five *fasciculi* appeared, with plates. At his death, which took place in November, 1716, he left behind him a great mass of manuscripts and drawings, and particularly an History and Description of Japan. These treasures were purchased by Sir Hans Sloane, who caused a translation to be executed of the work upon Japan, which appeared at London in 1727, in two volumes 4to. A copy of the German manuscript of this book was afterwards discovered at Lemgo, and published by Kaempfer's countryman, Dohm, in the years 1777 and 1779, in two volumes 4to, with many additions.

The extensive knowledge, acute observation, and love of truth, which are displayed in the works of Kaempfer, have acquired for their author a considerable portion of celebrity. These works consist of his *History of Japan*; the *Amænitates exoticæ*; an *Herbarium Ultra Gangeticum*; a dissertation *de Magistatis divisione;* and his *Inaugural Theses*, on taking his degree at Leyden.

KAESTNER, Abraham Gotthelf, an eminent German mathematician, was born at Leipsic, on the 27th of Sept. 1719. His instruction had been conducted privately, under the direction of his father, and some of his other relations, with so much success, that in his tenth year, he was enabled to attend his father's lectures; and, at the age of twelve, he became a regular student at the university. At that period, his attention was principally directed to the study of jurisprudence, although, by his own account, he had a great predilection for philosophy and the mathematics. His diligence was so great, and his progress so rapid, that, in his sixteenth year, he became qualified for the degree of Bachelor in Law; and, at eighteen, he took the degree of Master in the philosophical faculty. Soon after, he commenced his career as an academical teacher, and delivered private lectures for seven years; when he was appointed an extraordinary professor of the mathematics, in 1746. In 1756, he succeeded Segner, as ordinary professor of natural philosophy and the mathematics at Gottingen. He obtained the title of aulic counsellor in 1765, and continued in this situation during four and forty years, until the period of his death, on the 20th of June, 1800.

Kaestner's greatest merit consisted in a happy talent for exhibiting the principles of mathematical science in a luminous and intelligible form. His "*Elements of Arithmetic*," and other elementary treatises on different branches of the mathematics, are extremely valuable. Their merit was so conspicuous, that they gradually, almost entirely superseded the *compendia* of the celebrated Wolf, which had previously been universally adopted in the German universities; and contributed greatly to facilitate and diffuse the study of mathematical science. His separate treatises are distinguished by the same acuteness of thought and perspicuity of arrangement. Among these we shall only mention his "*Observations on Mining, with an introduction to the method of measuring heights by means of the barometer*," which was published in 1775. Kaestner also translated several works from other languages into German; such as Hallot's *Art of Dyeing*, Smith's *Optics*, and Lulof's *Introduction to the Knowledge of the Globe. The Transactions of the Royal Swedish Academy of Sciences* were partly translated by him, and partly by others under his inspection.

Kaestner, however, did not confine himself within the province of the mathematics, but frequently displayed his talents in other departments of literature. He particularly distinguished himself as an epigrammatist, and made himself both esteemed and dreaded by the sallies of his wit; in which he is thought to have sometimes been too fond of indulging himself.

His last great work, the "*History of the Mathematics*," published at Gottingen, 1795-1800, in four volumes, although valuable as an index to the literature of the science, betrays evident marks of the age and declining talents of the author.

KALEIDOSCOPE.

Kaleidoscope[*] is the name of a new instrument, invented by Dr. Brewster, for the purpose of creating and exhibiting an infinite variety of beautiful and perfectly symmetrical forms, and is derived from the Greek words *καλος*, *beautiful*, *ειδος*, *a form*, and *σκοπεω*, *to see*.

This instrument, in its simplest form, consists of two reflecting surfaces as shewn in Plate CCCXLI. Fig. 1, placed between the eye and certain objects, by the combination of which the picture is to be created; but as the reflectors may have an infinite number of positions with respect to each other, as the eye may have an infinite number of positions with respect to the common section of the two planes, and as the object may also have an infinite number of positions with respect to the reflectors, it is necessary to ascertain the effects which are produced under these various circumstances, and to discover if there are any determinate positions of the reflectors, the object, and the eye, which enable the reflectors to form and carry to the eye of the observer a picture mathematically symmetrical, and in which all the reflected images shall have as nearly as possible the same intensity of light.

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[*] The word *Kaleidoscope* has been preferred to *Callidoscope*, *Calidascope*, and *Caleidoscope*, not merely because it approaches nearer to the original words of which it is compounded, but to avoid the appearance of its being derived from the Latin words *callidus* or *calidus*

SECT. I. *On the Effects produced, by varying the relative Position of the two Reflectors.*

Let AB, BO, Fig. 2, be a section of the two reflecting planes shewn in Fig. 1. and let us consider the aperture AOB as an object placed before the mirror AO. By the principles of catoptrics, a similar image AO b will be formed behind AO; and for the same reason, a similar image BO a of the aperture will be formed behind the other mirror BO. But the reflected images AO b, BO a, may be considered as new objects placed before the reflectors BO and AO; and therefore similar and similarly situated images of these, viz. b O a', a O b', will be formed behind the mirrors. In like manner, these images being considered as new objects, other images of the aperture AOB will be formed at $b'Oa''$, $a'O\,b''$, and $a''O\,b'''$, $b''O\,a''$, till a complete circle is formed by their combination. If the angle AOB is such as to make exactly 360°, when multiplied by any of the even numbers 2, 4, 6, 8, &c. then the circle MANB will be composed of an even number of sectors, each of which is exactly equal to AOB; but the last sector $a'''Ob''$ will consist of two halves a'''ON, b'''ON, the first of which is half of the image of $a''Ob'''$ formed by reflection from AO, while the other is half of the image of $b''Oa'''$, formed by reflection from BO; and, in this case, the last sector is bisected by the common section MN of the two reflecting planes. If, on the other hand, the angle AOB is such as to make exactly 360°, when multiplied by any odd number 3, 5, 7, 9, &c. each image of the aperture will be complete by itself, and the line MN will separate the series of images formed by AO from the series formed by BO.

When the angle AOB, after being multiplied by an even or odd number, is either greater or less than 360°, then the last reflected images on both sides of MN will be incomplete, and the circular field will be composed of a certain number of complete images of AOB, and of two incomplete images. Hence $\frac{360^\circ}{AOB}$ will always represent the number of sectors of which the circular field is composed. When the quotient is a whole number, the images will be exactly equal and complete; but if it consists of an integer and a fraction, the integer will represent the number of complete sectors, and half the remainder will represent in degrees the magnitude of the incomplete sectors. If AOB, for example is 17°, then $\frac{360^\circ}{17}=21\frac{3}{17}$; that is, the circular field will be composed of 21 complete sectors, and 2 incomplete sectors, the angular magnitude of each of which is equal to one-half of 3°, or $1\frac{1}{2}$°.

If, instead of supposing the angular aperture AOB to be the object, we place any object whatever between AO and BO, the images of it will be formed according to the principles which we have explained; and the picture created by the combination of these images will be complete or incomplete, according as the angle AOB is an integral or fractional part of the circle.

There is an exception, however, to the generality of this result, when the inclination of the reflectors is an *odd* aliquot part of a circle; that is, when $\frac{360}{AOB}$ is an odd number. In order to explain this with sufficient perspicuity, let us take the case where the angle is 72°, or $\frac{1}{5}$th part of the circle, as shewn in Fig. 3. Let AO, BO, be the reflecting planes, and $m\,n$ a line *inclined to the radius which bisects the angle* AOB, so that $O\,m > O\,n$, then mn', nm', will be the images formed by the first reflection from AO and BO, and $n'\,m''$, $m'\,n''$ the images formed by the second reflection; but by the principles of catoptrics, $O\,m = O\,m' = O\,m''$, and $O\,n = O\,n' = O\,n''$, consequently since O m is by hypothesis greater than O n, we shall have O m'' greater than O n''; that is, the images $m'\,n''$, $n'\,m''$ will not coincide. As O n approaches to an equality with O m, O n'' approaches to an equality with O m'', and when $O\,m = O\,n$, we have $O\,n'' = O\,m''$, and at this limit the images are symmetrically arranged. In like manner it may be shewn, that when the rectilineal object $m\,n$ bisects the angle AOB, the images of it will bisect all the other four sectors, and consequently are symmetrically disposed round the centre of the circle; and in general, when the object has such a form or such a position that its parts are similarly situated with respect to both the mirrors, a symmetrical picture may be produced, when the angle formed by the reflectors is an *odd* aliquot part of a circle; and therefore, since all irregular objects are composed of lines not similarly situated with respect to both the mirrors, we may conclude, *That in order to form a perfectly symmetrical picture, from the combination of any objects with irregular outlines by successive reflections between two inclined reflectors, the inclination of the reflectors must be an even aliquot part of* 360°.

SECT. II. *On the Effects produced by varying the Position of the Eye.*

If we consider the aperture ABO, Fig. 1, or any object lying in a plane passing through ABO, as the object which undergoes successive reflections, it is obvious that it may be viewed by placing the eye in any point of the quadrant comprehended between OC and OE. When the eye is placed at a small distance from C, it will be a little above the plane of the circular field formed by repeated images of AOB, and therefore this field must appear a very eccentric ellipse. As the eye advances from C towards E, the ellipse becomes less eccentric, the symmetry of the combined images increases, and when the eye comes to E, the ellipse becomes a perfect circle, and the eye being placed in a line perpendicular to its centre, observes all the images symmetrically arranged round the centre O. In the production of perfectly symmetrical forms, therefore, the position of the eye is necessarily limited to the point E, or rather to a point so situated, that the line $A'O = AO$ (Fig. 1.) may be just seen by the eye; that is, that the line joining the point A′ and the eye may just pass within the point E.

This limitation is however necessary, for very different reasons. When the eye is placed near C, the rays are incident almost perpendicularly upon the mirrors; and it is

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There are several technical words derived from the Greek, where the K is not changed into C, such as *Keratophyton*, *Keramia*, &c. which are derived from κερας, *a horn*, and several also, in which the word καλος does not double the L in its compounds, καλοπους, καλομορφος, &c.

well known, from the experiments of Bouguer, that the loss of light by reflection, is in this case extremely great both in the case of metals and polished glass. From this cause, the intensity even of the first reflected image is greatly inferior to that of the sector AOB seen by direct vision; but if the number of reflections is 16, 18, or 20, or even above 8 or 10, the last reflected image is scarcely if at all perceptible, even when a pretty strong light is thrown upon the aperture. If the picture consequently had been symmetrical and agreeable to the eye, in so far as the arrangement of its parts was concerned, it would have lost all its beauty from the extreme inequality in the light of the reflected images of which it is composed. When the reflectors are made of glass, or of glass covered on one side with black varnish, this difference is so very striking, that the circular field can scarcely be completed. By very powerful illumination, indeed, the last image may be rendered visible; but the difference of the intensities of the sectors remains the same, and therefore the imperfection of the picture cannot be corrected even by the application of the strongest lights.

As the eye advances from C to E, the angles of incidence increase, the loss of light diminishes, and the difference in the intensity of the reflected images is the least possible when the eye arrives at E. In the case of blackened glass, the last reflected images are sufficiently bright, when the number of sectors is 12 or 16. Hence it follows, *that in order to obtain a perfectly symmetrical picture from the images formed by reflection, and to procure as much equality as possible in the light of the different images, the eye should be placed in the planes of both the reflectors, or as near as possible to the angular point at* E.

SECT. III. *On the Effects produced by varying the Position of the Object.*

If the object is placed within the reflectors at any point D, between their object end O and their eye end E, a perfectly symmetrical picture will obviously be formed from it; but the centre of this picture will not be at O, the centre of the luminous sectors, but at the point D, or its projection *d*, Fig. 1 and 2, where the object is placed, so that we shall have a circular luminous field enclosing an eccentric circular pattern. Such a position of the object is therefore entirely unfit for the production of a symmetrical picture, unless the object should be such as wholly to exclude the view of the circular field, formed by the reflected images of the aperture AOB.

As the point D approaches to O, the centre of the symmetrical picture will approach to O, and when D coincides with O, the centre of the picture will be at AO, and all the images of the object placed in the plane AOB will be similarly disposed in all the sectors which compose the circular field of view. Hence we may conclude, that a perfectly symmetrical pattern cannot be exhibited in the circular field of view, when the object is placed between O and E, or any where within the reflectors. If the eye could be placed exactly at the angular point E so that every point of the line EO should be projected upon O, then the images would be symmetrically arranged round O; but this is obviously impossible, for the object would, in such circumstances, cease to become visible when this coincidence took place. But independent of the eccentricity of the pattern, the position of the object within the mirrors prevents that motion of the objects without which a variation of the pattern cannot be produced. An object between the reflectors must always be exposed to view; and we cannot restrict our view to one-half, one-third, or one-fourth of it, as when we have it in our power to move the objects across the aperture, or the aperture over the objects.

Another evil arising from the placing of the objects within the mirrors is, that we are prevented from giving them the proper degree of illumination, which is so essential to the distinctness of the last reflections. The portions of the mirrors, too, without the objects, or between D and O, are wholly unnecessary, as they are not concerned in the formation of the picture. Hence it follows, that the effects of the Kaleidoscope cannot be produced by any combination of mirrors in which the objects are placed within them.

Let us now consider what will happen, by removing the object beyond the plane passing through AOB. In this case the pattern will lose its symmetry from two causes. In the first place, it is manifest, that, as the eye is necessarily raised a little above the point E, and also above the planes AOE, BOE, it must see through the aperture AOB a portion of the object situated below both of these planes. This part of the object will therefore appear to project beyond the point, or below the plane where the direct and reflected images meet. If we suppose, therefore, that all the reflected images were symmetrical, the whole picture would lose its symmetry, in consequence of the irregularity of the sector AOB seen by direct vision. But this supposition is not correct; for since the image *m n*, Fig. 3. seen by direct vision does not coincide with the first reflected images *mn'*, *nm'*, it is clear, that all the other images will likewise be incoincident, and therefore that the figure formed by their combination must lose its symmetry, and consequently its beauty.

As the eye must necessarily be placed above a line perpendicular to the plane ABO at the point O, it will see a portion of the object situated below that perpendicular continued to the object. Thus, in Fig. 1. if the eye is placed at *e* above E, and if MN is the object placed at the distance PO, then the eye at *e* will observe the portion P *o* of the object situated below the axis POE, and this portion, which may be called the aberration, will vary with the height E *e* of the eye, and with the distance OP of the object.

Let us now suppose E *e*, and OP to be constant, and that a polygonal figure is formed by some line placed at the point Q of the object MN. Then if PQ is very great compared with P *o*, the polygonal figure will be tolerably regular, though all its angles will exhibit an imperfect junction, and its lower half will be actually, though not very perceptibly, less than its upper half. But if Q approaches to P, P *o* remaining the same, so that P *o* bears a considerable ratio to PQ, then the polygonal figure will lose all symmetry, the upper sector being decidedly the largest, and the lowest sectors the smallest. When Q arrives near P the aberration becomes enormous, and the figure is so distorted, that it can no longer be recognized as a polygon.

The deviation from symmetry, therefore, arising from the removal of the object from the extremity of the reflectors, increases as the object approaches to the centre of the luminous sectors or the circular field, and this deviation becomes so perceptible, that an eye accustomed to observe and admire the symmetry of the combined objects will instantly perceive it, even when the distance of the object or PO is less than the 20th part of an inch. When the object is very distant, the defect of symmetry is so enormous, that though the object is seen by direct vision, and in some of the sectors, it is entirely invisible in the rest.

The principle which we have now explained, is of primary importance in the construction of the Kaleidoscope, and it is only by a careful attention to it that the instrument can be constructed so as to give to an experienced and fastidious eye that high delight which it never fails to derive from the exhibition of forms perfectly symmetrical.

From these observations it follows, that a picture possessed of mathematical symmetry cannot be produced, unless the object is placed exactly at the extremity of the reflectors, and that even when this condition is complied with, the object itself must consist of lines all lying in the same plane, and in contact with the reflectors. Hence it is obvious, that objects whose thickness is perceptible cannot give mathematically symmetrical patterns, for one side of them must always be at a certain distance from O. The deviation in this case is, however, so small, that it can scarcely be perceived in objects of moderate thickness.

In the simple form of the kaleidoscope, the production of symmetrical patterns is limited to objects which can be placed close to the aperture A O B; but it will be seen in the sequel of this article, that this limitation may be removed by an optical contrivance, which extends indefinitely the use and application of the instrument.

SECT. IV. *On the Effect produced by varying the Length of the Reflectors.*

Before we proceed to investigate the effects produced by a variation in the length of the reflecting planes, it will be necessary to consider the variation of the intensity of the light in different parts of the reflected sectors. In the direct sector AOB, (Fig. 2.) the intensity of the light is uniform in every part of its surface; but this is far from being the case in the images formed by reflection. In Fig. 1, take any two points m, o, and draw the lines $m\,n$, $o\,p$, perpendicular to AB, and meeting b O in n and p. Let OE, Fig. 4, be a section of the reflector AO seen edgewise, and let O p, O n, be taken equal to the lines $m\,n$, $o\,p$, or the height of the points n, p, above the plane of the reflector AO. Make OR to OE as O p is to E e, the constant height of the eye above the reflecting plane, and O r to OE as O n to E e, and the points R, r, will be the points of incidence of the rays issuing from p and n; for in this case $ORp = ERe$, and $Orn = Ere$. Hence it is obvious, that ER e is less than E r e, and that the rays issuing from p, by falling more obliquely upon the reflecting surface, will be more copiously reflected. It follows, therefore, that the intensity of the light in the reflected sector AO b is not uniform, the lines of equal brightness, or the *isophotal* lines, as they may be called, being parallel to the reflecting surface AO, and in every sector parallel to the radius between the given sector and the reflecting surface by which the sector is formed. The intensity of the light in different points of the same sector, as well as in the different sectors, is affected by the polarisation which the light experiences by successive reflections; an effect which is produced, though in a different manner, when the reflectors are metallic. In plates of glass, the pencil in the last reflected image $a''' O b'''$, Fig. 2. is polarised in a plane perpendicular to MN, or in the same manner as if it had been reflected at the polarising angle from a vertical plane parallel to MN.

Let us now consider what will take place by a variation in the length of the reflecting planes, the angular extent of the field of view remaining always the same. If AOE, AOE′, Fig. 5, be two reflecting plates of the same breadth AO, but of different lengths, it is manifest that the light which forms the direct sector must be incident nearer the perpendicular, or reflected at less obliquities in the short plate than in the long one, and therefore that a similarly situated point in the circular field of the shorter instrument, would have less intensity of light than a similarly situated point in the larger instrument. But in this case, the field of view in the short instrument is proportionally enlarged, so that the comparison between the two is incorrect. When the long and the short instrument have equal apertures, which will be the case when the plates are AOE, A′OE, then similarly situated points of the two fields will have exactly the same intensity of light.

There is, therefore, no peculiar advantage derived in theory, from increasing the length of the reflectors beyond the distances at which their extremities can be distinctly seen by the naked eye. In practice, however, the difficulty of constructing a perfect instrument increases with the length of the reflectors. The additional risks of breaking and bending, and the additional difficulty of forming a good junction, render it advisable to limit the greatest length of the planes to six, seven, or eight inches.

SECT. V. *On the Construction and use of the simple Kaleidoscope.*

When two reflecting planes are placed in a tube, according to the principles explained in the preceding section, and the eye applied to one end of it, it will perceive at the other end a circular field, composed of as many luminous sectors as the number of times that the inclination of the plates is contained in 360°.

If we now fix upon the edges AO, BO, Fig. 1, some pieces of differently coloured glass, so as to project within the aperture AOB, the portions of the glass included in the aperture will also be included in all the images of the apertures; the images of these portions in the inverted sectors will join those in the direct sectors, and the whole will be arranged into a fixed symmetrical pattern, far surpassing what can be produced by the hands of the most skilful artist. If we now turn the tube to different parts of the room, the light will fall in different directions upon the fragments of coloured glass, and a variation of the patterns will thus be produced to a very considerable degree from fixed objects. This was the first state in which Dr. Brewster constructed the kaleidoscope; and it was not for some time afterwards, that the idea of varying the pattern by the motion of the objects occurred to him.

In executing the kaleidoscope in this new form, Dr. Brewster first placed the coloured glass, or other objects, between two plates of the thinnest glass, and holding this object plate in the hand, it was moved in various directions across the angular aperture of the instrument. The instrument was still farther improved, by sliding the object plate in a groove, as in the magic lantern, by placing the objects in a cell at the end of the reflectors; or by giving the object plate a circular form, so as to have a rotatory motion round the axis of the tube. By these means, the power of the kaleidoscope, and the beauty of the pattern, were inconceivably increased; and from being a mere toy, it now promised to be an useful and amusing instrument.

The kaleidoscope, in this simple form, is shewn in Fig. 6, where AB is the tube, A its object end, and B its eye end, and C a cell, which holds the circular object plates D, and has a groove for admitting rectangular object plates. This cell is placed on the end A of the tube, and turned round by the hand, while the eye is applied at B. When the rectangular object plate is used, it is placed in the groove of the cell C, and moved backwards and forwards in this groove, while the cell itself may be either stationary, or moved round its axis. By this means the most splendid patterns are produced, and the singular effects arising from the different directions, in which the objects cross or enter the angular aperture, are displayed in a striking manner.

The patterns may likewise be varied, by placing the different sides of the object plates next to the instrument, though in general the clear glass should be nearest the eye.

Other changes of form may be produced by a pencil or ink, or by varnish or transparent paint laid at random on the ground side of the plate.

One of the object plates is made less in diameter than the rest, in order that it may lie loose in the cell D, and vibrate by the slightest motion of the hand. The effect of this vibration is singularly fine, particularly when it is combined with the motion of the coloured fragments in the object plate. The best method of producing the vibration, is to strike slightly with the finger on the end N of the tube.

Another of the object plates, in several of the instruments, contains either fragments of colourless glass, or an irregular surface of transparent varnish or indurated Canada balsam. This object plate gives very fine colourless figures when used alone; but its principal use is to be placed in the cell between an object plate with bright colours and the end of the instrument. When this is done, the outline of the pieces of coloured glass are softened down by the refraction of the transparent fragments, and the pattern displays the finest effects of soft and brilliant colouring. The colourless object plate supplies the outline of the pattern, and the mass of colour behind fills it up with the softest tints.

When the instrument is used in candle light, the end of it, N, should be held within an inch or two of the candle, and a little to one side of it, or should be directed to a point half way between two candles placed as near each other as possible. The light of an Argand lamp is, however, preferable to that of a candle.

If the observer wishes to look at any other object not contained in the object plates, he has only to remove the cell D, and hold the object *close* to the end N of the instrument; for the symmetry of the figure is destroyed if it is kept at a distance, or if the tube MO is pulled out in the slightest degree. Hence it will be found that the pattern is most perfect when the object is actually placed upon the fixed glass at the end N of the tube OM.

In looking at opaque objects, as a seal, a watch-chain, the seconds hand of a watch, coins, pictures, gems, shells, flowers, leaves, and petals of plants, impressions from seals, &c. the object, instead of being held between the eye and the light, must be viewed in the same manner as we view objects through a microscope, being always placed as near the instrument as possible, and so as to allow the light to fall freely upon the object. The object plates A, B, C, &c. and all transparent objects, may be viewed in this manner: but the most splendid exhibition of this kind is, to view minute fragments of coloured glass, &c. placed in a flat box, the bottom of which is made of mirror glass. An object plate of this description accompanies some of the instruments.

SECT. VI. *On the Compound or Telescopic Kaleidoscope.*

IN using the simple instrument, which we have just described, the observer is often disappointed at not being able to produce a perfectly symmetrical pattern from opaque objects, from objects which are necessarily at a distance from the instrument, or from those which have such a magnitude that they cannot be introduced at the aperture AOB. The power of the instrument, indeed, in its simple form, is limited to transparent objects, or to the outlines of opaque objects held close to the aperture. A method of removing this limitation, and of extending indefinitely the use and the application of the instrument, soon suggested itself. It occurred to Dr. Brewster, that if MN, Fig. 7, were a distant object, either opaque or transparent, it might be introduced into the picture by placing a lens LL at such a distance before the aperture AOB, that its image might be distinctly formed upon the plane passing through AOB. By submitting this idea to experiment, he found it to answer his most sanguine expectations. The image formed by the lens at AOB became a new object, as it were, and was multiplied and arranged by successive reflections in the very same manner as if the object MN had been reduced in the ratio of ML to LA, and placed close to the aperture.

The compound kaleidoscope is therefore fitted up as shewn in Fig. 7, with two tubes AB, CD. The inner tube AB contains the reflectors, as in Fig. 6, and at the extremity C of the outer tube CA is placed a lens, which may be taken off or put on at pleasure. The focal length of this lens should always be much less than the length of the outer tube CA, and should in general be such that it is capable of forming an image at the end of the reflectors, when AB is pulled out as much as possible, and when the object is within three or four inches of the lens. When it is required to introduce into the picture very large objects placed near the lens, another lens of a less focal length should be used, and when the objects are distant, and not very large, a lens whose principal focal length is nearly equal to the greatest distance of the lens from the reflectors, should be used.

When this compound kaleidoscope is used as a simple instrument for viewing objects held close to the aperture, the tube AB is pushed in as far as it will go, the cell with the object plate is slipped upon the end C of the outer tube, and the instrument is used in the same way as the simple kaleidoscope.

In applying the compound kaleidoscope to distant objects, the cell is removed, and the lens LL substituted in its place. The instrument is then directed to the objects, and the tube AB drawn out till the pattern appears perfectly symmetrical.

When the object is about four inches from the lens, the tube requires to be pulled out as far as possible, and for greater distances it must be pushed in. The points suited to different distances can easily be determined by experiment, and marked on the inner tube, if it should be found convenient. In most of the instruments there is, near the middle of the tube O M, a mark which is nearly suited to all distances beyond *three feet*. The object plates A, B, C, &c. held in the hand at a distance greater than five or six inches, may be also used when the lens L is in the tube. The furniture of a room, books and papers lying on a table, pictures on the wall, a blazing fire, the moving foliage of trees and shrubs, bunches of flowers, horses and cattle in a park, carriages in motion, the currents of a river, moving insects, and, in short, every object in nature may be introduced by the aid of the lens into the figures created by the instrument.

In order to mark with accuracy the points on the tube AB, suited to different distances, the instrument should be directed to a straight line inclined like $m\,n$, Fig. 8. to the line bisecting the angular aperture AOB, and brought near to the centre O of the field. The perfect junction of the reflected images of the line at the points m', n', &c. so as to form a star, or a polygon with salient and re-entering angles, will indicate, with great nicety, that the tube has been pulled out the proper length for the given distance. In this way a scale for different distances, and scales for different lenses, may be marked on the tube.

When the length of the reflecting plates is less than the distance at which the eye sees objects with distinctness and without exertion, which may often be the case, it is of great advantage to have a convex lens placed at the eye end B of the reflectors. This lens should in general have a focal length greater than the length of the reflector, though the pattern will be seen with extreme distinctness when these two lengths are the same.

The compound Kaleidoscope, in the form now described, will be found nearly sufficient for all the purposes of amusement; but for the sake of those who may wish a greater variety of object plates, it is fitted up in a very elegant manner, with plated work, in a box which contains the instrument, the cell, the lens, twelve object plates, and a mirror box for the purpose of holding fragments of coloured glass, or other objects.

Although a skilful artist will have no difficulty in sketching a pattern from the preceding instrument, when held in his hand, yet it is obviously of great advantage to place the instrument on a stand, as shewn in Fig. 7, where the quaquaversus motion is obtained by a ball and socket, and where the instrument is capable of being raised or depressed by two drawing tubes which rise out of the outer tube MN. With this instrument, the patterns, created either from near or distant objects, can be rendered steady, so that the observer can either copy them with the utmost care, or apply to the end of the instrument the *camera lucida*, invented by Dr. Wollaston. Some of these instruments with stands are accompanied with a spare tube, for giving a different pattern by means of reflectors placed at a different angle.

The kaleidoscope, in the different forms in which it has been described, is fitted up in such a manner that it may be taken to pieces, and freed from the dust which is apt to collect upon the reflectors. In order to do this, unscrew the brass end N of the outer tube MN, and the tube OM being pushed in, its object end will be exposed to view. When the ring of leather which keeps the reflectors together is slipped off, they may be taken out, and carefully wiped with a piece of clean wash leather. When this is done, their extremities must be placed in the cell from which they were removed, and fixed there, either by the cork wedges, or the other means which are adopted for this purpose, the greatest care being taken to put the same edges in contact. The leather ring being slipped upon the reflectors, they must then be placed in the tube OM as before. A little practice will render this operation extremely easy to any person of ordinary ingenuity. The greatest care, however, must always be taken to make a fine point, or to keep the edges of the reflectors close together at that part which forms the centre of the field of view, and to have no pressure upon the reflectors, which is capable of bending them; for when this is the case, the beauty and symmetry of the pattern is greatly injured.

Different ways of fixing the reflectors so as to be easily separated and replaced at the proper angle, have been adopted in different instruments. One of the most convenient is, to support the reflector in a groove cut out of a solid cylinder of wood, of nearly the same diameter as the interior diameter of the tube AB. This grooved cylinder goes tightly into the small tube which carries the angular aperture and plane glass at A; and after a slip of wood, or any other substance, is placed along the open edges of the plates, to keep them at the proper angle given by the groove, the whole is slipped into the tube AB, where it remains firm and secure from all accident.

Sect. VII. *On the Construction and Use of the Polyangular Kaleidoscope, in which the Reflecting Planes can be fixed at any angle.*

In all the preceding instruments, the reflecting planes are fixed at an invariable angle, which is some even aliquot part of 360°; and therefore, though the forms or patterns which they create are literally infinite in number, yet they have all the same character, in so far as they are composed of as many pairs of direct and inverted images as half of the number of times that the inclination of the reflectors is contained in 360°.

It is therefore of the greatest importance, in the application of the kaleidoscope to the arts, to have it constructed in such a manner, that patterns composed of any number of pairs of direct and inverted images may be created and drawn. With this view, the instrument may be fitted up in various ways, with paper, cloth, and metallic joints, by means of which the angle can be varied and fixed; but one of the most convenient methods is shewn in Fig. 8, which represents the instrument as made by Mr. Bate, optician, London.

This instrument is composed of two cones M, N, connected together by a middle piece or ring below R, into which they are both screwed. These lines enclose two highly polished metallic reflectors AO, BO, one of which BO is fixed to the same ring below R, to which the two cones are screwed, and is so adjusted by screws that its reflecting surface passes through the axis of the cones and rings. The other reflector AO is fixed to the outer ring R, by an arm passing through an annular space or arch of a little more than 90°, cut in the circumference of the inner ring, and while its reflecting surface is adjusted so as to pass through the axis of the cones and rings, its lower edge OMNE is finely ground to a perfectly straight line, free of all roughness; and this edge is so adjusted by screws that it coincides with the axis of the cones and rings. The lower edge of the reflector AO comes a little below the same axis, so that the edge OE of the reflector BO just touches a line in the reflector AO, which coincides with the axis of the cones and rings, and forms a junction in every part of the two meeting edges.

If we now fix the outer ring R into the ring of a stand ST, so as to be held fast, and turn the cones MN with the hand, we shall give motion to the reflector BO, so as to place it at any angle we please, from 0° to 90°; and during its motion through this arch, the junction of the two reflectors must remain perfect, if the touching lines are adjusted, as we have described them, to the axis of motion, which must also be the axis of the cones and rings. If, on the contrary, we take away the stand, and, holding the instrument in the hand by either of the cones M, N, turn the ring R with the other, we shall give motion to its reflector AO, and produce a variation in the angle in the same manner as before.

In order to enable the observer to set the reflectors at once to an even aliquot part of a circle, or so as to give pairs of direct and inverted images, the most convenient of the even aliquot parts of the circle are engraven upon the ring R; so that we have only to set the index I to any of these parts, to No. 20 for example, and the reflectors will then be set at an angle of 18°, and will form a circular field with *twenty* luminous sectors, or a star with *ten* points, and consequently a pattern composed of ten pair of direct and inverted images.

As the length of the plates is only about 5 inches, it is necessary for some eyes to have a convex lens placed at E. A brass ring, containing a plane glass, screws into the outer ring CD, and there is an object plate accompanying the instrument, and containing fragments of differently coloured glass. This object plate consists of two plates of glass, one ground and the other transparent, set in brass rims. The transparent one goes nearest the reflectors, and the brass rim which contains it screws into the other, so as to contain between them the coloured fragments. A loose ring surrounds this object plate; and when this ring is screwed into the circular rim CD, the object plate can be turned round so as to produce a variety of patterns, without any risk of its being detached from the outer cone.

Some of the preceding instruments have been fitted up also with plates of glass ground perfectly flat and highly polished, which reflect a great deal of light, and are less liable to be injured by the operation of removing the dust, or by other causes. Flint glass, from its high reflective power, is preferable to any other. The polyangular kaleidoscope, as made by Mr. Bate with glass plates, is constructed on different principles from the one now described. The reflectors are placed in a cylindrical tube, and the motion of the moveable reflector is produced by a contrivance extremely simple and ingenious. A full account of this instrument will be found in Dr. Brewster's *Treatise on the Kaleidoscope.*

The kaleidoscope appears in its most perfect form, when the preceding instrument is constructed with an outer tube containing one or more lenses, for the purpose of creating patterns from distant objects. One of the lenses, intended for objects at a greater distance than 10 or 12 feet, should have its focal length nearly equal to the greatest distance between the lens and the end of the reflector, in order that these objects, if small, may be introduced into the aperture as large as possible. The other lens, intended for objects at a less distance than 10 or 12 feet, or for distant objects of a very great size, should have a focal length a little greater than one half the focal length of the other lens. By combining these lenses, the effect of a more convex lens will be obtained, which may often be useful, when we wish to see objects held very near the instrument.

SECT. VIII. *On the application of the Kaleidoscope for projecting the Pictures which it creates upon a wall.*

The pictures created by the Kaleidoscope are visible only to one person at a time; but it is by no means difficult to fit it up for the express purpose of exhibiting it at the same time to a number of spectators. The necessary limitation of the aperture at the eye end of the instrument, is however very hostile to this species of exhibition, and renders it necessary that the objects should be as transparent as possible, and very strongly illuminated.

The apparatus requisite for this purpose is shewn in Fig. 9, where FG is the kaleidoscope, having its reflectors inclined at an angle of $22\frac{1}{2}^\circ$, $25\frac{10}{14}^\circ$, 30°, 36°, 45°, 60°, or 90°; for if the angle is made smaller, the last reflections will not be easily seen. The objects out of which the picture is created are placed in the object plate DE, and are illuminated by means of a lens AD, which concentrates upon them the direct light from the lamp or candle C, and also the light reflected from the concave mirror M. At the eye end of the kaleidoscope is placed a lens L, close to the end of the reflectors. This lens should have a focal length about an inch less than the length FG of the reflectors, in order that the image of the pattern created at F may be thrown upon the wall W, at a convenient distance from L.

When the instrument is thus fitted up, an enlarged image of the pattern will be seen upon the wall W, and this image will undergo every possible transformation, and exhibit to the spectator every variety of tint and form by the motion of the object, either through a groove or round the axis of the instrument. The same effect may be produced by the light of the sun; but in this case the mirror MN is unnecessary.

One of the polyangular kaleidoscopes, as made by Mr. Bate, has been fitted up in this manner, for exhibition at the lectures on natural philosophy delivered at Guy's Hospital, by that eminent chemist, William Allen, Esq. F. R. S. The light is derived from an oxygen lamp, which produces the most intense illumination.

SECT. IX. *On Annular and Rectilineal Kaleidoscopes.*

As it is often of considerable importance in the ornamental arts to have patterns for circular and rectilineal borders, the kaleidoscope may be fitted up to accomplish these objects. If the two reflectors AC, BD are placed in the manner shewn in Fig. 10, so that AO is the centre to which they converge, any objects placed at the end of the reflectors will give an annular pattern, forming part of a circle whose radius is AO. As the point of convergence O recedes from CD, the circle of which it is a portion increases in magnitude; and when O is infinitely distant, the reflectors have a parallel position, as shewn in Fig. 11, when the pattern which they form becomes exactly rectilineal. A portion of the pattern is seen of sufficient length to enable the artist to form the most correct opinion of its effect. A very ingenious instrument has been constructed for this purpose by Messrs. P. and G. Dollond, of which a complete drawing and description will be found in Dr. Brewster's *Treatise on the Kaleidoscope.* Two metallic mirrors are placed at an angle of 30°, so as to form a kaleidoscope for giving circular patterns in the usual way; and, by a particular contrivance, these same mirrors may be thrown into the positions shewn in Figs. 10, 11, so as to give rectilineal patterns, and annular patterns of any radius.

SECT. X. *On Polycentral Keleidoscopes.*

Hitherto we have considered the effects produced by the use of two reflecting planes; but it must be obvious, from the principles already explained, that very singular effects will be obtained from the combination of three or more reflectors.

Kaleidoscopes may be constructed, by combining four equal reflectors in the form of a hollow square, or five reflectors in the form of a hollow rectangle; but though they exhibit regular figures from the angles being even aliquot parts of 360°, yet they are by no means interesting. All polygons of a greater number of sides are incapable of giving regular forms, as their angles must exceed any even aliquot part of a circle. It is, therefore, only from a combination of three reflectors that we can expect any pleasing and useful effect.

Since the angles at which the three mirrors are placed must be all even aliquot parts of 360°, such as 90°. 60°. 45°, 36°, 30°, $25\frac{10}{14}^\circ$, $22\frac{1}{2}^\circ$, 20°, &c. the quotients of 360°, divided by 4, 6, 8, 10, 12, 14, 16, 18, &c. we must select any three of these even aliquot parts which make up 180°, as this must be the sum of the angles at which the reflectors are placed.

Now it is obvious that this condition will be complied with, when the angles are

$$90+45+45=180$$
$$90+60+30=180$$
$$60+60+60=180$$

The polycentral kaleidoscopes are therefore limited to five different forms, viz.

1. Four mirrors forming a square,
2. Four mirrors forming a rectangle,
3. Three mirrors at angles of 90°, 45°, and 45°,

4. Three mirrors at angles of 90°, 60°, and 30°, and
5. Three mirrors at angles of 60°, 60°, and 60°.

Sect. XI. *History of the Kaleidoscope.*

As this instrument has excited great attention, both in this country and on the continent, we have no doubt that our readers will take some interest in the history of the invention. In the year 1814, when Dr. Brewster was engaged in experiments on the polarisation of light by successive reflections between plates of glass, which were published in the *Philosophical Transactions for* 1815, and honoured by the Royal Society of London with the Copley Medal, the reflectors were in some cases inclined to each other, and he had occasion to remark the circular arrangement of the images of a candle round a centre, or the multiplication of the sectors formed by the extremities of the glass plates. In repeating, at a subsequent period, the experiments of M. Biot on the action of fluids upon light, Dr. Brewster placed the fluids in a trough formed by two plates of glass cemented together at an angle. The eye being necessarily placed at one end, some of the cement which had been pressed through between the plates appeared to be arranged into a regular figure. The symmetry of this figure being very remarkable, Dr. Brewster set himself to investigate the cause of the phenomenon, and in doing this he discovered the leading principles of the kaleidoscope. He found that, in order to produce perfectly beautiful and symmetrical forms, three conditions were necessary.

1. That the reflectors should be placed at an angle, which was an *even* or an *odd* aliquot part of a circle, when the object was regular, and similarly situated with respect to both the mirrors; or the *even* aliquot part of a circle, when the object was irregular.

2. That out of an infinite number of positions for the object, both within and without the reflectors, there was *only one* position where perfect symmetry could be obtained, namely, by placing the object in contact with the ends of the reflectors.

3. That out of an infinite number of positions for the eye, there was *only one* where the symmetry was perfect, namely, as near as possible to the angular point, so that the circular field could be distinctly seen; and that this point was the *only one* out of an infinite number at which the uniformity of the light of the circular field was a maximum.

Upon these principles, Dr. Brewster constructed an instrument, in which he fixed *permanently* across the ends of reflectors, pieces of coloured glass, and other irregular objects, and he shewed the instrument in this state to some members of the Royal Society of Edinburgh, who were much struck with the beauty of its effects. In this case, however, the forms were nearly permanent, and a slight variation was produced by varying the position of the instrument, with respect to the light. The great step, however, towards the completion of the instrument remained yet to be made, and it was not till some time afterwards that the idea occurred to Dr. Brewster *of giving motion to objects, such as pieces of coloured glass, &c. which were either fixed or placed loosely in a cell at the end of the instrument.* When this idea was carried into execution, the kaleidoscope, in its *simple form*, was completed.

In this state, however, the kaleidoscope could not be considered as a general philosophical instrument of universal application; for it was incapable of producing beautiful forms, unless the object was nearly in perfect contact with the end of the reflectors.

The next, and by far the most important step of the invention, was therefore to remove this limitation by employing a draw tube and lens, by means of which beautiful forms could be created from objects of all sizes, and at all distances from the observer. In this way the power of the kaleidoscope was indefinitely extended, and every object in nature could be introduced into the picture, in the same manner as if these objects had been reduced in size, and actually placed at the end of the reflectors.

When the instrument was brought to this state of perfection, Dr. Brewster was urged by his friends to secure the exclusive property of it by a patent, and he accordingly took out a patent for "a new optical instrument for creating and exhibiting beautiful forms." In the specification of his patent, he describes the kaleidoscope in two different forms. The first consists of two reflecting planes, put together according to the principles already described, and placed in a tube, with an eye-hole in the particular position which gives symmetry and a maximum uniformity of light, and with objects such as coloured glass, *placed in the position of symmetry, and put in motion, either by a rotatory movement, or by their own gravity, or by both combined.* The second form of the instrument, described in the specification, is, when the tube containing the reflectors is placed in a second tube, at the end of which is a convex lens, which introduces into the picture objects of all magnitudes, and at every distance, as has been already described.

After the patent was signed, and the instrument in a state of forwardness, the gentleman who was employed to manufacture them under the patent carried a kaleidoscope to shew to the principal London opticians, for the purpose of taking orders from them. These gentlemen naturally made one for their own use, and for the amusement of their friends; and the character of the instrument being thus made public, the tinmen and glaziers began to manufacture the detached parts of it, in order to evade the patent; while others manufactured and sold the instrument complete, without being aware that the exclusive property of it had been secured by a patent.

In this way the invasion of the patent right became general among that class of individuals, against whom the law is seldom enforced but in its terrors. Some workmen of a higher class were encouraged to piracy by this universal opposition to the patent; but none of the respectable London opticians would yield to the clamours of their customers, to encroach upon the rights of an inventor, to whom they were at least indebted for a new and a lucrative article of trade.

In order to justify these piratical proceedings, it became necessary to search for some combinations of plain mirrors, which might be supposed to have a resemblance to Dr. Brewster's instrument; and it would have been strange, indeed, if some theorem or experiment had not been discovered, which could have been used to impose upon the great crowd, who are entirely ignorant of the principles and construction of optical instruments. There never was a popular invention, which the labours of envious individuals did not attempt to trace to some remote period; and, in the present case, so many persons had hazarded their fortunes and their characters, that it became necessary to lay hold of something which could be construed into an anticipation of the kaleidoscope.

The first supposed anticipation of the kaleidoscope was found in Prop. XIII. and XIV. of Professor Wood's *Optics*, where that learned author gives a mathematical investigation of the number and arrangement of the images formed by two reflectors, either inclined or parallel to each other. These theorems assign no position, either to the eye or to the object, and do not even include the principle of inversion, which is absolutely necessary to the production of symmetrical forms. The theorems, indeed, are true, whatever be the position of the object or of the eye. In order to put this matter to rest, Dr. Brewster wrote a letter to Professor Wood, requesting him to say if he had any idea of the effects of the kaleidoscope when he wrote these propositions. To this letter, Dr. Brewster received the following handsome and satisfactory answer:

St. John's, May 19th, 1818.

"SIR,—The propositions I have given, relating to the number of images formed by plane reflectors inclined to each other, contain merely the mathematical calculation of their number and arrangement. *The effects produced by the kaleidoscope were never in my contemplation.* My attention has for some years been turned to other subjects, and I regret that I have not time to read your Optical Treatise, which I am sure would give me great pleasure. I am, Sir, your most obedient humble servant,

"J. WOOD."

The next supposed anticipation of the Kaleidoscope was an instrument proposed by Mr. Bradley in 1717. This instrument consists of two large pieces of silvered looking-glass, *five inches wide*, and *four inches high*, jointed together with hinges, and opening like a book. These plates being set upon a geometrical drawing, and the eye being placed in front of the mirrors, the lines of the drawing were seen multiplied by repeated reflections. This instrument was described long before by Kircher, and did not receive a single improvement from the hands of Bradley. It has been often made by the opticians, and was principally used for multiplying the human face, when placed between the mirrors; but no person ever thought of applying it to any purpose of utility, or of using it as an instrument of rational amusement, by the creation of beautiful forms. From the very construction of the instrument, indeed, it is quite incapable of producing any of the singular effects exhibited by the kaleidoscope. It gives, indeed, a series of reflected images arranged round a centre; but so does a pair of looking-glasses placed angularly in an apartment, and so do the pieces of mirror glass with which jewellers multiply the wares exhibited at their windows. It might therefore be as gravely maintained that any of these combinations of mirrors was a kaleidoscope, as that Bradley's pair of plates was an anticipation of that instrument. As the similarity between the two has been maintained by ignorant and interested individuals, we shall be at some pains to explain to the reader the differences between these two instruments; and we shall do this, first, upon the supposition that the two instruments are applied to geometric lines upon paper.

1. In Bradley's instrument, the length is less than the breadth of the plates.	1. In the kaleidoscope, the length of the plates must be four, or five, or six times their breadth.
2. Bradley's instrument cannot be used with a tube.	2. The kaleidoscope cannot be used without a tube.
3. In Bradley's instrument, from the erroneous position of the eye, there is a great inequality of light in the sectors, and the last sectors are scarcely visible.	3. In the kaleidoscope, the eye is placed, so that the uniformity of light is a maximum, and the last sectors are distinctly visible.
4. In Bradley's instrument, the figure consists of elliptical, and consequently unequal sectors.	4. In the kaleidoscope, all the sectors are equal, and compose a perfect circle, and the picture is perfectly symmetrical.
5. In Bradley's instrument, the unequal sectors *do not unite*, but are all separated from one another by a space equal to the thickness of the mirror glass.	5. In the kaleidoscope, the equal sectors all unite into a complete and perfectly symmetrical figure.
6. In Bradley's instrument, the images reflected from the first surface interfere with those reflected from the second, and produce a confusion and overlapping of images entirely inconsistent with symmetry.	6. In the kaleidoscope, the secondary reflections are entirely removed, and therefore no confusion takes place.
7. In Bradley's instrument, the defects in the junction of the plates are all rendered visible by the erroneous position of the eye.	7. In the kaleidoscope, the eye is placed so that these defects of junction are invisible.

The reader will observe, that in this comparison the two instruments are supposed to be applied to *geometric lines upon paper*, and that this was the only purpose to which Bradley ever thought of applying his mirrors; yet the kaleidoscope is in every respect a superior instrument, even for that inferior purpose, and gives true symmetrical forms, which the other instrument is incapable of doing.

In the comparison which has now been made, we have degraded the Kaleidoscope, by contrasting its effects with those which Bradley's instrument is capable of producing, for these effects are not worth the looking at. When we attempt to employ Bradley's instrument to produce the effects which have been so much admired in the kaleidoscope, namely, to produce beautiful forms from transparent or opaque coloured objects contained in a cell, and at the end of the reflectors, it fails so entirely, that no person has succeeded in the attempt It is, indeed, quite impossible to produce by it the beautiful and symmetrical forms which the kaleidoscope displays. Had this been possible, Dr. Brewster's patent might have been invaded with impunity by every person who chose to manufacture Bradley's instrument; but this was never tried, and for the best of all reasons, because nobody would have purchased it.

We trust that no person, who wishes to judge of this subject with candour, will form an opinion without having *actually seen and used* the instrument proposed by Bradley. Let any person take Bradley's plates, and, having set them at an angle of 30° or 22½°, place them upon a cell containing fragments of coloured glass, he will infallibly find that he cannot produce a picture of any symmetry or beauty. The disunion of the sectors, the darkness of the last reflections, and the enormous deviation from symmetry, towards the centre of the figure, will convince him, if he required conviction, that the instrument is entirely useless as a kaleidoscope. To those, however, who are not capable, either for want of knowledge, or want of time, to make such a comparison, we may present the opinion of three of the most eminent natural philosophers of the present day, viz. the celebrated Mr. Watt, Professor Playfair, and Professor Pictet.

"It has been said here," says Mr. Watt, "that you took the idea of the kaleidoscope from an old book on gardening. My friend, the Rev. Mr. Corrie, has procured me a sight of the book. It is Bradley's Improvements of Planting and Gardening. London 1731, part 2d. chap. 1st. It consists of two pieces of looking glass of equal bigness, of the figure of a long square, five inches long and four inches high, hinged together, upon one of the narrow sides, so as to open and shut like the leaves of a book, which, being set upon their edges upon a drawing, will shew it multiplied by repeated reflections. This instrument I have seen in my father's possession 70 years ago, and frequently since, but what has become of it I know not. In my opinion, the application of the principle is very different from that of your kaleidoscope."

The following is Professor Playfair's opinion :

Edinburgh, 11*th May*, 1818.

"I have examined the kaleidoscope invented by Dr. Brewster, and compared it with the description of an instrument which it has been said to resemble, constructed by Bradley in 1717. I have also compared its effect with an experiment to which it may be thought to have some analogy, described by Mr. Wood in his Optics, Prop. 13 and 14.

"From both these contrivances, and from every optical instrument with which I am acquainted, the kaleidoscope appears to differ essentially, both in its effect and in the principles of its construction.

"As to the effect, the thing produced by the kaleidoscope is a series of figures presented with the most perfect symmetry, so as always to compose a whole, in which nothing is wanting and nothing redundant. It matters not what the object be to which the instrument is directed, if it only be in its proper place, the effect just described is sure to take place, and with an endless variety. In this respect, the kaleidoscope appears to be quite singular among optical instruments. Neither the instrument of Bradley, nor the experiment or theorem in Wood's book, have any resemblance to this ; they go no further than the multiplication of the figure.

"Next, as to the principle of construction, Dr. Brewster's instrument requires *a particular position of the eye of the observer, and of the object looked at*, in order to its effect. If either of these is wanting, the symmetry vanishes, and the figures are irregular and disunited. In the other two cases, no particular position, either for the eye or the object, is required.

"For these reasons, Dr. Brewster's invention seems to me quite unlike the other two. Indeed, as far as I know, it is quite singular among optical instruments ; and it will be matter of sincere regret, if any imaginary or vague analogy, between it and other optical instruments, should be the means of depriving the Doctor of any part of the reward to which his skill, ingenuity, and perseverance, entitle him so well.

John Playfair,
Professor of Natural Philosophy in the University of Edinburgh.

"P. S.—Granting that there were a resemblance between the kaleidoscope and Bradley's instrument, in any of the particulars mentioned above, the introduction of coloured and moveable objects, at the end of the reflectors, is quite peculiar to Dr. Brewster's instrument. Besides this, a circumstance highly deserving of attention, is the use of two lenses and a draw tube, so that the action of the kaleidoscope is extended to objects of all sizes, and at all distances from the observer, and united, by that means, to the advantages of the telescope.

J. P."

Professor Pictet's opinion is stated in the following letter :

Sir,—Among your friends, I have not been one of the least painfully affected by the shameful invasion of your rights as an inventor, which I have been a witness of lately in London. Not only none of the allegations of the invaders of your patent, grounded on a pretended similarity between your kaleidoscope and Bradley's instrument, or such as Wood's or Harris' theories might have suggested, appear to me to have any real foundation ; but I can affirm, that, neither in any of the French, German, or Italian authors, who, to my knowledge, have treated of optics, nor in Professor Charles' justly celebrated and most complete collection of optical instruments at Paris, have I read or seen any thing resembling your ingenious apparatus, which, from its numberless applications, and the pleasure it affords, and will continue to afford, to millions of beholders of its matchless effects, may be ranked among the most happy inventions science ever presented to the lovers of rational enjoyment.

M. A. Pictet,
Professor of Nat. Phil. in the Academy of Geneva.

To Dr. Brewster.

The propositions in Harris' Optics relate, like Professor Wood's, merely to the multiplication and circular arrangement of the apertures or sectors formed by the inclined mirrors, and to the progress of a ray of light reflected between two inclined or parallel mirrors; and no allusion whatever is made, in the propositions themselves, to any instrument. In the proposition respecting the multiplication of the sectors, the eye of the observer is never once mentioned, and the proposition is true, if the eye has an infinite number of positions ; whereas, in the kaleidoscope, the eye can only have one position. In the other proposition, (Prop. XVII.) respecting the progress of the rays, the eye and the object are actually stated to be placed *between the reflectors ;* and even if the eye had been placed without the reflectors, as in the kaleidoscope, the position assigned it, at a great distance from the angular point, is a demonstration that Harris was *entirely ignorant of the positions of symmetry either for the object or the eye*, and could not have combined two reflectors so as to form a kaleidoscope for producing beautiful or symmetrical forms. The *only practical part* of Harris' propositions is the 5th and 6th scholia to Prop. XVII. In the 5th scholium he proposes a sort of catoptric box or cistula, known long before his time, composed of four mirrors, arranged in a most unscientific manner, and containing opaque objects *between the speculums*. "Whatever they are," says he, when speaking of the objects, "the upright figures between the speculums should be slender, and not too many in number, otherwise they will too much *obstruct the reflected rays from coming to the eye*." This shews, in a most decisive manner, that Harris knew nothing of the kaleidoscope, and that he has not even improved the common catoptric cistula, which had been known long before. The principle of inversion, and the positions of symmetry, were entirely unknown to him. In the 6th scholium, he speaks of rooms lined with looking-glasses, and of luminous amphitheatres, which have been described and figured by all the old writers on optics.*

The persons who have pretended to compare Dr. Brewster's kaleidoscope with the combinations of plain mirrors described by preceding authors, have not only been utterly unacquainted with the principles of optics, but have not been at the trouble either of understanding the principles on which the patent kaleidoscope is constructed, or of examining the construction of the instrument itself. Because it contains two plain mirrors, they infer that it must be the same as every other instrument that contains two plain mirrors, and hence the same persons would, by a similar process of reasoning, have concluded that a telescope is a microscope, or that a pair of spectacles with a double lens is the same as a telescope or a microscope, because all these instruments contain two lenses. An astronomical telescope differs from a compound microscope only in having the lenses placed at different distances. The progress of the rays is exactly the same in both these instruments, and the effect in both is produced by the enlargement of the angle subtended by the object. Yet surely there is no person so senseless, as to deny that he who first combined two lenses in such a manner as to discover the mountains of the moon, the satellites of Jupiter and Saturn, and all the wonders of the system of the universe, was the author of an original invention. He who produces effects which were never produced before, even by means which have been long known, is unquestionably an original inventor; and upon this principle alone can the telescope be considered as an invention different from the microscope. In the case of the kaleidoscope, the originality of the invention is far more striking. Every person admits that effects are produced by Dr. Brewster's instrument, of which no conception could have been previously formed. All those who saw it, acknowledged that they had never seen any thing resembling it before; and those very persons who had been possessors of Bradley's instrument, who had read Harris' Optics, and made his shew boxes, and who had used other combinations of plain mirrors, never supposed for a moment, that the pleasure which they had derived from the kaleidoscope had any relation to the effects described by these authors.

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* The reader is requested to examine carefully the propositions in Harris' Optics ; he will then be convinced, that Harris placed both the eye and the object between the mirrrors, an arrangement which was known 100 years before his time.

No proof of the originality of the kaleidoscope could be stronger than the sensation which it excited in London and Paris. In the memory of man, no invention, and no work, whether addressed to the imagination or to the understanding, ever produced such an effect. A universal mania for the instrument seized all classes, from the lowest to the highest, from the most ignorant to the most learned, and every person not only felt, but expressed the feeling, that a new pleasure had been added to their existence.

If such an instrument had ever been known before, a similar sensation must have been excited, and it would not have been left to the ingenuity of the half learned and the half honest, to search for the skeleton of the invention among the rubbish of the 16th and 17th centuries.

The patent kaleidoscopes are now made in London, under the sanction of the Patentee, by Messrs. P. and G. Dollond, W. and S. Jones, Mr. R. B. Bate, Messrs. Thomas Harris and Son, Messrs. W. and T. Gilbert, Mr. Bancks, Mr. Berge, Mr. Thomas Jones, Mr. Blunt, Mr. Schmalcalder, Messrs. Watkins and Hill, and Mr. Smith. In Birmingham by Mr. Philip Carpenter; in Bristol by Mr. Beilby; and in Edinburgh by Mr. John Ruthven. An account of the different forms in which these ingenious opticians have fitted up the kaleidoscope, and of the new contrivances by which they have given it additional value, will be published in Dr. Brewster's *Treatise on the Kaleidoscope*, now in the press.

KALENDAR. See CHRONOLOGY.

KALIF. See CALIPH.

KAMMA. See RUSSIA.

KAMMENI, the Great and Little, or Burnt Islands, are two islands in the Grecian Archipelago, which derive their name from their calcined appearance. The first of these, or the Great Kammeni, was called *Kiera* by the ancients. In the year 1473, another island suddenly appeared above the sea, and was distinguished by the name of the Micri Kammeni. On the 23d of May, 1707, a new islet appeared about a league from Santorin, between the Great and the Little Kammeni; and as a very particular account of this remarkable phenomenon has been given by an eye-witness, we shall not scruple to lay an abridged account of it before our readers.

"On the 18th of May, there had been felt at Santorin two slight shocks of an earthquake. No great attention was paid to them at the time; but there was reason to suppose that the new islet was beginning to detach itself from the bottom of the sea, and to rise towards its surface. Some Greeks belonging to Santorin having seen the first points of the growing island, imagined that these might be the remains of some shipwreck, which the sea had brought during the night. When they discovered that, in lieu of pieces of a floating wreck, these were black and calcined rocks, they returned, quite frightened, publishing every where what they had seen.

"Though the fright was general in the whole island of Santorin, yet some of the inhabitants came to a resolution of making observations on the very spot. Having landed, curiosity induced them to proceed from rock to rock: they found every where a sort of white stone which might be cut like bread, and a quantity of fresh oysters adhering to the rocks; a circumstance very uncommon at Santorin. While these Greeks were amusing themselves with eating the oysters, they all at once felt the rocks move, and the ground tremble under their feet: terror soon made them abandon their repast, in order to jump into their boat, and row away as hard as they could pull. This shock was a motion of the island, which was increasing, and which, at that moment, visibly rose, having, in a very few days, gained near 20 feet in height, and twice as much in breadth. One day, a rock very remarkable from its size and figure, having issued from the sea, 40 or 50 paces from the middle of the island, sunk at the expiration of four days into the water, and appeared no more. These different commotions violently shook the Little Kammeni, and on its summit was remarked a long fissure, which had not been seen there before. During this time, the sea of the gulf several times changed its colour: it first became of a dazzling green, then of a reddish hue, and at last of a pale yellow, and constantly emitted a great stench.

"On the 16th of July, smoke was seen, for the first time, to issue, not from the part of the island that appeared, but from a chain of black rocks, which rose all on a sudden sixty yards from that spot, and from a part of the sea where no bottom had been found: this, for some time, formed as it were two separate islands, one of which was called the White Island, and the other the Black Island, on account of their different colours; but which, ere long, were again united to each other, yet in such a manner that those black rocks which last sprang up became the centre of the whole island.

"Neither fire nor smoke was ever seen on the White Island; yet it continued to grow larger; but the Black Island increased far more quickly. Every day were seen to arise big rocks, which sometimes were joined to the island, and sometimes were very remote from it; so that, in less than a month, were reckoned as many as four little black islands, which in four days formed but one. It was likewise remarked that the smoke had greatly increased, and that, no wind blowing at the time, it ascended so high that it was seen from Candia, from Naxia, and from other distant islands. During the night, this smoke always appeared fiery to the height of fifteen or twenty feet, and the sea was covered with a reddish substance or froth in some places, and yellowish in others. So great a degree of putrefaction spread through all Santorin, that the inhabitants were obliged to burn perfumes, and to kindle fires in the streets. This infection lasted only a day and a half. A very fresh south-west wind dispelled it; but, in driving away one evil, it introduced another. It carried this burning smoke over a great part of the best vineyards of Santorin, the grapes of which were almost ripe, and which, in one night, were all scorched. It was likewise remarked, that wherever this smoke was carried, it blackened silver and copper, and occasioned the inhabitants violent headaches, accompanied by strong nausea. At that time, the White Island settled and sunk all at once upwards of ten feet.

" On the 31st of July, it was discovered that the sea cast forth smoke, and boiled up in two places, the one at thirty, and the other at sixty yards from the Black Island. In these two spaces, each of which formed a perfect circle, the water appeared like oil on the fire. This lasted upwards of a month, during which were found a great many dead fishes.

" The following night was heard a hollow noise, like the report of several cannon fired at a distance; and almost immediately issued from the middle of the crater two long sheets of fire, which ascended very high, and were directly extinguished.

" On the 1st of August, the same hollow noise was heard repeatedly. It was followed by a bluish black smoke, which rose in the form of a pillar to a prodigious elevation.

" On the 7th of August, the noise was similar to that of several large heaps of stones falling all at once into a deep well; and after having lasted several days, changed into another considerably louder.

" On the 21st of August, the fire and smoke diminished considerably; but at break of day, they resumed more strength than they had before possessed. The smoke was red and very thick, and the fire which issued was so fierce, that the sea round the Black Island smoked and boiled up in a surprising manner.

" On the morning of the 22d, the island was become much higher than it was the day before. A chain of rocks, of nearly fifty feet, had greatly increased its breadth. The sea was again covered with that reddish foam already mentioned, which emitted every where an intolerable stench.

" On the 5th of September, the fire opened itself a passage at the extremity of the Black Island, at the same time inclining towards Therasia. The fire issued thence for some days only, during which less came out of the great crater.

" Thrice there arose from the great crater, as it were, three of the largest sky-rockets, of a fire the most brilliant and the most beautiful. On the following nights it was quite another thing. After the usual reports of the subterraneous thunder, all at once were seen going off, as it were, long sheaves sparkling with a million of lights, which, following each other, ascended to a very great height, then fell again in showers of stars on the island, which thence appeared quite illuminated.

" On the 9th of September, the two islands, the White Island and the Black one, by dint of increasing each in breadth, began to meet and to form but one body. After this junction, the extremity of the island to the south-west increased no more either in length or height; whereas the other extremity to the west did not cease to lengthen very perceptibly.

" Of all the openings, there were now but four which emitted any fire. Sometimes the smoke issued with impetuosity from all together, sometimes only from one or two; one while with noise, another without, but almost always with a whistling, which might have been taken for the various sounds of the pipes of an organ, and sometimes for the howling of wild beasts.

" On the 12th of September, the subterraneous noise, having to spread between four openings, was never so frightful, nor so frequent as on that day and the following. The loud and repeated claps, similar to the general discharge of a numerous and heavy train of artillery, were heard ten or twelve times in the course of twenty-four hours; and, a moment after, there issued from the great crater stones of an enormous size, quite red hot, which were thrown to a great distance, and lost in the sea. These loud claps were always accompanied by clouds of ashes, some of which were carried in eddies as far as Anasi, an island twenty-five miles distant from Santorin. These ashes had the figure and the grain of fine powder; but, thrown into the fire, they produced only a few slight crepitations, without emitting flame.

" On the 18th of September, there was at Santorin an earthquake which occasioned no damage. The island was considerably increased by it, as well as the fire and smoke, which, on that day and the following night, opened to themselves new passages. Till then, so many fires together had not been seen, nor had such loud reports been heard: their violence was so extraordinary, that the houses of Scaro were shaken by it. Through thick volumes of smoke, which appeared like a mountain, was heard the loud noise of an infinite number of huge stones, which whizzed in the air like large cannon balls, and fell afterwards on the island and into the sea, with a crash which made all who heard it shudder. The little Kammeni was several times covered with these burning stones, which rendered it quite resplendent.

" On the 21st of September, the little Kammeni being thus quite in a blaze, after one of those furious shocks just mentioned, there thence arose three large flashes of lightning, which traversed all the horizon of the sea. At the same instant, there occurred so great a shaking of the whole new island, that the half of its great crater fell in, and there were huge burning stones, of a prodigious mass, which were driven to the distance of upwards of two miles.

" On the 24th of September, the fire resumed all its strength, and the island became more formidable than ever. Among the claps, almost continual, and which were so violent, that two persons, speaking to each other, could with difficulty make themselves heard, there suddenly occurred one so dreadful, that it made every body run to the churches. The big rock, on which Scaro is built, tottered, and all the doors of the houses were forcibly thrown open.

" Every thing continued in the same state during the months of October, November, and December 1707, and January 1708. Not a day passed without the great crater making an explosion at least once or twice, and most frequently five or six times.

" On the 10th of February 1708, about eight o'clock in the morning, there was at Santorin a rather violent shock of an earthquake. In the course of the night, there had been one much slighter, which induced the opinion, that the volcano was again preparing some terrible scene. Large rocks of a frightful mass, which till then had appeared only even with the water's edge, rose very high; and the boiling up of the sea increased to a great excess. The subterraneous roarings lasted day and night without intermission. The great crater burst even five or six times in a quarter of an hour, and gave reports which, from their repetition, from the quantity and the bigness of the stones that flew about, from the shaking of the houses, and from the great fire that appeared in open day, surpassed every thing that had preceded.

" The 15th of April was remarkable, among all the other days, from the number and the fury of those terrible shocks;

so that, for a long time, seeing nothing but fire, fiery smoke, and large pieces of rock, which filled the air, all the inhabitants of Santorin thought that the island was blown up. Half of the circumference of the great crater had fallen in, and in an instant again became higher than it was, by the heap of ashes and big stones by which it was repaired.

“ From that day till the 23d of May, every thing continued nearly on the same footing. What was particularly remarked, was, that the island constantly increased in height, and scarcely increased any more in breadth. The great opening, or large crater, rose very high; and from the melted substances which cemented its fabric, was gradually formed, as it were, a great pasty, with a very broad slope.

“ On the 15th of July, some persons belonging to Santorin wished to have a near view of the new island. They took care to provide themselves with a boat well caulked, and whose seams were filled with oakum strongly chinced. They went straight to that side of the island where the sea did not boil up, but where it smoked very much. Scarcely had the inquisitive party reached this smoke, than they all felt a suffocating heat, which affected them. They put their hands into the water, and found it scalding; they were as yet, however, only within five hundred yards of the land. There not being a probability of their proceeding farther that way, they turned towards the point most distant from the great crater. The fire, which was still there, and the sea, which boiled up with fury, obliged them to take a long circuit. They landed on the Great Kammeni, whence they had the convenience of examining the real length of the island, and particularly the side which they had not been able to see from Scaro. The island might then be two hundred feet in its greatest height, a mile and upwards in its greatest breadth, and about five miles in circumference.

“ After this examination, the observers again felt a strong desire to approach the island, and to land at the place called the *White Island.* When they were within two hundred yards of it, they perceived that, by dipping the hand into the water, the more they approached, the warmer it became. They hove the lead; all the line, which was, ninety-five fathoms long, was employed, without finding any bottom. While they were deliberating whether they should advance farther, or turn back, the great crater began to play with its usual crash and impetuosity. The wind carried over the boat the thick cloud of ashes and smoke, which made them think of rowing off very quickly. On arriving at Santorin, it was discovered that the great heat of the water had melted almost all the pitch from the seams of the boat, which began to open on all sides.

“ Till the 15th of August, of the same year, 1708, the island vomited fire, smoke, and burning stones, always with a great noise, yet less than that of the preceding months.

“ This account of a judicious eye-witness, is to be found in a rather scarce collection, entitled “ *Les Mémoires des Missions de la Campagne de Jésus dans le Levant.*”

“ After the author of the account had quitted Santorin, the new island risen from the sea in the gulf, between the Great and the Little Kammeni, continued for a long time to cast forth flames, a thick smoke, and large masses of stones, but the explosions became less frequent and less violent, and at length ceased.

“ The new island is about a league in circumference. All around, but very close to it, the depth of water is from thirty to thirty-five fathoms: farther off, no bottom is to be found. From the rocks of the island is frequently detached a quantity of fragments of pumicestone, which, floating on the surface of the sea, are driven on the coasts of the islands of the Archipelago. The quantity of these light productions of volcanoes, thrown up by the new island, was so considerable during the beginning of its astonishing appearance, that the sea of the Archipelago was covered with them, and several harbours were choked up to such a degree, that no vessel, however small, could get out, unless a passage were cleared for her by means of poles.

“ The Little Kammeni, where are seen six craters by which the volcano vomited forth the substances that compose it, is equally naked and barren; but the Great Kammeni, more ancient, is covered with a thin stratum of a dust, which allows a few herbs to grow in it.” See Sonini's *Travels.*

KAMTSCHATKA, a large peninsula in the south-eastern extremity of Siberia, is situated between 155° and 165° East Long. from Greenwich, and extends from 51° to 62° of North Latitude. It is bounded on the west by the sea of Okotsk, or Kamtschatka; on the east and south by the Pacific Ocean; and on the north by the country of the Koriaks, from which it is separated by an isthmus about 40 miles broad, lying between the gulfs of Olutorsk and Penginsk. From this junction with the main land to its most southern point, it stretches about 600 miles; and is nearly half that distance in breadth, from the mouth of the Tegil to that of the Kamtschatka river, in the latitude of 55°, but becomes gradually narrower towards each extremity, terminating on the south in a low promontory, called Cape Lepatka.

Kamtschatka was first discoverd by the Russians about the year 1696; but the natives preserve a tradition of a much earlier visit from that people. They point out the spot where a few strangers from Russia settled, and intermarried in the country who were afterwards murdered in a quarrel with the natives; and this account is supposed to describe the fate of a ship's crew belonging to a small squadron, which sailed from Kolyma about the middle of the 17th century. The whole peninsula was finally subdued by the Russian arms in 1711; but, for some time, added little to the trade or wealth of the empire, except a small tribute of furs. After the discovery, however, of the adjoining islands, (see Aleutian, Beering, and Fox Islands,) the supply of furs was greatly increased, and Kamtschatka became an important station of Russian commerce with the east. The peninsula is divided into four districts, forming one government, and protected by a force of 500 men.

The peninsula of Kamtschatka is traversed through its whole length, and divided into two parts of nearly equal extent, by a chain of mountains, which form a part of the same line with those of the Kurile and Japan islands. In these mountains are several volcanoes; one on the summit of Kamtschatka, the highest of the whole ridge; another on a neck of land, between the river Kamtschatka and Tolbalicheck; and a third to the north of Awatska bay, called Awachinsky, which frequently emits immense volumes of smoke, ashes, and flame. There are several hot springs in the country, which never freeze; and two extraordinary wells, where the water boils with prodigious force, sending forth at the same time a dense vapour and dreadful noise.

From the mountains, many rapid streams descend to the coast. The principal rivers are the Teghil, which falls into the sea of Penckinsbe, in 58° North Latitude; the Bolchaia-reka, or Great River, which flows from a large inland lake, and falls into the sea of Okotsk, in 52° 45′ North Latitude; the Awatscha, flows into the bay of Peter or Paul, on the east side of the peninsula; and the Kamtschatka, the only navigable river in the country, which, after a long course towards the north and north-east, joins the Eastern Ocean in $56\frac{1}{2}°$ North Latitude. The most considerable lakes are Nerpitche, near the mouth of the Kamtschatka; Kronotskoy, farther south, above 50 versts long and 40 broad; and the Kurilskoy, near the southern extremity of the peninsula. On the eastern side are several large bays, and especially that of Awatska, in 52° 44′ North Latitude, about 25 miles in circuit.

The principal ostrogs, or towns, are Bolcheretsk, the residence of the governor, containing about 300 inhabitants, and situated on the west coast, in a swampy plain, at the mouth of the Botchaia-reka; Peterpaulowska, or Peter and Paul, containing about 30 houses, and situated in the bottom of Awatska bay, on the east coast, about 135 miles distant from Bolcheretsk; Nishnei-Kamtschatka, about 20 miles up the river Kamtschatka, a considerable mart for the inland traffic of the country, defended by a fort, and containing 150 houses. Several forts are planted along the coast, in the vicinity of which a few houses are found; but the inhabitants are thinly scattered over the country, in solitary huts, or small hamlets, scarcely deserving the name of villages.

The appearance of the country is mountainous, covered with low heath and stunted trees; but the vallies afford every evidence of considerable natural fertility, and might, by proper cultivation, be made capable of raising many valuable productions. They produce grass five feet in height, and abound in wild roses and flowers of the finest perfume. The climate has hitherto been considered as peculiarly adverse to all agricultural improvements; but later writers have given a more favourable representation of its capabilities; and Krusenstern particularly affirms, that it is not inferior to that of any northern country under the same latitude. On the coast, and in the southern districts, frequent fogs and drizzling rains, which are very injurious to the growth of grain and vegetables, prevail to a great degree even in the summer months; but the northern, and especially the middle districts, present a more fruitful soil, and possess a more genial climate. The winter is long and severe; and dreadful hurricanes, which bring on thick and heavy showers of snow, occasionally prevent all operations out of the house, and all travelling from one place to another. The snow begins to appear in October; and no thaw takes place till April or May. There are generally heavy rains in spring and autumn; but the summer months, June, July and August, and even September, "have just as many pleasant and cheerful days," says the last mentioned navigator, "as in any other place under the same latitude;" "and the month of June," he particularly adds, "was as beautiful as it can possibly be in the most favoured climate."

Even in the middle of May, wild garlic, celery, and nettles, may be gathered for use; and every kind of cultivation may be commenced in the month of June. Several useful vegetables grow naturally in the summer months, particularly wild pease, wild garlic, celery, purslane, angelica, and sarana; but, either from ignorance or prejudice, the natives, and even the Russian soldiers. rarely collect them as articles of food. Towards the end of summer, there is a great plenty of raspberries, strawberries, huckleberries, and several other kinds, which are often boiled to a jam for preservation through the winter. Every kind of vegetable and corn may be raised in the inland districts, especially rye and barley; and even on the southern coasts, the gardens of the Russian officers produce potatoes, cabbage, carrots, and every kind of sallad and pot-herb, in sufficient abundance. The soil is so productive, that at Bolcheretsk, where the climate is rather more unfavourable, potatoes produced more than thirty-fold; and in other places, without the least attention, rye returns eight-fold, and barley twelve-fold. Hemp has been cultivated with great success; and the different kinds of Siberian corn might be advantageously introduced. But agriculture is much neglected by the inhabitants, whose time is considerably interrupted by the services which the government requires, and is also more profitably employed in hunting sables than raising corn. The prosperity of the country seems to demand some positive encouragement to be given to the cultivation of the soil, to counteract the more immediate profits of the fur traffic.

The animals most common in this country, are reindeer, the argali or wild sheep, the bear, beaver, fox, otter, hare, sable, ermine, marmot, wolf, weasel, wolvereen. There are not above 600 head of cattle in the whole country, though pasture is abundant in summer, and plenty of natural hay might be collected for winter use. Sheep and goats might also be easily reared; but the scarcity of corn precludes entirely the breeding of hogs. There are a few horses at the settlements, which belong to the government, and are entrusted to the care of the Cossacs. They are employed in conveying merchandize, and other effects of the crown, or for the occasional service of travellers Dogs are the prevailing quadrupeds in Kamtschatka, and are peculiarly serviceable to the inhabitants, every individual of whom possesses at least half a dozen of those useful creatures. They resemble the shepherd's dog of Europe, and are fed chiefly on the offals of various animals, or the decayed fish which their masters cannot use; but, in summer, they are left entirely to provide for themselves, when they range over the country along the banks of lakes and rivers, always returning at the approach of winter, with the greatest punctuality, to their respective proprietors.

There are no poultry in the country, as there is so little corn for their support, and no means of preserving them from the prowling canine race around the villages. Almost every kind of northern sea-fowl frequent the coasts and bays; and the inland lakes and rivers are plentifully stored with wild ducks, wild geese, and swans. Wild fowl are remarkably abundant in the country, especially woodcocks, snipes, and grouse, hawks, falcons, bustards, and various kinds of eagles, some of which are of a prodigious size.

The coasts and rivers are full of excellent fish, cod, herring, trout, flat-fish, and especially salmon of every species, and of the finest quality. There are great quantities of crabs and cray-fish; and a great variety of amphibious sea animals are found on the coast, particularly seals, which pursue the shoals of salmon into the rivers and lakes that have any communication with the sea. Whales also are frequently seen and taken in the adjoining seas, and supply the inhabitants with various useful articles. The flesh is eaten, and the fat preserved for cooking and for burning. The skin is made into shoe-soles, belts, and strops for various purposes. The bones are made into knives, chains for the dogs, and protecting covers to the bottom of the sledges. The whiskers are used to sew the seams of the canoes, and to make nets for the larger kinds of fish. The nerves and veins are employed in making snares; and the intestines are cleaned, dried, and blown like bladders, to contain oil and grease.

The natives of Kamtschatka are considered as a different race from the other inhabitants of Siberia, and as having proceeded originally from Mungalia, beyond the river Amur. Both in their language and persons, they are said to bear some similarity to the Mungals. They have a swarthy complexion, black hair, a round face, prominent cheek bones, small sunken eyes, thin eye-brows. large mouths, and thick teeth. They are of short stature, and broad between the shoulders, with slender legs and arms, and hanging bellies. They appear, however, to have occupied the peninsula at a very remote period; and have no traditionary memorials of their emigration, but believe that they were created on the spot which they now inhabit. Their first acknowledged discoverer was a Cossac, named Volodimir Atlassoff, who had been dispatched, in 1697, from fort Jakutsk to the Anadirsk, with orders to engage the assistance of the Koriacs, in discovering and rendering tributary the countries to the east of theirs. With 60 Russians, and the same number of Cossacs, he penetrated, in 1699, to the centre of the peninsula; and built the Verchnei ostrog on the river Kamtschatka, where he left a small garrison, and returned to Jakutsk with a great quantity of tributary furs. Proceeding with these to Moscow, he was appointed commander of Jakutsk as a reward for his services; and appointed to return to Kamtschatka with sufficient reinforcements, to complete the conquest of the country, and form proper settlements among the natives. In consequence of the oppressive character of the commissaries, to whom the government of the country was entrusted, and the undisciplined conduct of the troops, continual revolts, which were suppressed by cruel massacres, occurred in every part of the peninsula during the first fifty years of its subjugation to the Russians; but, with the exception of a slight insurrection at Bolcherelsk, it has been in a perfectly peaceable state since the middle of last century. Before the Russian conquest of Kamtschatka, the natives are said to have lived in a state of complete natural equality, subject to no chief, law, or tribute; but merely rendering a tacit respect to the old men, or to those who were most distinguished for their bravery.

The government established among them by the Russians, when considered as of a military character, is remarkably mild and equitable; and the tribute exacted from individuals, though rendered heavy by a change of circumstances, was very inconsiderable as originally established. In every ostrog a magistrate is elected by the inhabitants, who is named tayon, and whose authority resembles that of a starost, or elder, in the Russian villages. This person has power to settle all inferior disputes, and to inflict corporal punishment to the extent of twenty lashes; but all intricate cases, and flagitious offences, are referred to the governor of Kamtschatka. The tayon has another officer under him, bearing the title of Jessaul, who executes the orders of his superior, and fills his place in his absence; while, in like manner, the eldest Kamtschadale in the village assumes the office of jessaul, when the actual holder of that station is not present. The tayon, besides attending to the internal regulations of his ostrog, collects the sables paid by the inhabitants as tribute, and carries them sealed up to the town, where they are examined and valued in the presence of certain magistrates, by a person authorised by the crown; and the surplus above the duties is paid in money to the tayon, to be proportionally divided among the inhabitants. The annual taxes of a Kamtschadale, exclusive of the capitation tax, amounts to three rubles; but these being paid in sables, and the government valuation of these articles being considerably lower than the price of the merchant, he may be considered as paying at least double that sum. The capitation tax also, being levied always in Russia according to the last census, which is taken only every twentieth year, bears hard upon the decreasing villages of Kamtschatka, many of which are now diminished from 30 or 40 to 8 or 10 householders, who must nevertheless make up among them the old capitation assessment upon the whole ostrog. This error, however, is said to have been recently rectified; and more attention has, in many respects, been paid by the government, to promote the prosperity both of the natives and Russian settlers. Free schools have long been established in many of the ostrogs; and all the inhabitants have been led to adopt the Christian religion. But by the most recent accounts, it appears that most of the Greek priests sent among them, are very inattentive to the duties of their office, and have very generally forfeited the respect of the natives. No correct estimate can be formed of the population of the country. When first subdued by the Russians, it was described as full of inhabitants; but, in 1768, many thousands were swept away by the small-pox; and, in 1780, the number of persons who paid tribute was only 3000. Krusenstern states, that in 1800 and 1801, 5000 or 6000 perished by another epidemic disorder; and, supposing one-fourth of the number to have been householders, liable in payment of tribute, this would reduce the above number of taxable persons to one-half, viz. 1500, and (allowing to each a wife and three children) the whole population to between 7000 and 8000 souls. Their number has been rapidly decreasing, even without the aid of epidemics; and apprehensions are entertained, that the native race of inhabitants will soon become extinct. One principal cause of this progressive desolation, is to be sought in the pernicious effects of ardent spirits, which have hitherto been made the chief article of barter for their furs, and in the use of which the Kamtschadale villager is utterly incapable of practising the smallest self-denial. The agents of the American Company, and the other merchants, have long been in the habit of traversing the country with no other wares than a quantity of the worst kind of gin. As soon as one of them arrived at an ostrog, he treats his host with a glass of the liquor, who, as soon as he has swallowed one mouthful, which he receives for nothing, instantly begs for another, for which, however, he must pay perhaps with one of his best sables; and so on for a second and a third, till he begins to be intoxicated, when the trader contrives to give him spirit mixed with water, still charging higher for every glass, as the unhappy peasant becomes the more urgent in his demands for more of the poison. The usual result is, that the merchant carries off the whole stock of furs in the house as the price of the spirits drunk; and that the infatuated Kamtschadale finds himself deprived of all his wealth, without having provided the powder and shot, and the other articles which are indispensable for his support. The debilitating effect of the liquor on his frame, the depression of spirits into which he sinks, and the want of those comforts, which, by his misconduct, he has lost the means of procuring, speedily exhausts his strength, and sinks him prematurely to the grave. The governor, however, has recently prohibited the traders from carrying spirits into the country; and by such regulations only, can the natives be preserved from extirpation. They are, in other respects, a very estimable race, "not easily to be surpassed," says Krusenstern, "for kindness of heart, fidelity, obedience, hospitality, perseverance, and attachment to their superiors." In spite of their extreme poverty, they are patterns of honesty. "In this respect," says the last mentioned voyager, "it is impossible to exceed them; and it is as rare to find a cheat among the Kamtschadales as a man of property." Travellers, on their arrival at any ostrog, usually give their money, papers, and valuables, even their stock of brandy, tea, sugar, tobacco, &c. into the hands of the tayon; and there is no instance of any one having been robbed to the smallest extent. In many respects, the Russian settlements could not exist without the services of the natives. They serve as guides through the country, and as carriers of the mail, which they are required to do without pay; and, of their own accord, they engage to lodge every traveller, and to supply his dogs with provisions, without demanding any remuneration. In every ostrog, there is a supply of fish set apart for this purpose. They are more barbarous in their manners than in their minds, and have made very little progress in the arts of civilized life. They never inhabit the towns built by the Russians, but reside in small villages scattered over the interior districts. These ostrogs rarely contain more than fifteen or twenty inhabitants.

The Kamtschatka hamlets are surrounded by an earthen wall, or by palisades, (as the Russian name ostrog imports,) and contain two sorts of habitations, one kind, called balagans, for summer, and another, named yoursts, for winter. The balagan is constructed, by erecting nine posts in three regular rows, at equal distances from each other, and about thirteen feet in height. About ten feet from the ground, rafters are laid from post to post, and firmly fastened with strong ropes or thongs; and upon these rafters are laid joists, which being covered with turf, complete the floor of the apartment. Upon this platform, a roof of a conical figure is raised by means of strong poles, fastened to the rafters at one end, and meeting together in a point at the other. The whole is covered with a thatching of coarse grass, except an opening in the centre, to serve the purpose of a chimney. There are two low entrances directly opposite to each other, to which they ascend by means of a ladder or staircase, which is merely a large beam or tree, with rough notches on the upper surface, by way of steps, with one end on the ground, and the other resting on the corner of the door. When they wish to intimate that there is nobody at home, they merely turn the tree, with the steps downwards. In the lower part of the balagan, which is left open, they dry their fish, and other articles, intended for winter stores; and sometimes employ the upper apartment as a magazine for holding their provisions. Their dogs, also, are frequently tied to the posts below, and find their kennel under the floor of the building. In forming a yourst, or winter habitation, an oblong square hole is dug in the earth to the depth of six feet, and of such dimensions as the number of families intended to occupy it may require. Strong wooden posts are then fixed in the ground at equal distances, on which are extended the beams for supporting the roof, the rafters of which rest with one end on these beams, and the other on the ground; and the interstices between them being filled up with wicker work, a covering of turf is laid over the whole. The external appearance of these dwellings resembles the roof of an ice-house, or a round squat hillock. A hole in the centre of the roof serves the purpose of chimney, window, and door; and the inmates pass through it by means of notched trees, as already described. There is another entrance on one side level with the ground, appropriated for the use of the women, and through which none of the men could go out or in without incurring ridicule and disgrace. The inside of this subterraneous abode forms only one apartment, with the fire-place on one side, and the utensils and provisions on the other. Broad platforms of boards are extended along the sides; and, being well covered with mats and skins, serve the purpose of seats and beds. These houses are generally kept so warm, as to be intolerable to a stranger; and the hotter they are made, the greater honour is supposed to be done to their guests. They reside in these winter recesses from the middle of October to the middle of May. Instead of these yoursts, isbas have been introduced by the Russians; and the natives have been prohibited, especially in the southern districts, from constructing their accustomed subterranean habitations. The isbas resemble the dwellings of the Russian peasantry, except that they are seldom so large in Kamtschatka. The walls are formed, by piling long trees (smoothed only with the hatchet) horizontally upon one another, and filling up the interstices with clay or moss. The roof is of a sloping form, like the thatched cottages of Europe, and is covered with coarse grass, rushes, or sometimes with boards. Each of these log-houses has three apartments, one of which may be considered rather as a kind of entrance, which extends the whole width and height of the house, and serves as a receptacle for the sledges, harness, and other bulky articles. This place communicates with the principal apartment, which occupies the middle space, and around the sides of which are fixed broad benches, used both as tables and beds. From this there is a door into the kitchen, where a large stone or oven is fixed in the wall, which separates it from the middle apartment, so as to warm both rooms at the same time. In each apartment are two small windows, the panes of which are made of fish skins, or gullets of sea wolves, or the bladders of various animals; but sometimes in more opulent dwellings of plates of talc. Above the kitchen and middle room are lofts or garrets, to which there is access, by a ladder placed in the entrance.

The clothing of the Kamtschadales, consists of an upper garment resembling a waggoner's frock, which in summer is made of nankeen, or of skin without hair, but in winter of deer or dog skin, with the hair preserved, and worn innermost; a close jacket of nankeen, or other cotton stuff; a shirt of thin Persian silk, of a red, blue or yellow colour; a pair of long breeches, or tight trowsers, made of leather, and reaching nearly to the ankles; boots of goat, dog, or deer skin, tanned in summer, but, in winter, with the hair turned inwards; and a fur cap with two flaps, which are usually tied up round the head, but, in cold weather, are brought down to cover the neck and shoulders. Their richer dresses, and robes of ceremony, consist of an upper garment resembling that already described, with gloves, cap and boots, made up of finer furs of different colours, cut into triangular pieces, and neatly joined together, with trimmings of coloured leather threads, and edgings of velvet or sea otter's skin.

The principal food of the Kamtschadales is fish, and especially salmon, which, with little exertion, they can procure in great abundance during the whole summer season, from the middle of May to the end of September. The greater part of this provision is dried or smoked, and stored up for winter use, when it is either eaten like bread, or pulverized and formed into paste and cakes. In preparing the fish for drying, they first take off the belly piece, which is esteemed the best, and is carefully smoked; next a slice along each side of the back bone, which are merely dried in the air; and the remainder, consisting of the back, ribs, and head, are generally deposited, after drying, as provender for the dogs. When the fish is not dried, but used for immediate subsistence, it is prepared by boiling, or broiling, and sometimes by placing a heap of it on stakes over a large fire, so that it is partly roasted and partly smoaked, so as to prove a very savoury kind of food. But the most favourite mode of preparing it, is to bury it, as soon as caught, in a hole lined with grass, and leave it there till it becomes sour, or rather perfectly putrid; and in this state it is eaten with the utmost relish, as the most luxurious repast. The roes of the fish, dried or soured, afford also a very favourite dish. Several kinds of vegetables, roots, and berries, collected by the women in harvest, form a considerable part of the winter provisions. The berries, made like jam, are used as a general sauce to the dried fish; or are mixed with fish roe, or whale and seal fat, by way of puddings; or are employed by decoction, in making cooling drink for ordinary use. There are two vegetables, particularly, which deserve to be noticed among these articles of subsistence, namely, the sarana, or *lilium Kamtschatiense*, and the sweet grass, or *heraclium Sibericum*. The former affords a bulbous root, wholesome, nourishing, and agreeable, which may be boiled like potatoes, or baked in an oven, and then pounded into the form of meal or flour, which is mixed in all the soups, and most other dishes. The latter, resembling sedge, about six feet in height at its full growth, with a hollow stalk, and a white, sweet, pungent down on its leaves and stem. The stalks, after being split and freed from the pith, are dried for future use, and are boiled when wanted to be mixed with other dishes; but the plant has, in later times, been chiefly employed in distillation. In preparing it for this purpose, the stalks are freed from the downy substance, (in scraping off which the women are obliged to wear gloves, as the rind is so acrid as to ulcerate the skin,) placed in small heaps till they begin to heat; and, after being dried, are laid up in sacks of matting, where, in a few days, they become covered with a sweet saccharine powder, which exudes from the hollow of the stem. When taken out for distillation, they are steeped in hot water in a close vessel, where a violent fermentation takes place; and then the whole mass of herbs and liquor put into a copper still yields a spirit called raka, as strong as brandy, in the proportion of 25 pints from 72 pounds of the plant. They make several decoctions from various other plants; and drink, without any kind of mixture or preparation, the liquor which flows from a dwarf-birch, and which they procure by simply tapping the tree.

The furniture of the Kamtschadales consists only of a few of the most necessary cooking utensils; and the place of chairs, beds, tables, is supplied by the benches, covered with skins and mats, around the walls of the apartments. Several of their instruments are neatly made; and others sufficiently coarse. A hollow stone, filled with fat, with a bit of rag as a wick, constitutes the lamp, the smoke and smell of which are intolerably fœtid and pungent. From a coarse kind of grass, which grows plentifully along the coast, they make a strong matting to cover their floors, beds, &c.; and from the same materials they form baskets, bags, sacks. From a plant growing in the marshes, and resembling *cyperoides*, they gather a sort of down, which they card like wool, with an instrument made of the bones of the sea-swallow; and with this soft substance they swathe the new born children, and also make a kind of wadding, to give additional warmth to different parts of their own clothing. From the nettle, which they cut down in August, and hang around their houses to dry, they form a useful kind of hemp, which they spin into thread with a spindle, and manufacture into cordage, for fishing nets and other purposes. Formerly they used spears and arrows, poisoned with the juice of a root called *zgate*; but, since their subjugation to the Russians, they are provided with rifle-barrelled guns.

The principal other articles which they must still provide for themselves, are boats and sledges. The former are of the most wretched description, being nothing more than the trunk of a tree hollowed out, and resembling a trough more than a boat. They are easily overset in the currents of the rivers, or by striking against any obstruction during the night; and scarcely a season passes, without several instances of persons being drowned by such accidents on the Kamtschatka and Awatscha rivers. In the northern districts, where timber cannot be procured, the boats are made of still more slender materials, namely, of the skins of sea animals sewed together with whales' whiskers, and caulked with moss or beat nettles. This vessel is seldom able to carry more than two persons, one at each end, who make use of poles instead of oars to guide it down, or push it up the stream. Sometimes a kind of float, or raft, resting upon two of these boats, is employed to convey the heavier articles. The sledge of the Kamtschadale is formed like an oblong basket, with the two extremities rising in a curve, and is made of very thin wood, with the sides of open work, ornamented with straps of different colours. This basket, or frame, which is about three feet in length, and scarcely above one foot in breadth, is placed upon two parallel planks, longer than the sledge, and three or four inches broad; which serve as supports, or skates, and in time of thaw have long pieces of whale-bone fastened to their bottom with leathern thongs. These planks bend upwards in front, and meet the poles which support the seat of the driver, which is elevated three feet from the ground, and covered with bear skin. The whole machine is remarkably light, sometimes weighing only about ten pounds. To these vehicles the dogs are harnessed by means of a leather strap, which passes under the neck, resting on their breasts, and is joined to the sledge by traces. The animals, being yoked in couples, are also fastened together by straps passing through their collars; but a single one goes foremost as a leader, and is always the best trained, and most intelligent in understanding the signals and sounds of the driver. There are always five, or at least four, dogs yoked to each sledge, which are able to draw two persons, or the driver and his over-weight of baggage; but they may be employed in a much greater number; and Krusenstern mentions a governor in the country, who used to travel in a sledge like a small house, drawn by 100 dogs. The animals are trained to this service by being fastened, when young, to elastic stakes, while their food is placed beyond their reach, so that, by continually pulling, in order to obtain a meal, they acquire strength, and the faculty of drawing. They learn to obey the voice of the driver, in setting off, stopping, turning to right or left; but those that are well trained, are guided rather by signals than sounds. For this purpose, the driver carries in his hand a curved stick, which he employs also to preserve the sledge from being overset, and which is sometimes pointed with iron, to take a firmer hold of the ice; while the other end is provided with iron rings, which serve as bells to encourage the dogs. He turns them to the left, merely by striking this stick upon the ice; or to the right, by striking the poles of the sledge; or stops their progress, by placing it between the snow and the front of the vehicle; or corrects them, when inattentive, by throwing it among them; and to recover it, as he passes rapidly along, is the strongest test of his skill. The utmost dexterity also is requisite in the driver to keep his seat, and to preserve the sledge from being overturned; for which purpose, his body is almost perpetually in motion, inclining to either side, or recovering an upright posture, with the greatest alertness and nicety, as the balance may render necessary. They sit sometimes astride, but usually side-ways, with the right hand towards the front; and some adepts are able to stand upright, or even on one leg. It is of the most essential importance to the traveller to preserve his seat, or to retain hold of the sledge, as the dogs continue their progress, and rather increase their speed, as the vehicle becomes lighter, never halting in their course till they arrive at some habitation, or find themselves entangled by some obstruction on the road. It is necessary for the traveller to alight, both in descending and ascending any considerable declivity; and, frequently after a fresh fall of snow, a road must be formed by a person furnished with snow-shoes. These are made of thin boards, about four feet long, and six or eight inches wide, turned up in front like skates, and covered below with the skin of the sea-wolf or reindeer. With these the traveller is always provided; and is often obliged to proceed in this manner, alternately clearing the way, and then leading forward the sledge, till he arrives at some inhabited place. When overtaken by a drift of snow, they are under the necessity of seeking the shelter of some copse; and when long detained by the storm, dig a hole in the snow, filling up the entrance with brushwood, and wrapping themselves in their furs.

Besides the long journies which the Kamtschadales have often occasion to make, both on their own account and in the service of the government, their principal occupations are hunting and fishing. In the former, they are more or less employed at all seasons of the year, as they must pursue the different animals at the time when their furs are most valuable: the argali, or wild sheep, in autumn—the rein-deer in winter—the sable in the beginning of winter—the fox at any period except summer—the bear in all seasons of the year. They employ snares, nets, and pit falls; but more commonly place their chief dependence on their rifle, if they can procure powder and shot. Armed with his gun, lance, and knife, and provided with a bundle of dry fish, the hunter places himself in ambush, where he will patiently keep his station for days and weeks, till he has succeeded in his object, or is compelled by hunger to return home. The Kamtschadales are not dexterous marksmen, though the expense of ammunition precludes all unprofitable practising; but, from the same cause, they are so careful in taking a sure aim, (which they render more steady by using a forked stick as a rest to their piece,) that they very rarely expend a shot in vain. They frequently take the sables, which live among trees, by throwing a noose over their head, while intent upon the dogs which are baying around them; and employ the *nux vomica*, and other poisoned baits, for the foxes. But the most hazardous pursuit, in which all their courage and dexterity are required, is the killing of the bear. Sometimes they take this animal without much personal risk, by means of heavy traps, which fall down upon his pulling the bait attached to them; or by assailing him with dogs and guns, when almost torpid in his den, in the winter season; but, most frequently, they boldly meet him in the open plain, and fire upon him as he passes their place of concealment. A single hunter will engage in this attack; but more frequently in company with others. As they seldom fire till the animal be within fifteen yards of the spot where they are stationed, they have rarely time for a second discharge; and, if they should not have succeeded in disabling him, they must receive his furious onset with their spears; and, unless fortunate enough to inflict a mortal thrust, not unfrequently fall a sacrifice to his vengeance. The bear is most apt to make these assaults upon the huntsman in the beginning of spring, when he comes famished from his winter retreat, and in autumn when in quest of the female; but, at other times, he more commonly takes to flight when wounded, and is traced by the blood to his retreat. By very recent accounts, it appears that, from a failure of fish on the coast, the bears became so ferocious during the winter of 1816-17, as to attack and devour many of the natives, and also to destroy one another.

They are employed in fishing at different periods during summer, but particularly in May for herring; in June for salmon; and in the remaining months for sea-wolves. In killing the latter, they employ harpoons, and large nets, made of leather thongs, with wide meshes; but for other fish they have smaller nets of pack-thread, which they purchase from the Russians, or of their own cordage manufactured from nettles. They shoot and hawl their nets in the sea and large lakes in the usual manner; but in rivers they commonly stretch one across, and hawl another down the stream. They sometimes erect also a line of stakes and branches of trees, so as to afford only one or two small openings for the passage of the fish: and in these are placed baskets, constructed in such a way, that the fish having entered cannot again retreat.

Besides these occupations, the Kamtschadales have their amusements of dancing, singing, and relating of love stories. Their dances are merely pantomimical representations of the motions and gestures of the different animals which they pursue in the chase, but especially of the bear. The performance consists in a succession of unwieldy motions, or rather difficult distortions, of the body, imitating the clumsy gestures of the bear in various situations, especially of the young ones sporting around the dam—of the male fawning on his mate—and of the agitations which any of them exhibit when hard pressed by the hunters. The body is generally bowed forwards, the knees bent, and the arms employed in imitating the motions of the animal, whom they delight to copy. Even his cries are introduced in the course of the drama; and, throughout the whole performance, a kind of forced grunt, or guttural sound, resembling a continued hiccough, is uttered by the dancer, in unison with the time of the air sung by the musicians, or rather by the whole company present. The song is nearly as unvarying in its notes, and unmeaning in its words, as the dance; and both to European spectators are extremely tedious and uninteresting, while the natives discover a degree of extacy in the spectacle, which seems incompatible with the indolence of their habits.

The Kamtschadales are considered as naturally a healthy, though not a long-lived race; and few persons are found among them, who have been deformed from their birth. They are rarely afflicted with the scurvy, which proves so destructive to the Russian settlers; and their exemption from that disorder is ascribed to the liberal use which they make of wild garlic and various acid berries, as a part of their diet. Consumptions are not unfrequent; but the most common diseases are boils, wens, and other tumours of a similar description, which are cured by incision or extirpation, by means only of such instruments as a knife, or even a sharp stone. One of the remedies, which they employ in almost every disease, and especially as an application to all kinds of sores or wounds, is called bear's-root, which they steep in brandy, and to the use of which they are said to have been first led, by observing that the animal, whose name it bears, was fond of eating it, and of rolling himself upon it when he was wounded.

The natives of Kamtschatka were formerly held in great subjection by their doctors, who were called chamans, and who conjoined the arts of magic and medicine. These persons were distinguished by having their garments decorated profusely with mystic rings, and other symbolical metal figures, which made a jingling noise upon every motion of the body; and, by carrying a kind of kettle drum, with which they announced their approach, and accompanied their incantations. They acted the parts also of priests; and, amidst the most extravagant gesticulations, resembling the ravings of the Pythian priestess, uttered their prescriptions and revelations in the name of their idol Koutka. Even the slender religious instruction which the Kamtschadales have received from the Russians has abolished their confidence in these impostors; and the chaman art is now confined to a few old women, who practise their sorceries with great secrecy. But, though the natives have adopted the Christian religion, they are said to know little more of it than the ceremony of baptism; and the priests sent among them are either utterly incapable of teaching the people, or are in general more attentive to commercial gains than to clerical duties. There are eight principal churches in the peninsula; and all the clergy are subordinate to the archbishop of Irkutsk, from whom they must receive ordination, and an appointment to their cures.

The language of Kamtschatka, is said to be extremely guttural in its sounds, and difficult to be pronounced. The dialects and accents, also, are very various; almost every ostrog having its own peculiarities of speech. The following selection, from a vocabulary by the French traveller, M. De Lesseps, may furnish some idea, at least of its uncouth form:

One	Dizitt.
Two	Kaacha.
Three	Tchook.
Four	Tchaak.
Five	Rom téak.
Six	Kilk-okk.
Seven	Eitgatanock.
Eight	Tchokh-ottenokh.
Nine	Tchakh-attanokh.
Ten	Tchom-khotako.
Twenty	Kaachatcho-khotako.
Thirty	Tchook-tchom-khotako.
Forty, &c.	Tchaak-tchom-khotako, &c.
I	Kimméa.
Thou	Kizé.
He	Tié.
She	Tschii.
We	Bouzé.
You	Souzé.
They	Tie nakie.
Husband	Kiskong.
Wife	Tigen-outch.
Father	Epep.
Mother	Engatcha.
Child	Péétch.
Brother	Tiga.
Sister	Dikhtoung.
Yes	Lebeee.
No	Bünakitlik.
The sun	Koulletch.
The moon	Kirkh-kirkh.
A star	Ezeng-itch.
The sky	Kokh-khéll.
Day	Taaje.
Night	Kiounncuk.
Life	Zoitlenem.
Death	Eranim.
Fire	Panitch.
Water	Azamkh, or Ji.
The face	Goueng.
The back	Karo.
The heart	Guillioun.
The hand	Tonno, or Cetoud.
The blood	Bechlem.
Great	Tgolo.
Small	Outchinnelo.
High	Kranalo.
Low	Disoulo.
Old	Kizekh-ketlinn.
Young	Linnett-lek.
Good	Klioubelle.
Bad	K'kellello.
To drink	Ekoss-kholnim.
To sleep	Oun-ekleni.
To cut	Lzinim.
To tie	Tratak.
Go	Teout.
Give	Katkou.

Formerly the Kamtschadales received their principal articles of commerce from the Japanese; but of late, the Dutch, and particularly the Russians, have supplied the daily diminishing demand of the country. They imported from Europe different kinds of coarse cloth, serges, knives, silk and cotton handkerchiefs, red wine, tobacco, and sugar; from Siberia, iron and copper utensils, fire-arms, wax, hemp, rope-yarn, nets, tanned rein-deer skins, and the common Russian cloths; from Turkey, different sorts of cotton stuffs; and from China, silk and cotton cloths, tobacco, coral, and needles. The exports from Kamtschatka consists entirely of furs and skins, particularly of the beaver, marten, fox, and otter, all of which pay a duty of ten per cent.

The state of the Russian settlements in Kamtschatka, though founded more than a hundred years ago, was, in 1805, when visited by Krusenstern, in every respect wretched and unpromising. The finest bays were entirely deserted and uninhabited; and not a single boat was to be seen in the beautiful harbours of St. Peter and St. Paul. The shores were strewed with stinking fish cast up by the sea, among which crowds of half starved dogs were wallowing and fighting. Not one well-built house was to be seen, nor even a beaten path, that might lead safely to the town. A few planks, laid across the small brooks which flow through the valley, served the purpose of bridges. No garden, or meadow, or plantation, or even inclosure of any kind, indicating the least cultivation, was to be seen. The town itself consisted of a few huts, mostly in a decayed state; and, as the inhabitants are generally absent during the day time, scarcely a single person was to be seen; and no other living creature, except half a dozen cows feeding near the houses, and innumerable dogs resting in holes, dug by themselves as a shelter against the flies. As timber, necessary for the construction of proper dwellings, is extremely scarce, and procured only with great labour from the interior of the country, only two houses were observed by Krusenstern, which could be considered as superior to the rest; yet the best of these, the ornament of Kamtschatka, possessed by a person holding the rank of major in the army, had all its windows extremely small, and patched with broken glass, and contained no other furniture than a table, wooden stool, two or three broken chairs, two or three tea-cups, one glass, a few broken knives and forks, and some pewter spoons. "Poverty, or rather misery," says Krusenstern, "was apparent in all the houses. All the necessaries of life, particularly bread and salt, are extremely scarce, and extravagantly dear; and, except where a cow is kept, which few are able to do, even the children have no better nourishment than dried fish and coarse black bread. Nothing is to be found readily, except spirits, and perhaps tea and sugar. The want of gun powder prevents the colonists from supplying many of their wants; and the greater profit derived from hunting sables than from cultivating the soil, discourages all attention to the pursuits of agriculture, and even of gardening. The want of women in the settlement, and the difficulty of maintaining a family, are obviously most unfavourable circumstances for the increase and the morals of the population. Formerly, also, it was the practice of the Russian government to send those officers to Kamtschatka, whose conduct had not been strictly correct, and whose appointment to such a distant station was regarded as at the same time, a species of punishment. These persons usually became regardless of their own character, as well as tyrannical in their treatment of those whom they were intended to benefit. Much of this injudicious system has now been amended, and various means adopted for the improvement of the settlement, as well as for the civilization of the natives. All the later accounts concur in proving the capabilities of the country to be much greater than had hitherto been understood; and its prosperity once commenced, though slow in its progress, may be expected to be permanently increasing. See Lessep's *Travels in Kamtschatka*; Cook's *Last Voyage*; and Krusenstern's *Voyage Round the World* (*q*)

KANT, IMMANUEL, the celebrated German metaphysician, and author of the *Critical or Transcendental Philosophy*, was born at Koningsberg, in Prussia, on the 22d of April, 1724. It is said that his paternal ancestors were descended from a Scotch family of the name of Cant, and that he was the first who changed the initial letter of his name to K. His father exercised the humble profession of a sadler in the suburbs of Koningsberg; of whom, and especially of his mother, who appears to have been a woman of some talents, and great piety, Kant uniformly spoke with feelings of the warmest affection. Although in poor circumstances, his parents seem to have resolved, that their son, Immanuel, should enjoy all the advantages of a liberal education; for, after having been taught to read and write at the hospital school of the suburbs, he was sent to the *Collegium Fridericianum*; an institution which was then in high repute as a seminary of pietism. At this school, he contracted an intimate friendship with the celebrated philologer Ruhnkenius, which may naturally be supposed to have had a salutary influence on the studies of both. It is rather a remarkable circumstance, however, that at this early period, the inclination of Kant led him to devote his attention principally to philology, while the mind of Ruhnkenius was chiefly directed, by an apparently natural disposition, to philosophy. In their maturer years, as is well known, these dispositions were precisely reversed.

In his old age, Kant dwelt with peculiar pleasure on the recollection of his early philological studies, and delighted to have an opportunity of reciting passages from his favourite classical authors.

In his youth, Kant had the mifortune to lose both his parents, who had scarcely the pleasure of witnessing the dawning talents of their son. The liberality of some friends of his family, however, still enabled him to prosecute his studies; and after having completed his school education, he repaired to the university of his native town. Here he applied with ardour to the mathematical, philosophical, and theological sciences; and his pecuniary means being extremely slender, he contrived to support himself, in part, by assisting other young men in the prosecution of their studies. After he had finished his university course, he engaged for some years as a private tutor in several families, particularly that of a M. de Hullesen, at Arnsdorf; and during this period he embraced the opportunities which his retirement afforded him, of collecting a vast store of knowledge, in almost every department of science.

Having attained his thirtieth year, and already distinguished himself as the author of several philosophical tracts, exhibiting great depth of thought, and originality of genius, he resolved to devote himself to the profession of a public teacher. With this view, he returned to the university, and took the degree of doctor, according to the usual forms, in the year 1755. A short time thereafter, he began to deliver lectures on logic, metaphysics, mathematics, and natural philosophy; to which, at a subsequent period, he added the law of nature, moral philosophy, natural theology, and physical geography. Although his talents were now well known and justly appreciated, yet he remained in this situation fifteen years, before he obtained a professorship; which was, at length, conferred upon him in 1770. From this period, he continued to discharge his duties, as a public teacher in the university of Koningsberg, with fidelity and success, until a few years before his death He never changed, nor wished to change his place; riches and honours seem to have had no attractions for him; and he is known to have declined several advantageous proposals that were made to induce him to transfer his talents to other universities. He died on the 12th of February, 1804, in the 80th year of his age.

Professor Kant was a man of a very cheerful and social disposition; and his manners were genteel and affable. He had none of that awkwardness or reserve which is generally held to be characteristic of the scholar and the philosopher. He loved company, and was both inquisitive, and fond of communicating his own opinions upon all subjects. His moral character was unimpeachable; and he appears to have been much esteemed in the circle in which he moved.

Kant was well advanced in years, before he attempted to accomplish that reform in metaphysical science, which he seems to have long meditated. In several of his earlier productions, however, he evidently appears to be dissatisfied with the previous theories; and in his inaugural dissertation, in 1770, *De mundi sensibilis atque intelligibilis forma et principiis*, he exhibited some of those peculiar views, which were afterwards more fully developed in his great work, the *Critik der reinen Vernunft*. This work was published in 1781. For several years, it attracted no attention; and the publisher, it is said, was on the point of destroying the sheets, as waste paper, when a sudden demand rapidly carried off the whole impression. From that period, the philosophers of Germany were divided into professed partizans, and determined antagonists of the doctrines of Kant; and a multitude of publications issued yearly from the press, for the purpose of confirming or refuting them.

Of a theory which produced so great a sensation in that country where it was first promulgated, and which is still considered by many as having completely demolished the old metaphysical systems, some account will naturally be expected in this work. However difficult the task, we shall endeavour to exhibit such a concise statement of the peculiar doctrines of the critical philosophy, drawn up from an attentive perusal of the writings of Kant, and of his most eminent commentators, as shall, we trust, in some measure, gratify the curiosity of our readers.

According to the opinions of the greater number of philosophers, previous to Kant, there existed a science, in which the principles of purely speculative reason were applied to objects beyond the sphere of the sensible world. The cultivators of this science were agreed as to its reality; however widely they might be at variance with respect to the degree of certainty which they ascribed to its principles, the extent of their application, and the nature of their proofs. A great mass of heterogeneous materials had been gathered together, wrought up into a systematic form, and presented to the world as the result of abstract scientific investigation, upon subjects the most interesting to humanity. But, however rich in materials, and extent of territory, the teachers of this sublime philosophy had not been very careful to investigate the foundation upon which the system was constructed, nor to ascertain the precise limits within which its doctrines could be legitimately applied. Controversies accordingly ensued; these tended to produce uncertainty and doubt; and various contradictory opinions were successively broached upon some of the most important subjects of metaphysical inquiry. An ingenious individual, by a well directed objection to one element of this system,—the principle of causation,—produced a sensation in the philosophical world, which has yet scarcely ceased to be felt. We allude, of course, to the celebrated sceptical philosopher, David Hume. Against him it was in vain to contend with the old principles, because it was precisely these, the accuracy of which he disputed. His principal antagonists, however, instead of boldly meeting him upon his own ground, abandoned the field; left the whole science of metaphysics in jeopardy; and made their appeal to another tribunal,—that of *common sense*. Here their triumph was easy and complete; for, although they entirely failed to rescue the science itself, whose very existence was at stake, from the dangers to which it was exposed, they, at least for a time, contrived to gain the ear of the public, and to throw the arguments of their opponent into the shade of unpopularity and neglect. The lightness and plausibility of the empirical philosophy, indeed, could not fail to give it a decided advantage over the more abstruse and more rigorous philosophy of the schools. The oracles of the former, experience and common sense, were much more accessible to the multitude; probability, instead of strict demonstration, was more easily supplied; and all disputes were soon disposed of, or thrown aside as mere verbal controversies. The arbitrary language, which this philosophy introduced, rendered it easy for many to become the inventors of theories; and the analogical reasoning which it adopted drew all arts and sciences within its sphere, and gave it a specious, though false, appearance of universal application.

In the meantime, the science of metaphysics, once held in honourable estimation, and dignified with the proud title of Queen of the Arts, was repudiated and deserted, treated with scorn or neglect, and left to complain like Hecuba:

> *Modo maxima rerum,*
> *Tot generis natisque potens,*
> *Nunc trahor exsul inops.*—Ovid,

This science, indeed, might have been irretrievably lost, and entirely superseded by the airy speculations of popular theorists, had not a philosopher arisen, endowed with an extraordinary power of intense reflection, a spirit of profound and patient investigation, and a metaphysical acuteness and perspicuity in the discovery and developement of abstract truths, of which the world has seen no example since the days of Aristotle; a man who, to great natural talents, added the most various and extensive acquired knowledge. "Our age," says Garve, himself no mean philosopher, "has witnessed the labours of one of the most indefatigable philosophers, who have at any period cultivated the territory of the sciences. Whatever opinion we may entertain of the results of the Kantian system, as tending to enlarge or set bounds to human knowledge, it is impossible for us to withhold from its author that high respect, which is due to the unwearied application of superior powers of thought, and those thanks which we owe him for such an exercise of those powers as comprehends the whole field of philosophy." (*Essays*, vol. ii.) Kant thought he perceived those defects, which had brought metaphysical speculations into disgrace; and he devoted the labour of a whole life to a total reform and re-establishment of his favourite science. The difficulties attending such a task, however, were many and obvious. From a system of doctrines, which had given way upon the first rude shock of scepticism, he could expect little assistance or support. It was necessary to begin the process of meditation *de novo;* to subject the cognitive faculty to a new critical analysis; to determine the nature and conditions, the objects and extent of its exercise; and to fix the precise limits of its legitimate province. In several of his works, he has given us very interesting hints on the motives which induced him to undertake this laborious task, and on the principles by which he was guided during the progress of his investigations. The sceptical objections of Hume first roused him from his dogmatical slumber, and gave a new direction to his inquiries in the field of speculative philosophy. He was far from assenting to the conclusions which Hume drew from his premises, which appeared to him to result from a too limited view of the subject in question. Had Hume enlarged his views, and exhibited the problem, of which his objections embrace only a part, in its whole extent and bearings;—had these objections, in short, comprehended, as they ought to have done, the whole of metaphysical science, it seems to be the opinion of Kant, that he would most probably have been led, by his natural sagacity, to the discovery of principles similar to those which are developed in the critical philosophy.

Kant was now led to investigate the causes of the different fate which had hitherto attended the science of metaphysics, when compared with the successful result of the inquiries of philosophers in other departments of science. The principles of logic, he observed, had been incontrovertibly established, and the science completed, as early as the days of Aristotle. This advantage, he ascribes, in a great degree, to the narrow limits of this science; logic having nothing to do with objects and their differences, but being solely occupied with the abstract forms peculiar to the understanding. The science of mathematics had likewise been cultivated with success from the earliest times. Physical science was much more slow in its progress towards systematic principles. Metaphysical science,—a science of speculative reason quite isolated, which soars beyond experience, and is conversant in the region of ideas, —this science, in which reason is her own disciple, has not hitherto been so fortunate as to have acquired the possession of any systematic principles, which are recognized as of general application. On the contrary, its field has been, as it were, the *arena*, on which various champions have exercised their prowess, but where no triumph has been gained, which was attended with any permanent advantage. How has it happened, that no sure footing has yet been found for this science? And by what hint can we profit, in order to institute an investigation, with the prospect of better success than that which has attended the efforts of our predecessors? The remarkable revolutions which were accomplished in mathematics and natural philosophy, afford us examples worthy of imitation, in so far as their analogy with metaphysical science will permit. Hitherto, it has been generally held, that all our ideas must be accommodated to the objects of our experience; but all attempts to extend our knowledge *a priori*, upon this supposition, have proved entirely abortive. Let us try, therefore, says Kant, whether we shall not succeed better in our efforts to solve the problems of metaphysics, by assuming, *e contrario*, that the objects are accommodated to the nature of our cognitive faculty; a supposition which accords much better with the possibility of our possessing any ideas *a priori*, i. e. before the objects are given. This method is similar to that of Copernicus; who, when he found that he could not explain the motions of the heavenly bodies upon the old hypothesis—that the stars revolved round the spectator—tried whether he could not succeed better, by assuming, that the spectator revolved, and that the stars remained at rest.

Such was the preliminary train of thought, which suggested to the mind of Kant the elements of that system, which he afterwards developed in his great work, the *Critik der reinen Vernunft;* a work which, whatever may be the ultimate fate of the theory it inculcates, will long remain as a monument of the vast intellectual powers of its author. In order to convey to our readers some notion of the principles which this theory proposed to establish, it will be necessary for us to present them with a short abstract of the process of reasoning, adopted by the author in the work to which we have alluded. This abstract, indeed, can be but a mere skeleton,—our limits will admit of nothing more; but we think it will exhibit the peculiar doctrines of the Kantian system, in a much clearer point of view than the method which some have taken, of selecting a few of the detached principles and definitions of the critical philosophy, of which the application and consistency cannot possibly be perceived, without exhibiting them in connection with the whole theory. With the view of rendering the following outline more generally intelligible, we have endeavoured to divest it, as much as possible, of all technical phraseology.

That all our knowledge commences with experience, is a fact which cannot admit of a doubt. But it does not follow from thence, that all our knowledge is derived from experience, as its only source. For it may be, that even those notions which we derive more immediately from experience are made up of that which we receive through the medium of our senses, and that which our cognitive faculty, called into exercise by our sensual impressions, produces of itself; which latter addition it is difficult to distinguish or separate from the original matter, without long and constant habits of reflection.

If experience, in a philosophical sense, be the perception of objects as existing in a certain connection, we must have a faculty of perceiving simply, and a power of representing our perceptions in a certain (necessary) connection. The former we call sense; the latter intellect, or understanding. All that we perceive, must be presented to our senses under certain conditions, without which our percipient faculty cannot be exercised. These are the necessary conditions of all perception,—as the eye is the necessary condition of all vision; and, as such, they are not first called into being with the objects, but must have existed previously, otherwise the objects could not have been perceived. These conditions are, *space* and *time*; the former of the external, the latter of the internal sense, and of all our perceptions whatsoever. All that is perceived by the senses must be perceived under these conditions; which must, therefore, be necessary, and have existed previously to all perception, although first evolved, or, if we may use the expression, called into activity by external objects. That which is perceived under these conditions, however, is yet no experience: it must be represented, or conceived by the mind, as existing in a necessary connection. This depends upon the operation of judgment. A judgment is an operation of the understanding, by which two representations,—those of subject and predicate,—are immediately combined with each other. Of such combinations there are four species; indicating the relation of the subject to the predicate, of the predicate to the subject, of both together, and of both to the consciousness. To every judgment, one out of these four classes of forms must apply; each must be determined according to these four modifications. If all thought (or conception) depends upon the faculty of judgment, so does all conception of objects. Through the above mentioned forms of the judgment, therefore, we derive the possibility of conceiving objects. Objects may be conceived in as many modes as there are forms of judgment. Objects in general, therefore, may be conceived, 1. as *one*, as *many*, as *all*; 2. as *something*, as *nothing*, as *limited*; 3. as *substance* or *accident*, as *cause* or *effect*, as *common*; 4. as *possible*, as *real*, as *necessary*. All that is conceived must be conceived under these forms. But these forms, as we now view them, are not applicable to any objects. To say that *something is possible*, *real*, &c. has no meaning, unless something is added which renders these notions sensible. This *something* is TIME. That *something is possible*, then, means that something can exist at a particular time; and so of the other forms of thought; but even these forms of thought, thus rendered sensible, are still empty and without meaning, unless objects are given us, to which they may be applied. The forms, *possible*, *real*, &c. convey, of themselves, no information whatever. I must have something given me, which I can call *possible*, *real*, &c.; in short, I must have objects to subject to the operation of thought. But objects can only be given me through the medium of perception; therefore the forms of thought can only be used with reference to objects of perception. As the form of our perceptions renders these perceptions possible; so likewise do the forms of thought render it possible for us to represent these perceptions in a certain connection. They are, therefore, both, *a priori*, the objects of perception, *i. e.* our experience makes them real.

Hence we derive the following important results. It is in experience alone, that we can have true and real knowledge. All the objects which I would know, must be perceived under the forms of sense, and conceived under the forms of the understanding; and, as such, they are called *phenomena*, *i. e.* objects of experience. Whatsoever objects cannot be perceived under the forms of sense, are incapable of being conceived under the forms of the understanding; such, therefore, are called *noumena*, or things in themselves. These *noumena*, or things in themselves, cannot be subjected to the forms of sense; and, therefore, we cannot conceive or know them at all. The possibility of experience is the first principle of all our speculative knowledge. Whatever we cannot perceive under the forms of sense, and represent in that necessary connection, which is determined by the constitution of our understanding, is absolutely beyond the sphere of our knowledge. That which *is* so perceived, and subjected to the forms of the understanding, is known. That which is thus known is true. Our perceptions correspond with the objects; for the objects can only excite these, and no other perceptions in us; because, from the constitution of our nature, we are susceptible of no other impressions.

What becomes, then, of our boasted speculative knowledge from pure abstract reason? Things in themselves are not cognizable; yet, to convey information with regard to these was the professed object of metaphysics. Now, if we can acquire any such speculative knowledge, it must necessarily have its origin in the nature of our reason. But in what does reason consist? In the faculty of drawing conclusions. A rational conclusion is the deduction of knowledge from some principle—of the particular from the universal—of the conditional from the condition. In the principle of every conclusion, there is a relation between the condition and the conditional. This relation may be threefold: as that of the subject to the predicate; of the principle to the consequence; of the whole to the parts. But here we have nothing except the mere form of the conclusions. From whence does reason derive the contents, *i. e.* the matter? The former may be quite accurate, and yet the latter entirely suppositious. Reason cannot beget this matter in itself; for it can produce nothing but the mere form. Is it innate? Impossible. Matter is an object; and objects cannot be innate in the mind. Reason, therefore, must derive it from some other quarter; and from whence but from the understanding? The understanding furnishes the matter, that is, its judgments and notions. Reason works up these materials, by taking two notions, to which it seeks a third; which third notion is assumed as unconditional; or, if not, then the further conditions must be sought, even to the last possible. This notion of the unconditional is originally peculiar to reason, and indispensable to its exercise. Now, if the judgments and notions of the understanding are the materials of reason, and if these, as we have already shewn, are only the marks of certain relations existing between the objects and our cognitive faculty, then the working up of these materials, the combination of these judgments and notions, can give us no farther information with regard to the objects; consequently, we can neither obtain nor extend our knowledge by means of reason alone. The objects, therefore, with which the science of metaphysics has been conversant, are not cognizable. They are nothing but ideas of reason; that is, certain representations of the unconditional, of the highest unity and totality, which spring from the essence of reason; which serve to render the field of experience a comprehensible whole; and are, therefore, merely conditions of the exercise of our reason, and not real external objects.

What sort of a science of metaphysics, then, can we possibly have? We have already shewn, that there are in the mind certain forms of cognition given *a priori*, through which alone our knowledge of objects is possible. The exposition and developement of these forms—of the forms of perception, of our notions, and ideas—the essential and *a priori* determined characteristics of all that can be known, and of all that can be thought or conceived, comprehended under rules and general laws, will give us a science of metaphysics, certain in its principles, and secure against all objections. And here we find the limits affixed to our cognitive faculty. On the one hand, it has been shewn, that we can have no science of super-sensible things; and, upon the other, that all the laws of the understanding are not derived from mere accidental acquired experience, and consequently neither necessary nor certain; but that they are real laws, resulting from the nature of our understanding, indispensably necessary to all possible experience, and affording a knowledge of given objects true and undoubted.

Such is the metaphysical theory of Kant, as developed in the *Critik der reinen Vernunft*. Notwithstanding our anxiety to exhibit at once a compendious and familiar view of this theory, we fear that much of what we have said on the subject will not be very intelligible to those, who have not previously been, in some degree, conversant with the principles of the transcendental philosophy. We have, however, purposely avoided rendering it still more obscure, by entering into any discussion of the more abstruse doctrines peculiar to this theory; such as the possibility of synthetic judgments *a priori*, the critical notions of space and time, the deduction of the categories, &c. These doctrines—upon which the stability of the whole system mainly depends, and which have, therefore, been treated at great length in the works of Kant and his commentators—we must leave to the study of such as are desirous of becoming more minutely acquainted with the principles of transcendental metaphysics. The results of the Kantian theory may be stated, we conceive, in a few words. The first principles of our speculative knowledge are mere subjective forms, *i. e.* forms derived from the constitution of the thinking being; *first*, the forms of sense, or pure perceptions, (space and time); and *secondly*, the forms or notions of the understanding, (the categories). These intellectual forms, or notions, however, only acquire reality by their application to our perceptions, with reference to possible experience; and, therefore, we can have no speculative knowledge of things beyond the sphere of experience.

Having dwelt so much on the speculative part of the critical philosophy, we have left no room to enlarge upon the subject of its practical principles, or those which relate to the theory of morals. Our practical reason, according to Kant, is *autonomic*; it determines merely the form of the will, and postulates freedom as a necessary condition. The moral law appears as an absolute imperative, and dictates, with rigid necessity, universal legality as the general rule of all rational volition, without regard to any motives resulting from pathological feelings. The ideas of freedom, immortality, and Deity, which are placed entirely beyond the reach of speculation, receive from practical reason reality and certainty, not as objects of theoretical knowledge, but of rational faith.

Besides the critical investigation of speculative and practical reason, and of the faculty of judgment, which he considered as merely preparatory to a new metaphysical system, Kant, towards the latter end of his life, executed some detached parts of the system itself, with great originality, acuteness, and consistency. Some time before his death, he meditated a work, which was intended as the key-stone of his whole system, and which was to have been entitled, *The Transition from Metaphysics to Physics*, in which he proposed to demonstrate the general application of his principles. The decline of his faculties, however, prevented the execution of this meditated work.

In this country, the writings of Kant appear to be very little known; and, consequently, his character as a philosopher is very imperfectly appreciated. Those whose curiosity has prompted them to inquire into the merits of his system, have generally been content to receive their information at second hand, through the medium of expositions and translations, not always very perspicuous or very faithful. Hence it is not uncommon, to hear the name of the author of the critical philosophy associated with those shallow pretenders to science, who have occasionally started up, and contrived to impose upon the world, and to acquire an ephemeral reputation, by the display of crude, inconsistent, and absurd theories. We shall, therefore, conclude this article with the testimony of two authors to the merits of Kant, whose names are both celebrated in the literary annals of their native country; who had both studied the writings, and enjoyed the personal acquaintance, of the eminent metaphysician in question; and who are the less liable to the suspicion of partiality, because they are both known to have been hostile to the principles of his system. The first relates principally to the merits of his theory; the latter, to his character as a man and a philosopher.

" The distinctions," says Garve, " which Kant has drawn between the beautiful and the sublime, in his critical review of the faculty of judgment, harmonize extremely well with what he has said, in his moral writings, of the dignity of man. Indeed, it must be considered either as a happy throw of genius, or as the result of a most comprehensive power of thought, that, in those works of Kant which treat of the most widely different subjects, we always find that his notions are perfectly consistent, and even mutually tend to support each other." And again, " Our age, in respect to the progress which it has made in the sciences, will be particularly distinguished by posterity, as having, in different branches of knowledge, brought us nearer than ever to that Socratic wisdom, of acknowledging our ignorance, and the limits of our possible acquirements. For this clearer indication of that which we do not and cannot know in speculative science, we are indebted to Kant; and this merit will assuredly remain to him, even if the efforts which he himself has made to enlarge the province to which he had set bounds, or to fill up the chasms he discovered in science, should not ultimately be found to stand the test of future investigations." (Garve's *Miscellaneous Writings*, vol. ii. p. 415.)

H[illegible], in a work entitled *Briefe zur Beförderung der Humanität*, expresses his opinion of Kant in the following terms: "I have enjoyed the happiness of being acquainted with a philosopher who was my preceptor. In the bloom of his life, he possessed the gay hilarity of a youth; which, I believe, still attends him in his old age. His open forehead, formed, as it were, for thought, was the seat of undisturbable cheerfulness and joy. The language that flowed from his lips was rich in thought; wit and humour were always at his command; and his lectures were the most instructive converse. With the same spirit with which he reviewed the doctrines of Leibnitz, Wolf, Baumgarten, Crusius, Hume, &c. and prosecuted the investigations of Kepler, Newton, and the experimental philosophers, he took up the new writings of note which appeared from time to time—Rousseau's *Emilius* and his *Heloise*, &c. as he did every new discovery in natural philosophy—subjected them to the test of criticism, and always returned to the simple and unprejudiced knowledge of nature, and the moral worth of man. The history of man, of nations, and of nature, natural philosophy, mathematics, and experience, were the sources from which he drew his knowledge, and enlivened his conversation; nothing that was worth knowing was indifferent to him; no cabal, no sect, no advantage, no ambition of a name, had the smallest charm for him, when compared with the extension and developement of truth. He encouraged, and even agreeably forced, his pupils to exercise their own powers of thought; for despotism was a stranger to his mind. This man, whom I name with the highest gratitude and respect, is IMMANUEL KANT. His image is before me, and I contemplate it with pleasure."

The following is a list of the writings of Kant:

Gedanken von der wahren schätzung der lebendigen Kräfte, Koningsberg, 1746, 8vo; *Allgemaine Naturgeschichte und Theorie des Himmels*, 1755; *Principiorum primorum cognitionis metaphysicæ nova dilucidatio*,—a dissertation, or thesis, on taking his doctor's degree, in 1755; *Einzig mogicher Beweis-grund zu einer Demonstration des Daseyns Gottes*, 1763; *Beobachtungen über das Gefühl des Schönen und Erhabenen*, 1764; *Träume eines Geisterschers*, Riga, 1766; *De mundi sensibilis atque intelligibilis forma et principiis*, Koningsberg, 1770,—a dissertation, or thesis, on obtaining his professorship. These, with a number of other tracts, in which the author discovered an intimate acquaintance with the principles of the sciences, and great depth and originality of thought, were collected and published by Tieftrunk, in 3 vols. 8vo. Halle, 1799.

In the following works, his peculiar views of metaphysical science were more fully developed.

Critik der reinen Vernunft, Riga, 1781; 3d edit. 1791, 8vo. *Prolegomena zu einer jeden künftigen Metaphysik*, 1783. *Metaphysische Anfangsgründe der Naturwissenschaft*, 1786. *Grundlegung zur Metaphysik der Sitten*, 1785; *Critik der practischen Vernunft*, 1788. *Critik der Urtheilskraft* 1790. *Metaphysische Anfangsgründe der Richtslehre*, 1797. *Metaphysische Anfangsgründe der Tugendlehre*, 1797. *Anthropologie, in pragmatischer Hinsicht*, 1798.

The biography of Kant has been attempted by various individuals among his countrymen; but a concise account of the life, and delineation of the character, of this philosopher, with a perspicuous view of his doctrines, is still a *desideratum*. (z)

KAOLIN. See PORCELAIN.

KARAK, or GARAK, the *Icarus* of Arrian, is an island on the eastern coast of the Persian Gulf. It is about seven miles long, and four broad, or, according to Captain Goodfellow, it contains twelve or thirteen square miles. At the north-east end is a bay, where there is a good anchorage, and which is commanded by a strong castle, built upon the extreme point. The island was uninhabited till the year 1760, when it was surveyed by a Dutch gentleman, who reported his observations to the government at Batavia. He was immediately sent back, with several ships laden with articles necessary for building the castle and the town, and with a great quantity of European and Indian goods. Having completed their establishment, they carried on an active trade for six or seven years. A Persian prince, who lived at Bandareek, took possession of the island, and built several vessels, with which he carried on the trade of a pirate for some time. The Persians, however, succeeded in getting the island into their hands. The inhabitants, who, when the Dutch possessed the island, amounted to about 2000 or 3000, amount at present only to 300 or 400. They live by gardening and fishing, and manufacture a small quantity of cloth for their own use. The greater part of the island is very rocky; but the eastern side, which is lower than the rest, is capable of cultivation. It is well supplied with water from wells. Sir John Malcolm proposed to our government, in 1808, to take possession of the island, in order to get a complete command of the commerce of the Gulf of Persia. It is situated in East Long. 50° 10′, and North Lat. 29° 11′. See Milburn's *Oriental Commerce*, vol. i. p. 127; and Macdonald Kinneir's *Geographical Memoir of the Persian Empire*, p. 18, 468.

KARATSCHAI, or KARATSCHOLI, a tribe of Tartars dwelling at the foot of Elbrus, the most lofty mountain of the great ridges of Caucasus. The name Karatschai, is said to signify the Black Rivulet, and by some other tribes, the people of this tribe are called Black Circassians. Their abodes are on the rivers Chursuk, Kuban, and Teberdeh, towards the northern base of the mountains bounded by the Abascians on the west; and from the same people they are divided by various mountains on the north and east. Lamberti conjectures, that the appellation, Black Circassians, has been given them from the dark and cloudy nature of their country.

The personal appearance of the Karatschai is in general handsome; they are well shaped, their features are remarkably delicate, they have large black eyes, and a fair complexion. They bear a strong resemblance to the Georgians, and none are ever seen with the broad flat face, and oblique eyes, which denote the blood of the Mongols. The men wear woollen garments like the Circassians, resembling a close surtout: the women, on going abroad, dress in cloth and furs; but, in the warmest weather, have only a light under garment of white cotton. When of more advanced age, a white handkerchief is worn over the head, but the younger females have a cap of silver lawn, and plait their hair, which is tied with a white ribband, and falls down their backs after the Circassian fashion.

The houses of the Karatschai are built of fir, with very small windows; they have no fire places, and are kept extremely clean. They sleep on carpets and pillows, resting on wooden bedsteads, little elevated from the ground. The principal utensils consist of a variety of copper kettles, which are brought by the coast of the Black Sea from Natolia.

As the territory inhabited by this tribe is fertile, abundance of wheat, barley, millet, and tobacco is obtained by cultivation; and plenty of game is caught in the woods. The Karatschai keep many sheep, asses, mules, and horses, the last of small size, but strong and spirited, and admirably adapted for travelling among the mountains. On growing old and unserviceable, the tail and mane are cut off.

and they are turned out to feed in the woods, where they become very fat; and being killed, the flesh is dried for winter provisions. The Karatschai make a kind of beer resembling English porter, another beverage called *bosa*, and they also distil a little brandy from wheat and barley; but the former is chiefly used, strong liquors being forbidden by their religious precepts. Formerly they were very fond of pork, now it is held in abhorrence, and the person touching a hog is deemed impure. They are indebted for this inconvenience to the labours of a Turkish missionary, who converted them to the Mahometan religion about the year 1782. The Karatschai were formerly pagans; they are entire strangers to Christianity, and being of the Sunnite faith, entertain an inveterate antipathy against other sects. They hold the principles of the Koran in strict observance, deeming it a great crime to omit the fasts and prayers prescribed by it. They are, however, exceedingly superstitious, believing in malevolent demons which haunt the mountains; and of which they relate numberless stories. Divination is also in vogue, especially to anticipate the success of the chase. Forty-one pebbles, pease, or grains of corn, are disposed in a certain arrangement, and, from particular rules, conclusions are deduced. Should the omen prove propitious, they hasten to fulfil their object; should it be adverse, nothing can induce them to attempt it.

On the decease of an individual, the women howl, beat their breasts, and tear their hair. The men attend the funerals, lash themselves on the forehead, and mangle the lobes of their ears with their knives. But, on returning from the funerals, their grief is drowned in copious libations of beer.

Parents generally seek out a suitable match for their son; as it is not customary for him to communicate his design of marrying to them, lest they should disapprove of his choice, and prevent the match. When they have decided, the parties are betrothed, but the marriage is deferred six months, or a year; nor during all that time are they permitted to see each other. Neither can the youth enter into conversation with the parents of the female until the union has been actually completed; and it is even judged indecorous that he should sit in their presence. Previous to marriage, the parents of the bride receive a *kalim*, or present, which is called the price of blood: and if the bridegroom be wealthy, he sends her a complete dress, which she puts on when conducted to him in the evening by a train of youths. On the wedding-day, an entertainment is given by each at their respective dwellings, but only to those of their own sex, excluding the other; and festivities ensue for three days, accompanied by particular dances, performed by the youthful of both sexes. In general, the Karatschai have only one wife; some among them, however, have two or three, with whom they live in perfect felicity; and, contrary to the practice of other mountaineers, treat them with kindness and affection. The common people live with their wives, who are permitted to see and converse with strangers. Among the higher ranks, each wife has a separate habitation; no one may approach her, except her husband, whose visits are never in the day-time, but only at night. Should the wife of a person of high rank have no offspring, his male illegitimate offspring by slaves succeed him in all his prerogatives and possessions, equally, as if they had been of lawful birth. Cases of seduction or adultery become a matter of public interest. The seducer is conducted to the mosque, and there tried by the elders of the tribe, who banish him from their territories. The father turns his dishonoured daughter, and the husband his adulterous wife, out of the house, nor is either ever forgiven; and sometimes the affair terminates in the death of the offender. The disgraced family then quit the country, to conceal their shame.

Three different ranks seem to be acknowledged among the Karatschai; first, princes; secondly, nobles; and thirdly, commons or peasants; but all are tributary to the Circassians, who are considered their only superiors. There are three families of princes, who are entitled to exact the attendance of the nobles in their equestrian excursions; and they may, besides, take the use of any person's horses, provided these be soon returned: but it does not appear that they derive any revenues from the tribe. They marry the daughters of the Circassian nobles, who take their daughters for wives reciprocally. Thus, on the whole, they should only be considered nobles of the highest rank. Neither do they seem to enjoy any real authority over the people, though they exert their influence among them. Important matters are discussed by an assembly of the elders in their mosque. Should a son be disobedient to his parents, he is placed at the door of the mosque, and seriously exhorted to reform. If the admonition proves ineffectual, his parents, after providing him with a few necessaries, turn him out of doors, which he is never again permitted to enter, and disown him; and should his conduct still prove reprehensible, he is expelled from the village for life. The Karatschai swear by the Koran to observe their agreements; and a violation of the bargain is attended with forfeiture of five or ten sheep to the village. After paying this penalty, the covenant may be renewed; and no instance is known of its being infringed a second time.

Children are brought up in a strict and commendable manner. Many persons commit the education of their sons to the priest, or mulla, who instructs them in reading and writing, in which having obtained proficiency, they are appointed to chant the Koran in the mosque.

The Karatschai are the most polished and best disposed tribe of any inhabiting the Caucasian mountains, and surpass all their neighbours in mildness of manners. The rich lend oxen to the poor; present them with donations; or find them such employment as enables them to subsist in comfort. Though easily exasperated, they are as easily pacified, and prone to acknowledge their errors. Treachery is so rare, as scarcely to be known to them even by name. Should a native be guilty of it, or a stranger find his way among them as a spy, he would literally be cut to pieces. To the Kabardian princes, their superiors, they pay the utmost respect.

The Karatschai dwell in a fertile country, from which subsistence can readily be obtained: they are industrious, and practise agriculture, but are incapable of manufacturing those articles which require skill. Their arms, which are guns, pistols, sabres, and daggers, they procure from the Circassians. All the cloth of their apparel is manufactured by themselves, and it is, besides, much esteemed throughout the whole of Caucasus. The females go little abroad, and are occupied in the manufacture of gold and silver thread, and in making clothes for the other sex. Their commerce is very limited. Furs of various wild animals, obtained in the woods and mountains, are either sold to foreign traders, or kept for carpets, whereon they kneel in prayer. A surplus of their woollen cloth, as also felts for carpeting and hoods, are exported to the Imirettians, and a Turkish fortress now occupied by the Russians, called Tschuschukulee, or Sochumkalah, on the coast of the Black Sea. Some tobacco, of which they are excessively fond, is disposed of to the neighbouring tribes, who export it to Russia. One of these is likewise supplied by them with lead and sulphur: great quantities of cornel berries, which grow in the woods, are preserved in honey, and sold to the Turks and Kabardians: but their own country being too cold for bees, they procure it from the latter for this purpose. From them likewise they get salt, and articles of Russian produce; and for their other commodities, are received in return, tobacco-pipes, which are in great demand, Turkish tobacco, otter skins, copper kettles, needles, thimbles, silks, and cottons.

The Karatschai inhabit a village, sometimes called by the same name, and sometimes Elbrus, consisting of 250 houses, distant about ten miles from the northern base of the mountain, and thirty north-east of another mountain, called Dshuman-taw, at the confluence of the rivers Chursuk and Kuban. A tribe called Urusby, dwelling on the elevated ridge of Tschalpach, belongs to the same people, and is ruled by a Kabardian prince. The whole nation seems limited to 4000 families.

Very little is preserved of the history of the Karatschai. Abulghasi Bahader Khan, the prince of Karazm, who bestowed so much attention on the history of the Tartars, is silent regarding them. But about the same period wherein he flourished, namely, the middle of the seventeenth century, they are mentioned in general terms by Lamberti, the Italian missionary. He remarks that they spoke the Turkish language, and expresses his surprise how they could have preserved it in such purity, amidst the variety of surrounding nations. In his time they were invaded by some of the mountaineers, who being repulsed, a number of women in military accoutrements were found among the slain. Being brought to the prince of Mingrelia, he promised great rewards to the Karatschai, if they could take one of these Amazons alive. Both arms and accoutrements were seen by Lamberti, who gives a very minute description of them. Of later years, the inroads of the Russians among the Caucasian tribes, and the desire of their government to become more intimately acquainted with the territories over which they claim authority, have exposed some singular and interesting features in the history of the mountaineers by which they are inhabited. (*c*)

KARLY, or **Carli**, is the name of a village between Bombay and Poonah, where there are several excavations similar to those of Elephanta and Ellora. See Lord Valentia's *Travels*, vol. ii. p. 163.; More's *Hindoo Pantheon*; and Mrs. Graham's *Journal of a Residence in India.*

KARMATHIANS. See Carmathians.

KASAN. See Kazan.

KASHNA. See Kassina.

KASIDEANS, or **Assideans**, were a religious fraternity among the Jews, who bound themselves to adorn the porches of the temple of Jerusalem, and preserve it from decay. Scaliger maintains, that the Essenes were descended from them.

KASSINA, or **Cashna**, is a kingdom of Africa, situated to the north of the Niger, between the kingdoms of Bornou and Tombuctoo. This kingdom has such a striking resemblance to that of Bornou in its soil, climate, and productions, as well as in its form of government, and in the manners of the people, that we must refer the reader, in those points, to an account of that kingdom.

There is a considerable difference, however, between the two kingdoms, in language, currency, and in certain articles of their commerce. The currency of Kassina consists of cowrie shells, of which 2500 are equal to 10s $1\frac{1}{2}$d. Sterling. The merchants of Kassina supply all other nations with the salt which is obtained from the kingdom of Bornou. The lakes in which this valuable commodity is found are 45 days march from Agadez, and are encircled by the burning sands of the Desart of Bilma. A thousand camels are employed in the caravans, which are engaged in this profitable trade. The other articles of commerce which the kingdom of Kassina affords, are, gold dust, slaves, cotton cloth, senna, goat skins, ox and buffalo hides, and civet; and, in exchange for these, they receive cowries, horses, red caps, check linens, coarse woollen cloths, baize, small Turkey carpets, Mesurata carpets, silks, tissues, and brocades, sabre blades, Dutch knives, scissars, coral beads, small looking-glasses, and nuts, which communicate a pleasant bitter by infusion.

The rapidity of the Niger in its passage through the kingdom of Kassina is so great, that vessels are unable to ascend the current. In the proceedings of the African Association (1792), Agadez is said to belong to Kassina, but Horneman states, that it is the capital of an independent kingdom called Asben. The city of Cassina is 650 miles W. S. W. from Bornou, and 690 E. S. E. from Tombuctoo. It is situated in East Long. 11° 34′, and North Lat. $14\frac{1}{2}$°.

KATMANDU. See Kathmandu.

KAUFFMAN, **Angelica**, an eminent female painter, was the daughter of an artist, and was born at Coire, the capital of the Grisons, on the 30th October, 1740. Her turn for painting was carefully cultivated by her father, who took her to Milan at the age of fourteen, and afterwards sent her to Rome, where she soon acquired the reputation which was due to her talents. In the year 1765, she came to England with Lady Wentworth, the wife of the British ambassador at Venice, and was there received in the most flattering manner. Her happiness, however, was destined to be of short duration. The footman of a German count, who personated his master, contrived to get himself introduced at court, and persuaded Angelica to marry him. The deception, however, was soon discovered; and it was only by paying him 300l. that he came under an obligationto return to Germany, and cease to molest her. She afterwards married an Italian painter of the name of Zucchi; and, after a residence of seventeen years in England, she returned with him to the Grisons. Some time afterwards she settled at Rome, where her house was the resort of artists and men of genius of all countries. She died at Rome, on the 5th November, 1807, in the 67th year of her age, and she was honoured with a splendid public funeral, which was under the direction of the celebrated Canova.

KAZAN, or **Casan**, is a city of Russia, and capital of a government of the same name, situated on the high bank of the rivulet Kazanka, above five versts to the left of the Volga. It consists of a strong fort, built with stone—of a town, built of wood—and of several suburbs, one of which is inhabited by the Tartars. There are here several churches built of stone, and eleven convents. At one end of the town is a cloth manufactory, the produce of which is bought by government at a fixed price, for the purpose of clothing the soldiers. It has also been long celebrated for its manufacture of Russian leather. In the convent of Sclandowa, which is situated about two versts from the town, on the river Kazanka, is a school for the education of the Tartars, who are instructed in the Russian and Latin languages, in the elements of philosophy, and in the principles of the Christian religion, in order to qualify them as preachers. Kazan is also the see of an archbishop. The garrison of the city consists of three regiments, for the use of whom there is a good hospital. The surrounding country is fertile in wheat, barley, oats, &c.; and to the north and east are extensive woods of fine oaks, which are conveyed to St. Petersburgh for ship-building. The city was consumed by fire in 1749 and 1752. Its distance from Moscow is 400 miles east, and from St. Petersburgh 660 south-east. It is situated in East Long. 49° 3′, and in North Lat. 55° 45′.

KEFT, Kepht, or Coptos, is a town of Egypt, situated on a canal made from the right bank of the Nile. At a village to the north of the town are the ruins of a small temple. There is a lake about 300 paces long and 200 broad, to the east of the high ground of the old city, which seems to have been a reservoir for the supply of the town. Over the canal which rises to the south of this are the remains of two bridges, one of which has five piers, but no arches, large stones being laid from one pier to another. Distance from Cairo 250 miles south, East Long. 32° 0′, and North Lat. 25° 50′.

KEILL, John, a celebrated mathematician and natural philosopher, was born at Edinburgh in the year 1671, and studied in that university under the celebrated Dr. Gregory. In 1694, he entered Baliol College, Oxford, where he acquired considerable reputation, by reading private lectures on experimental philosophy. He succeeded Dr. Millington in 1700, as Sedleian professor of natural philosophy. In 1708 he was elected a fellow of the Royal Society. In 1709, he went to New England, as treasurer to the Palatines, and upon his return in 1710, he was chosen Savilian professor of astronomy in Oxford. About the year 1711, he was appointed by Queen Anne, decypherer to her majesty, an office which he held till 1716. Having been seized with a violent fever, he died on the 1st September 1721, in the 50th year of his age. The following is a list of the principal works of Dr. Keill:

An Examination of Dr Burnet's Theory of the Earth, with some remarks on Mr. Whiston's New Theory of the Earth. Lond. 1698 A second edition of this work appeared in 1737.

Introductio ad Veram Physicam. Lond. 1702. A new edition of it appeared in 1736

An edition of *Euclid*, with two tracts on Trigonometry, and the nature of logarithms, 1713.

Introductio ad Veram Astronomiam, in 1701, which was afterwards translated into English.

His papers in the *Philosophical Transactions*, are,

1. On the Laws of Attraction, and other Physical Principles. *Phil. Trans.* 1708, No. 315, p. 97.

2. Of the Laws of Centrifugal Force, 1708. No. 317. p. 174.

3. The Newtonian Solution of Kepler's Problem of finding the true motion of the Planets, &c. &c. 1713. No. 337. p. 1.

4. Theoremata quædam infinitam materiæ divisibilitatem spectantia, 1714. No. 337. p. 82.

5. Observations on Mr. John Bernoulli's remarks on the inverse problem of Centripetal Forces, with a new solution of the Problems, 1714. No. 350 p. 91.

See our life of John Bernoulli, for an account of our author's quarrel with that mathematician; and our article Fluxions, for an account of his dispute with Leibnitz.

KEITH is the name of a town and parish of Scotland, in the county of Banff. The new town of Keith was founded in 1750, by the earl of Findlater, upon a barren moor, which was let in lots of 30 feet by 70. Manufacturers speedily formed establishments, and the town gradually increased. Flax dressing, spinning, and weaving, afford employment to many of the inhabitants. In 1791, the population of the town was 1075. In 1800, the population of the whole parish was 3289; and in 1811, it was 3352. See Sir John Sinclair's *Statistical Account of Scotland*, vol. v.

KELAT. See Mekran.

KELP is the produce of the burning of certain Fuci, as particularly specified under that article, and rendered useful in the arts, by the quantity of soda and of neutral salts which it contains, being in the form of greenish or bluish masses approaching to black. It has become an object of great attention to individuals, from the value which the manufacture of it adds to those landed estates which have any great extent of sea shore adapted to the raising of the fuci; and by public bodies, especially the Highland Society of Scotland, it is cherished as an important internal resource, by which the wealth of the country is extended. This active body has made many laudable exertions for discovering the means of cultivating it to advantage, and of turning it to account in the other manufactures to which it is applied. In the first volume of their prize essays and transactions, we have, from the late Dr. Walker, an excellent account of the manufacture, in the state in which it existed at the time when the essay was written; together with valuable suggestions for improving its quality, and for enlarging the manufacture, by the cultivation of sea-weeds. We have also the subsequent extended observations of his successor, Professor Jameson, which were first published in his account of the mineralogy of the Scottish isles. Considerable precautions are required, both in the gathering, drying, and burning of the fuci, in the treatment of the ashes, in their fusion, and the degree of exposure to the air during these processes, as the alkali is apt to be dissipated, by neglect or excess, in a variety of particulars. A knowledge of the most advantageous process in burning is still a desideratum; and, at the present moment, (1818) the Highland Society holds out the promise of an honourable testimony of its approbation, to the author of the best satisfactory experimental account of that subject.

Till very lately, it seemed a matter of difficulty among manufacturers who purchase kelp, to assure themselves of the comparative value of different cargoes. The processes of chemists for estimating the amount of alkali contained in it had been various, and some of them appeared to imply a degree of trouble in the manipulation, which was too inconvenient, and perhaps too uncertain, for habitual application to mercantile use. To remove this disadvantage, was one object with the Highland Society, for which they offered two of their prizes. In consequence of which, we have two judicious essays on the subject, both deemed worthy of the proffered mark of encouragement, one by Dr. Fyfe, and another by Mr. Parkes. The first of these is most extensive in its objects, and in a form best adapted to direct application to practice. Meritorious new discoveries are sometimes inferior, in utility, to the well executed task of rendering those available which are already made, pointing out the most judicious choice among many proposed expedients, and removing from the minds of those concerned all discouraging impressions of the difficulty of the subject. This essay has for one chief object the comparison of kelp and barilla; an important problem, as leading us to discover how far the domestic falls short of the foreign article, and what hope may be encouraged of rivalling the latter in the market, without the aid of the questionable policy of a heavy duty, tending to exclude from our manufactures the employment of the cheapest article. We shall follow the order in which the subject is treated in the essay now mentioned.

The soluble part of any fair sample of kelp is separated by boiling it in water, after it has been duly comminuted. The proportion of it that was found in the experiments of Dr. Fyfe varied from about one-third to two-thirds of the whole. The constituent parts of it are ascertained by two different processes; the one consists in the application of the different chemical tests to the whole in a state of solution, the other in making it yield its saline ingredients in a crystallized form, by the process of evaporation. The effects produced on the vegetable colours show the presence of an alkali, either uncombined, or in union only with the carbonic acid. This is well known to be soda. A quantity of potassa likewise exists in it, and shews itself, by giving, with tartaric acid a precipitate, which is soluble in the muriatic acid. There is no neutral salt with an earthy or metallic base. The existence of such a compound is excluded by the superabundance of free alkali, and this absence is confirmed by the employment of the tests, by which such base would be detected. The presence of sulphuric acid is shown, by a precipitate formed with the muriate of baryta, and which is not soluble in muriatic acid. The presence of muriatic acid is shown, by the insoluble precipitate the muriate of silver formed when it is treated with nitrate of silver. Other experiments were made, by which the following ingredients, besides the alkali, were found to be contained in 100 grains of the saline matter.

	Grains.
Carbonic acid and sulphuretted hydrogen, .	.5
Sulphur, ...	.1
Sulphuric acid, ...	2.04
Muriatic acid, ...	19.1
Insoluble matter, ...	.5

These were in combination with as much of the alkaline bases as was sufficient for their saturation. Experiments were made, to shew in what state of combination they existed, by observing what salts make their appearance in evaporation; but these are now superseded by the subsequent ingenious researches of Dr. Murray, on the analysis of mineral waters and the waters of the sea, (see the *Transactions of the Royal Society of Edinburgh*, vols. vii. and viii.): from which it appears, that the same solutions afford neutral salts, differing in chemical constitution according to the process by which these formations are separated; and consequently, that all the knowledge that is within our reach is obtained, when the proportions of different acids and bases contained in any mixed solution are determined. These ingredients were the same in the saline matter procured from different specimens of kelp, though in various proportions.

The principal object which was wanted, was an easy method of ascertaining the quantity of alkali contained in different specimens of kelp. Mr. Kirwan had employed a solution of common alum, and judged of the quantity of alkali by the quantity of aluminous earth which the solution was found capable of precipitating from the sulphuric acid, to which in that substance it is united. By this method, he shewed in a paper, contained in the *Irish Transactions*, that

Cunnamara kelp contained of soda .	3 437 per cent.
And when deprived of sulphur by the action of carbonic acid, .	4 457
Strangford kelp, . . .	1.25

Professor Jameson made experiments on different kinds of kelp by the application of this test, and also by that which was first recommended by Dr. Black, viz. the neutralization of an acid of given strength. In his experiments,

	lbs.	oz.
Norway kelp contained in 100 lbs. . .	2	11
Shetland do. of indifferent value, . .	2	6
Lewis do.	2	11
Arran do.	3½	
Good Isla do.	4	
Do. Mull do.	4	
Do. Morven do.	4½	
Do. Skye do.	5	
Leith do.	4	

Dr. Fyfe very properly gives the preference to the method of Dr. Black, as simpler and more easily employed by all who have any interest in knowing the value of different cargoes; and the strength of the acid must be in the first place perfectly known. This is conveniently done by using sulphuric acid, the strength of which is readily ascertained by its specific gravity. A given weight of kelp, reduced to powder, is mixed with a given weight of boiling water, allowed to remain in mixture several days, and frequently shaken. One half of the clear solution is poured off, and this is saturated with the acid, litmus paper being employed as the test of the point of saturation. The quantity of acid which it has required is ascertained by using a small measure divided into grains, in adding the acid in successive portions. The results of this test on 35 specimens are given, from which it appears that the proportion of alkali varies from 1 to 6 per cent. and that the kelp, even at the same place, varies considerably, depending, no doubt, on the circumstances which occur during the manufacture. This last circumstance renders it of importance, that the purchaser should always be able to judge of its value. It is shewn in the same paper, that for want of some method for this purpose, high prices are sometimes given for very indifferent articles. *L*. 8. per ton was given for kelp containing 4½ per cent. while *L*. 11. 11s. was given for an article containing less than one per cent. It is on this ingredient that the value of kelp to the soap-maker depends.

The following statement is given, of the composition of the *insoluble* part of kelp, as ascertained by experiment.

Sulphuretted hydrogen and carbonic acid, ...	14.
Carbon, ...	4.1
Sulphuric acid, ...	.47
Silica, ...	12.3
Lime, ...	32.6
Magnesia, ...	18.5
Alumina, ...	15.4
Iron, ...	.77
	36.14
Loss . .	1.86
	100.00

The quantity of uncombined alkali in barilla was found to be more uniform than in kelp, and the average about 11 per cent. The whole soluble matter amounted to from one-half to two-thirds. In all respects, the number and kind of ingredients in kelp and barilla are the same, with the exception of iodine, which is contained in kelp, but not in barilla.

The manufactures in which kelp is employed are principally soap-making, bleaching, and glass-making. The soap maker and bleacher use the soluble parts alone; and these are only so far valuable to them, as they contain uncombined alkali, or can be made to yield it. After the soda is extracted, an additional quantity of this alkali may be procured from the sulphates. For this purpose the spent lees are mixed with saw-dust, or waste tanner's bark, and a portion of lime is added; these are exposed to an intense heat, with the free access of air, in a reverberatory furnace. —The effect of this process is to decompose the sulphuric acid, in consequence of which the alkali is set free; and though this alkali should consist partly of potassa, yet it is the soda that is obtained free, as the potassa evolved detaches it from the muriate of soda, by combining with the acid of this salt. The combustion of the carbonaceous matter employed produces a quantity of carbonic acid, by uniting with the oxygen of the sulphuric, and this carbonic acid combines with more or less of the alkali, set free from the more powerful acids. The sulphur obtained by the decomposition of the sulphuric acid, unites with the lime to form a sulphuret. The muriate of potassa, formed in this process, is obtained by evaporation, and purchased by the alum manufacturers. The remaining lees contain iodine, which may be separated copiously, by the processes described under our article Iodine, to which the reader is referred for a full account of that singular substance.

As the soluble matter is thus valuable, and it is of some importance to be able to determine the total quantity of it contained in a given portion of any particular kelp, Dr. Fyfe proposes, as the readiest method of doing this, to extract it from a given weight of the kelp, by means of a determinate proportion of water, and then to use the common means for determining the specific gravity of the solution. To assist this process, he gives a table of the specific gravities of solutions of different degrees of strength, varying from 1 to 20 per cent.

A solution containing

1 per cent. has a specific gravity of	1008.1
2	1015.9
3	1023.4
4	1030.6
5	1037 5
6	1044 4
7	1051.1
8 . . .	1059.1
9	1066 9
10	1075.
11	1082.3
12	1089.5
13	1096.6
14	1103.5
15	1110.4
16	1116.9
17	1123.
18	1128.6
19	1133.8
20	1138.1

Two ounces of finely ground kelp may be put into a tall narrow glass; on this six ounces of water may be poured, and the height of the liquid marked on the glass. It may then be boiled gently for an hour, the whole returned into the glass, and a quantity of water added, till it rises to the mark. The specific gravity of a clear portion of this may then be ascertained, and, as six times the weight of water was employed, the proportion per cent. is to be multiplied by six.

When the whole quantity of soluble matter is ascertained, and also the quantity of uncombined alkali, or alkaline carbonate, it may be of use to determine the proportion of sulphuric acid, by treating it with muriate of barytes, and weighing the precipitate afforded. This will show what proportion of alkali may be obtained by the application of heat to the soaper's lees, mixed up with saw-dust, or other carbonaceous matter.

The insoluble residue of kelp is used by the glass-makers for preparing the coarser kinds of glass. When obtained from the soap-boiler, it contains a quantity of lime, which he has added to it, and this earth has a considerable share in the formation of the glass. This residue also forms a valuable manure.

In the manufacture of crown glass, kelp is employed in the entire state, being subjected to the process of comminution, but to no chemical separation of its ingredients, except that the carbon and sulphur are driven off by the application of a strong heat, and this is done after it is mixed with the sand, which is to form the glass along with it.

The kelp procured from the *Fucus Vesiculosus* is in largest quantity, and is generally in most esteem for its quality. The *Fucus Nodosus* affords a kelp of equal value, but in smaller quantity. The *Fucus Serratus* is in both these particulars less productive; and the *Fucus Digitatus* still less. The last forms the principal part of the drift ware, which is regarded as affording kelp of an inferior quality, though to this there are occasional exceptions.

Kelp procured from fuci which have been exposed to rain during the process of drying is found inferior in its quality to that which has escaped such exposure.

Fuci cut when two or three years old yield more kelp in proportion to its bulk, than when suffered to stand longer.

The alkali, free or carbonated, contained in kelp, is the product of the burning process; none being obtained from sea-weed by subjecting it to the action of boiling water. It is found, however, that the access of air is not necessary to the evolution of the soda, and that it is equally procured by strong heat applied to the weed, in close as in open vessels. The heat acts by the destruction of the sulphates, which is effected by the union of the carbonaceous matter of the weed with the oxygen of the acid, and has therefore exactly the same *rationale* with the process already mentioned, to which soaper's lees are subjected, by the artificial mixture with carbonaceous matter.

From some ingenious experiments of Dr. Fyfe, one valuable practical result was obtained; that the quantity of alkali in kelp may be increased, by sprinkling sea-water on the weed while it is drying. During hot weather, when it is nearly sufficiently dry, this might be done without much risk of a retardation to the manufacture, by the occurrence of the rains, to which our uncertain climate is so liable. Perhaps a similar sprinkling might be employed during the burning of the weed, especially when at any time the heat is too powerful, and the combustion too rapid.

KELSO, a market town of Scotland, in the county of Roxburgh, is situated on the north bank of the Tweed, at its confluence with the Tiviot. In ancient writings it is called *Palco*, and sometimes *Kelkow*, &c. but its etymology is quite uncertain. Kelso extends about half a mile along the sloping ground, on the bank of the river; and the plan of the town is uncommonly striking and convenient. A spacious square is near the centre, from which six streets diverge in different directions. Mr. Pennant, who visited Kelso in 1772, observes, that it is built much after the manner of a Flemish town. He perhaps alludes not so much to the general aspect of the town, as to the awkward fashion which then too much prevailed, of placing the gables instead of the fronts of the houses towards the street. This clumsy contrivance has now given way to a better taste, and the square and principal streets contain many neat, and some elegant shops and dwelling houses, built of the beautiful freestone of Sprouston quarry. Slates are now substituted for thatch, which used to be employed in covering the older buildings. The square was for many years deformed by an old and ruinous town-house, which was taken down several years ago. In March, 1816, the foundation of a new and elegant one was laid, which is now nearly finished, (Jan. 1818.) The building, carried on by subscription, under the liberal patronage of the Duke of Roxburgh, contains on the ground floor a piazza, surrounded by arcades, which is intended for a market-house. The principal story, adorned with simple Ionic columns, and surmounted by a balustrade, contains the town-hall, and other apartments.

The greatest ornament of the town is the abbey, founded by David I. about the year 1128, of which a large part has resisted the ravages of time, and the desolations of border wars. This pious prince, before he succeeded to the throne, and while he was earl of Cumberland, had planted a colony of monks, of the order called Tyronensis, at Selkirk. These he attempted to establish at the ancient city of Roxburgh; but finding, as we are told, in the preamble of the charter, that they could not be properly accommodated there, he removed them to the church of the Holy Virgin, at Calcow, (Kelso.). This church was delivered up to the monarch, for this purpose, by Robert, bishop of St. Andrew's, in whose diocese it then was. In the deed of conveyance, he declares it "salutam et ab omni subjectione et exactione liberam," and allows the monks and abbots of Kelso to receive ordination, and other sacraments of the church of Rome, from any bishop they pleased in Scotland or Cumberland. For their accommodation, David caused to be built a magnificent abbey and monastery, in the Saxon style, by artists brought from various countries. By the charter of the re-establishment from the royal founder, which makes part of the chartulary deposited in the Advocates' Library, Edinburgh, as well as by other political and historical documents, it appears that its possessions, privileges, and immunities, were great. The abbey had its original charter of confirmation from Pope Innocent II. In the chartulary already mentioned is to be found, a bull of Pope Alexander III. allowing the abbot to wear a mitre, and other pontifical distinctions, and to be present at all general councils. Innocent III. granted some important privileges to the abbey, and in particular exempted the abbot from all episcopal jurisdiction. He and his clergy, notwithstanding their removal, retained the churches of Selkirk and Roxburgh, "and the tythes with the schools of Roxburgh." They had various churches granted to them at different times; among others, those of Sprouston, Makerston, Greenlaw, Hume, Keith, Gordon, &c. &c. The Tyronensian monks are said to have been particularly attentive to agriculture and the arts; and to have maintained within their monasteries husbandmen and mechanics, the profits of whose labour formed a part of the funds of the establishment. Many persons of distinction have held the office of abbot, among others James Stuart, natural son of James V. The rental contained in the chartulary is curious, but much too long for insertion in a work of this nature. Upon the forfeiture of Francis, Earl of Bothwell, admiral of Scotland, James the VI. granted the superiority of the abbey to Sir Robert Ker of Cessford, the ancestor of the dukes of Roxburgh. Although this venerable structure was in a great measure defaced and demolished, in consequence of the civil and religious struggles that prevailed, especially at the glorious æra of the Reformation, yet the principal part of it was probably early used as a Protestant place of worship; and in the seventeenth century, it underwent considerable additions and repairs, in order to fit it for a Presbyterian church. From this time it was the parish church, till the year 1771, when a false alarm being spread during public worship, that the building was falling, it was never again used. This alarm was the more easily excited, as there was previously a popular fear, grafted on a traditional prophecy of Thomas the Rhymer, that the abbey would fall when it was at the fullest. (Vide notes to Scott's *Minstrelsy of the Border*, vol. iii.) From this time the building was neglected, till the late duke William of Roxburgh caused an ugly modern aisle, and a part of the modern wall, to be removed; and the present duke James has had almost the whole of the modern deformities taken away, by which means the transept, and many windows and side arches of the original abbey, are displayed. The style of the building is Saxon, with a slight mixture of Gothic. The central tower is about ninety feet in height. There is none of that exuberance of ornament, for the quantity and nicety of execution of which the neighbouring abbey of Melrose is remarkable, and there are no remains of niches for images or statues. But the arches are clustered with admirable strength and beauty, and those which support the lantern are truly magnificent. (See CIVIL ARCHITECTURE, Plate CLXVII. Fig. 2.)

Kelso, though the most populous town in the county of Roxburgh, is not the county town. It was erected into a burgh of barony, as is believed, in 1605. It is under the jurisdiction of a baron bailie, and fifteen stent-masters, or town-councillors, of whom a majority (eight) are nominated by the duke, or his bailie; and the remainder by the five incorporated trades, and the merchant and butcher companies, one from each.

The population of the town was, in 1793, 3557; and in 1806, 3962.

In the beautiful peninsula immediately opposite to Kelso, to the west, and at the extremity of the parish, stands the very last crumbling fragments of what was once Roxburgh Castle, so much celebrated in Scottish history. It was built on the north bank of the Teviot, on a mount rising about sixty feet above its level. The castle was defended by a deep moat, supplied with water from the river, in connection with which it would at any time have been easily insulated. Indeed, the streams of Tweed and Teviot approach so near above the castle, and then diverge, that it might be easy to convert it, and the whole adjoining ground, into an island; and this probably was sometimes done, for the defence both of the castle, and of the ancient town of Roxburgh, which stood near it. Camden says—"This castle was anciently called *Marchidun*, from its standing on the marshes; and, for its natural situation, and outward fortifications, was exceedingly strong." Early in the twelfth century, we find it mentioned as a place of national importance; and it is at various intervals recorded as the arena of bitter and extensive hostility—as having often changed masters—and as the scene of the birth, imprisonment, marriage festival, and death of kings. James II. of Scotland lost his life while besieging this fortress, then in possession of the English. His forces and artillery were drawn up on the north side of the Tweed, opposite to the castle, in a part of what is now the Park of Fleurs; and while trying a piece of wooden ordnance, it burst and killed him. A holly tree still marks the place where this disaster is said to have happened; and some of the older inhabitants remember the vestiges of a village which stood near the place, and was called *Fair-Cross.* The name is supposed by some to have originated in an exclamation of James' widowed queen, on seeing the body of the fallen monarch, "There lies his *Fair corpse*;" which, approaching in sound to the other name, and falling in with a favourite religious association, might easily give rise to the altered name. On the following day, James III. then only seven or eight years of age, was crowned at Kelso; and his gallant mother, animating the drooping spirits of the chiefs, by telling them they had still a king, and shewing him to the army, roused them to new and more vigorous exertion. In a few days the castle was taken, and in a great measure destroyed. It underwent, however, a partial repair; and was again put into a fortified state by the lord protector Somerset, in the reign of Edward VI. It finally fell into decay, after the happy union of Scotland and England, which rendered such strong-holds unnecessary. Yet it is to be regretted, that the very spot where it stood should retain no mark of its former existence; and perhaps something might yet be done, at a moderate expense, to prevent the last lingering vestiges of its ruins from utterly disappearing.

The ancient town of Roxburgh, which stood in a situation of much peril, on a part of the sloping ground between the castle and the junction of the rivers, is recorded to have been a place of considerable extent and population, where courts of justice were held, at which the king sometimes presided. It was one of the four most ancient royal burghs of Scotland; and, though fragments of the foundation are sometimes turned up by the plough or spade, not the slightest external trace of it is visible. The church of St. James, which was in or adjoining to the city, was founded, according to the *Chronicle of Mailross*, (Melrose) in 1134. In attempting to trace its foundation, upwards of thirty years ago, a considerable quantity of wheat and barley were found in a charred state, on a tiled pavement; also some pieces of glass and brick, which exhibited marks of fire.

On the meadow still called St. James' Green, one of the greatest fairs, and most ancient, in the south of Scotland, is annually held on the 5th of August. Of this fair, one half of the customs is drawn by the magistrates of Jedburgh; the other by the Duke of Roxburgh; and the jealousy of the inhabitants of Kelso for the honour of their superior, gave rise frequently, when the former came to maintain their privilege by "*riding the fair*," to tragi-comical squabbles, which are now succeeded by perfect harmony and peace. A part of the old church of Maxwell, which, as well as St. James', is in Kelso parish, was standing a few years ago; and, till lately, the ground adjoining the place where it stood was used as a place of sepulture. Several tombstones are still to be seen; but the plough desecrating the spot, and, if not protected, they will speedily vanish.

Our limits permit us to add but little respecting the scenery of Kelso, which renders it an object of high attraction to travellers. The town, viewed from the neighbouring heights, seems the centre of an amphitheatre formed by finely wooded rising grounds; and the lovely streams, (with their pretty islets,) having united their waters, flow powerfully, with many noble windings, through a richly cultivated vale. The princely mansion of Fleurs, which was built by Sir John Vanbrugh about the year 1718, with its fine terrace and park, command varying prospects of beauty and magnificence. But it is scarcely possible for language to describe the charms of the scene which opens on the traveller, as he approaches Kelso on the west, by the road passing Roxburgh castle. Mr. W. Wilson, a respectable artist of London, a native of this place, has made it the subject of some justly admired pictures. The approach also from the south, by Maxwellheugh, is exquisitely diversified with objects of rural beauty, and possesses, indeed, all the softness and grace of an Italian landscape. The view from the library is also very fine; and the prospect from Kelso bridge of Ednam house, the abbey, and town; at a greater distance, Fleurs, Springwood Park, Wooden, Hendersyde, and, in the back ground, the romantic Eildon hills, &c. is most justly admired. (*l*)

KENDALE, Kentdale, or Kirkby in Kendal, is a market town of England, in the county of Westmoreland. It stands in an agreeable valley on the west side of the river Kent, which is crossed by three bridges. The town consists of one spacious and well built street, having several narrow streets branching off from it at right angles; and of another main street, called Strammongate, in both of which the houses are chiefly built of hewn limestone, and covered with slate. The streets are well paved and lighted. On the east of the town flows the river Kent; and on the west is a long row of hanging gardens. The church stands at Kirkland, without the town. It is 180 feet long, and 99 broad. It has five aisles, and a square tower with eight good bells. There are also a meeting-house for Presbyterians, one for Quakers, two for Methodists, and a Roman Catholic chapel. The town hall is a "very elegant building;" and the butcher market, which was built about twenty-three years ago, is neat and convenient. A new gaol, with cells underneath, has been recently erected.

The principal charitable establishments are, a free grammar school, on the west side of the church-yard, which is well endowed, and has exhibitions to Queen's College, Oxford; Sandes' hospital and charity school, founded in 1670, with convenient dwellings for eight poor widows; a blue coat school, in which 50 boys and 40 girls are clothed, educated, and bred up to the art of weaving; a school of industry, instituted in 1799; a dispensary, begun in 1782, and supported by voluntary contribution; and a large and airy workhouse at the west end of the town.

The ruins of Kendal castle stand on the top of a hill, on the west side of the town, composed of rounded stones, embedded in a black sandy cement. Part of two squares and two round towers lately remained, and the foundations were repaired, and the fossé round the ruins enlarged in 1813. Opposite to the castle is castlelaw hall, which consists of a circular mount of gravel and earth, thrown upon a rock nearly 30 feet high. Round its base is a deep ditch, and a high dyke, fortified with two bastions on the east. In 1788, the inhabitants erected upon it a handsome obelisk, with an inscription, in commemoration of the Revolution of 1688. The government of the town is vested in a mayor, recorder, 12 aldermen, and 20 capital burgesses. There are here seven incorporated companies. A newspaper is printed in this town, and there is a very respectable book club, and an interesting museum.

The principal manufactures of Kendal, are Kendal cottons, a sort of coarse woollen cloths, and linseys for the North American market. Great quantities of woollen stockings are annually knit. Cotton mills, and the weaving of muslin, were lately established. A marble manufactory employs several hands, and has its mills for sawing and polishing at Water Crook. The marble is chiefly procured from Kendal Fell. The leather trade is also considerable; and there is a great supply of fruit from the numerous orchards. Hats, fish hooks, and wool cards, are also manufactured here.

In 1811, the number of houses were . .	1496
And the population	7505

See Nicholson and Brown's *History and Antiquities of Westmoreland*; and *the Beauties of England and Wales*, vol. xv. p. 190.

KENSINGTON is a populous village of England, near London. It is chiefly celebrated for its royal palace, whose garden and extensive walks, laid out by Brown, and about four miles in circumference, render it a place of great resort for the inhabitants of London. The palace, built by William III. is an irregular, and by no means a handsome building, and was erected at various periods. The ancient mansion of Holland house, the seat of Lord Holland, is in the parish of Kensington.

The parish church of Kensington is a modern brick building. There is a meeting-house for dissenters, and a small chapel for Roman Catholics. In 1811, the number of houses in the parish was 1579, and the population 10,886.

For a full account of Kensington, see the *Beauties of England and Wales*; vol. x. part v. p. 128-155; Lyson's *Environs of London*; and *The Architectural Antiquities of Great Britain*. For an account of the gardens of Kensington, see HORTICULTURE.

KENT is a maritime county of England, forming the south-east angle of that kingdom. It is bounded on the north by the Thames and the German ocean; on the east, and part of its south side, by the straits of Dover and the British Channel; on the remainder of its south side by the county of Sussex; and on the west by the county of Surry. Its form is nearly quadrilateral, or rather that of a trapezium. From Deptford, to the extreme point of the North Foreland, it measures about 63 miles, or about 129 minutes of longitude; and on the east side, from the North Foreland to Dungeness Point, it measures nearly 40 miles, between the latitudes of 50° 54′ and 51° 23′ 20″ north. The circumference of its coast, if all the sinuosities be measured, is about 165 miles. Its area has been variously computed: Some raise it as high as 1,200 000 acres; while, according to others, it contains only 832,000. Mr. Boys' estimate is probably nearer the truth; he makes its area 893,600 acres.

Kent is divided into five large portions, called Lathes; these are subdivided into 63 hundreds, 15 liberties, 414 parishes, 2 cities, and 24 market towns. The two cities are Canterbury and Rochester. The principal towns are Deptford, Woolwich, Gravesend, Sheerness, Margate, Ramsgate, Faversham, Deal, Sandwich, Dover, Folkstone, Hythe, Chatham, Maidstone, &c. This county sends 18 members to the House of Commons, viz. two for the shire, two for Canterbury, two for Rochester, two for Maidstone, two for Queensborough, two for Dover, two for Sandwich, two for Hythe, and two for Romney. There are fifteen deaneries in it; eleven of which are under the jurisdiction of the archbishop of Canterbury, and four under the jurisdiction of the bishop of Rochester. In order to facilitate the civil jurisdiction of the county, it is divided into two districts, East and West Kent. The former contains the lathes of Sutton-at-Hone and Aylesford, and the lower part of the lathe of Scray; and the latter contains the upper part of the lathe of Scray, and the lathes of St. Augustine and Shepey. In each of these districts a court of sessions is held twice a year.

The county of Kent is, in size, inferior only to Yorkshire, Lincolnshire, Devonshire, and Northumberland. Its general aspect is very striking and pleasing; and in some parts, especially near Maidstone, Tunbridge, and Sittingbourne, the scenery is uncommonly fine. The surface of the country, generally speaking, is much varied. The whole of it, with the exception of the marshes and the wealds, may justly be regarded as a cluster of small hills. Among these there are two chains higher than the rest, called the upper and lower, which run through the middle of Kent, in general about eight miles distant from one another, in a direction from west to east. The northern chain is composed principally of chalk and flints; the southern, of iron and ragstone.

The principal rivers which intersect or bound this county are, the Thames, Medway, the two Stoures, the Darent, the Cray, and the Ravensbourne. The Thames touches Kent first at Deptford; below Erith, it receives the Crag and Darent. The isle of Grain bounds its entrance on the south, being separated from the mainland by a boat channel, called the Scrag; this island is composed of low marsh soil, embanked from the sea. The Medway is more properly a Kentish river; it has four sources, only one, however, is in this county: the united streams flow to Tunbridge, near which place the river again divides; but, again uniting, it flows from Yalding, in a winding course towards Maidstone, and thence to Rochester and Chatham. Below Chatham it loses all its beauties, passing through a flat, marshy, and unpicturesque country, but still preserving its devious course. It falls into the sea at Sheerness, near the exit of the Thames. The tide flows nearly as high as Maidstone. From Sheerness to Rochester, a distance of nearly 20 miles, it is so deep, and the reaches so convenient, that many of the largest line of battle ships, when out of commission, are moored here. About the middle of the eighteenth century, the Medway was made navigable to Tunbridge. The greater and lesser Stoure unite near Ashford; they separate at Canterbury, and again unite below that city, having formed three small islets: from Canterbury its course is north-east, to the isle of Thanet; it falls into the sea at Pepperness.

There is only one canal in the county, the military canal, which begins near Sandgate. It extends from this place, nearly in a straight direction, along the coast, till it passes Hythe, when it takes the course of the hills which skirt the marshes, and terminates at Cliffend in Sussex, a distance of about 23 miles. Its breadth is about 30 yards, its depth 6 yards. It has also a raised bank to protect the soldiers. As this canal was constructed entirely for military purposes, the martello towers may be mentioned in connection with it. These are built on the sea-beach, generally within half or three-fourths of a mile from one another. They extend from near East Wenbay to Dymchurch. The largest is at the latter place. There are two wells in Kent deserving notice, one at Sheerness, and the other at Queensborough. The first is of the astonishing depth of 328 feet, 150 feet of clay, &c. and the remainder chalk. The water is so abundant, that it has never been lowered more than 200 feet. Its quality is fine and soft, and its temperature rather above that obtained from most wells. It is computed that the bottom of this well is 200 feet below the deepest part of the adjacent sea. The bottom of the other well at Queensborough is said to be 166 feet below the bottom of the adjacent sea. The depth of this well is 281 feet, and the supply of water is nearly as great as that derived from the well at Sheerness.

The manufactures of Kent are few and unimportant. Silk, which was long manufactured at Canterbury, is now giving way to cotton. The first mill for making white paper, was erected near Dartford, but the most extensive paper mills are now at Maidstone and Dover. There are salt-works near Sandwich, and in the isle of Grain; large copperas works at Whitstable and Deptford, and in that part of the Weald which borders on Sussex, there are furnaces for casting iron. The gunpowder mills at Deptford and Faversham carried on a very extensive business in time of war. At Craigford there are large works for bleaching and printing; calicoes, sacking, and hop-bagging, are made in different parts of the county; but the woollen manufacture, which formerly raised to wealth and eminence many Kentish families, no longer exists in any extent or importance. One of the largest flour mills in the kingdom is in Canterbury on the Stoure; it is upon a most excellent construction, and grinds and dresses 500 quarters of corn weekly.

The principal commerce of Kent consists in sending corn to London, by the Medway and Thames, in hoys, carrying from 300 to 500 quarters each. They return with grocery goods, &c.

The population in the year 1700, was 153,800; in the year 1750, 190,000; and, in 1801, 317,800. The returns in 1811 were as follow:

Males,	183,500
Females,	189,595
Total,	373,095
Population in 1801,	317,800
Increase,	55,295

The history of this county is perhaps as interesting and important as that of any other county in England; but our notice of it must be very short. The Cantii inhabited it at the Roman conquest; they are supposed to have been a Roman colony. When Cæsar invaded it, it was divided into four principalities. It was included in Britannia Prima. The Romans appear to have paid particular attention to the defence of its shores; and for that purpose they erected forts, which were under the direction of a particular officer, called Count of the Saxon Shore. When the Anglo-Saxons obtained possession of England, Kent formed one of their kingdoms, which was founded in the year 454, and ended in 823. The Saxon kings of Kent discharged the office of Counts of the Saxon Shore, in their regal capacity: and when England was formed into one kingdom, this post was revived in the Lord Warden of the Cinque-ports. See Marshall's *Southern Counties; Beauties of England and Wales*, vol. vii. and viii.; Campbell's *Survey of Great Britain*. (W. S.)

KENTUCKY, one of the United States of North America, derives its name from the river Kentucky, by which it is traversed, and lies between 36° 30′, and 39° 7′ North Lat., and between 82° 50′ and 89° 20′ West Long. It is about 300 miles long, from north to south; its greatest breadth is 180 miles, and its least width 40. Its superficial extent is about 50,000 square miles. On the whole of its northern side it is bounded by the Ohio river, through a length of 645 miles. This river separates it from the states of Indiana and Illinois for 525 miles, and from Ohio for 125. On the east it is separated from Virginia by the Cumberland mountains, and by Big Sandy river, for 80 miles. On the south it is divided from Tennessee by the parallel of latitude of 36° 30′; and on the west it is separated from the Missouri territory by the Mississippi river, for 60 miles.

Kentucky was originally divided into two counties, Lincoln and Jefferson, and afterwards into 42; but it is now divided into 59, and sends 10 representatives to Congress. The south-east part of this state is mountainous. The principal mountains are the Cumberland mountains, which bound the state for about 80 miles on the south-east. The country below the mountains is hilly for some distance; but the great part of the state is agreeably uneven, and formed of gentle elevations. The whole country below the mountains rests upon an immense bed of limestone, from 1 to 20 feet thick, but usually about eight feet below the surface.

The soil of Kentucky is in general good. It is either black, or tinged with a brighter or deeper vermilion, or resembles dark ashes. Wheat was at one time the principal grain that was cultivated; but no more of it is now raised than is consumed in the state. Much rye is raised for the distilleries. Maize is cultivated to a great extent. Hemp has lately been the principal article of produce. An ordinary crop is about from 700 to 1000 weight the acre. Barley, oats, flax, cotton, and tobacco, are raised; and it is said that 50, 60, and even 100 bushels of grain have been produced upon an acre. Of wheat, or rye, 30 bushels is the ordinary produce. Kentucky is well covered with timber. The principal trees are the elm, the beech, the ash, the juniper, the sugar, the coffee, the papaw, the hackberry, and the cucumber.

The mineralogy of this state has not been much examined. Iron is found in various places. It is well fitted for hollow ware, but not for malleable iron. A valuable gold mine has been discovered between Cumberland river and Green river. Copper, sulphur, copperas, and alum, have also been obtained. Nitre is obtained from the earth in the caverns on Green river. Coal is found in abundance, and in some places there is an appearance of potters' clay. An immense quantity of marble, of a greyish cast, finely variegated, and susceptible of a high polish, has been found on the banks of the Kentucky river. On the banks of Kentucky and Dick's river are solid perpendicular rocks, rising to the height of 300 and 400 feet. Some of these are of common limestone, and others of white marble, curiously chequered with strata of singular irregularity. These lofty banks are covered with groves of red cedar trees, and the rivers have the appearance of deep artificial canals. Caves of enormous length have been discovered in the limestone rock.

The most celebrated of these is the Mammoth Cave, situated in the lower part of Kentucky, called the Green River country. This cave consists of one great trunk, with numerous and irregular ramifications, and the total length of it appears to be about ten or eleven miles. A great quantity of saltpetre is manufactured from the earth in its interior. The following is the only account of this remarkable curiosity which has been published:

"About a quarter of a mile from the mouth is a mummy, lately deposited there from a neighbouring cave, and intended for Peale's Philadelphia museum. It is grey headed, the teeth much worn, but round, and the flesh entirely dried up. It is supposed to have been a queen, from the number of trinkets found with it, consisting of needles, head dresses of various kinds of feathers, necklaces of deer hoofs, beads, mockasons, paint, a whistle, a bear's jawbone, a hawk's claw, and a rattle-snake's skin, with rattles. These were enclosed in a pack, (or wallet used by Indians for transporting goods,) they being first enclosed in a fine wrought indispensible, afterwards in one of a coarser texture, and then in the pack, which, with the body, was wrapped up in two dressed deer skins, and the whole again enclosed in a mat or coarse wrapper. The visage seemed quite venerable, and the whole presented a truly antique appearance. I examined the ears and nose; but did not discover aught, whereby to conclude that either had ever been decorated with trinkets, from which circumstance, it may be presumed they were not in vogue, when regal dignity, and perhaps power, were vested in the body. The nails on the hands and feet were perfect; and the feet small in proportion to the body, which was of a large stature.

"Proceeding on, I entered the haunted room, (so called,) in which is an arm-chair formed of petrified rock, and one and a quarter mile from the mouth of the cave. Near to this is a spring of water falling from the arch above, remarkably clear, and pleasant to the taste, having an agreeable sweetish flavour. In another branch is a heap of petrifactions, resembling furnace cinders, a pond, &c.

"A strong current of cold air issues from the cave, perceptible at the mouth before descending. The current sets in during the winter season; but the temperature within is not affected by the change, it being uniform throughout the year. Human tracks, imprinted on the sand, and from four to twelve inches in length, are to be seen in some of the rooms; and pieces of cane or reed strewed along the paths, having, in all probability, been formerly used for lights by those who then frequented, and not improbably inhabited, the place. In many places are large pillars of petrifaction, formed by water dropping from the arch, and which seem to support it. One (or rather part of one) is called the Bell; it is four feet long, and extends half way down to the bottom of the cave, the height of the arch in this place being about eight feet. A sound is occasioned by striking it with a stone, similar to that produced by striking a cannon of pretty large calibre with a piece of wood. The height of the arch varies in different places. In some it is estimated at fifty feet; and in others, a person is obliged to stoop almost to the ground to pass along. The arch, in many places, has a beautiful appearance, being that of a plastered ceiling. In one or two places which I particularly noticed, and where the passage is wide, it presented a strong resemblance to a spacious circular room. The effect was produced by the light of lamps, which showed distinctly the white and smooth petrifactions above, and which was gradually lost by the shades becoming darker, as the power of the light was lessened upon the more remote parts, and until the eyes, by following them, were carried to silent darkness. The descent (a small ascent in some places excepted) is generally gradual as you advance inwards. The most rapid is down a rather steep hill, of about 40 feet in height. By stamping occasionally, I discovered that I passed over several vaults, or probably other rooms or branches. The subterraneous sound produced by stamping was not terrific, as I had been led to believe, before I made the experiment."

In Plate CCCXLI. we have given a representation of this remarkable cave, which will be understood from the following references to the engraving.

1. Mouth.
2. Indian mummy.
3. Right hand chamber.
4. Mountain room; the entrance is from the top of the mountain.
5. Little room, with a spring and two pits.
6. Springs.
7. Sand room.
8. Part of the haunted room.
9. Sick room.
10. Haunted room.
11. Springs.
12. Horn room.
13. Pit 100 feet deep, and water falling several hundred feet.
14. Part of the deserted chamber, which runs under the salt rooms.
15. Deserted chamber.
16. This room runs under the deserted chamber.
17. A large spring falls several hundred feet.
18. Glauber salts (sulphate of soda) found here.
19. Mockason room.
20. A large room or pit above 50 feet deep.
21. Salts.
22. Ground room.
23. Basket room.
24. Sembin's room.
25. Weeping willow. This room runs about a quarter of a mile, and then returns to the same place.
26. Two springs in two large sink holes.
27. Beekman's room.
28. Miller's room.
29. Hell's gate.
30. Devil's chamber, supposed to be ten miles from the mouth.

When the mummy was brought to New York for exhibition, it was examined by Dr. Samuel L. Mitchill, who has given the following account of it, in a letter addressed to the earl of Buchan, and published in the 2d volume of the *Transactions of the Society of Scottish Antiquaries.* It was a perfect exsiccation. All the solids were preserved as entire as in an anatomical preparation, or rather as dried bacon. The posture was squatting, with one hand embracing the right knee, and the palm of the other put under the left buttock. It was inclosed in four distinct wrappers. *First*, a mantle of cloth and feathers, exactly like those worn at this day by the chiefs of Wakush and Owhyhee. *Second*, a shawl of cloth, manufactured after the manner now practised by the natives of the Sandwich and Fegee islands. In both these, the material of the cloth is neither flax nor hemp, nor the product of any vegetable known in America as an indigenous plant; and the preparation, the twist, and the manner of connecting the threads, is wholly unlike any fabric of the present indigenes, or the European emigrants. Dr. Mitchill, and the most distinguished persons of New York, were decidedly of opinion, that there was a wonderful similitude between these cloths and various cloths brought from the Pacific islands, with which they compared them. The hair of the mummy is a brown sorrel, or dark chesnut, and not either a sandy or a black. *Thirdly*, the next wrapper was a deer-skin, whose hair had been cut away by a sharp instrument, that had left incisions on the hide, exactly like those on the pelt of a beaver by a hatter's knife; and, *fourthly*, the outside envelope was a deer's skin that had been simply dried, without any cutting, or marks of any kind.

Dr. Mitchill conversed with Mr. Gratz, the proprietor of the great cave, who confirmed the account we have given of its extraordinary length, windings, and saline contents. Mr. Gratz was persuaded that the chambers of this cavern had been formerly used as places of refuge. He had found heaps of mockasons, or coverings for the feet, all worn more or less, and thrown by like old shoes, and the materials and workmanship of these were completely different from those practised either by the red or the white men.

There are in this state five celebrated hot springs, or licks, namely, the higher and lower blue springs on Licking river, from some of which streams of brinish water are said to issue.

The climate of Kentucky is moist, though it is said to be salubrious, except in the vicinity of ponds and low grounds. In the winter, and early in the spring, the ground is generally very muddy, and colds, rheumatisms, and inflammatory fevers, then prevail. The extremes of heat and cold are unknown. In 1798, the maximum heat was 89° of Fahrenheit. In the spring and fall of the year, the weather is delightful. A wind from the south-west blows during half that time. The very cold winds are all from the north and west. The winter generally lasts about two months, and is so mild, that cattle subsist without fodder.

The principal rivers are, the Mississippi, the Ohio, the Big Sandy, the Tennessee, the Kentucky, the Green river, and the Licking river. The Kentucky rises in the southeast of the state, and runs through a north-west course of 280 miles, where it empties itself into the Ohio, by a mouth 250 yards wide. It has a rocky and irregular course, through banks generally rugged and precipitous. In the winter tides, it is navigable for boats of a considerable size for 180 miles; but at Frankfort they can pass only during half the year. Green River rises in Lincoln county; and, after an irregular westerly course of 280 miles, runs into the Ohio, 120 miles below Louisville. It is at all times navigable for loaded boats for 80 miles. Licking river runs into the Ohio, by a mouth 150 yards wide, after a course of 180 miles. It is navigable about 70 miles.

The principal towns in this state, are Lexington and Frankfort. Lexington stands on an agreeable plain, about 120 miles in circuit, which is half encircled by Kentucky river for a course of 60 miles, so that it is no where more than 20 miles from the town. It is the seat of several flouishing manufactures; and contains a handsome presbyterian church, a church for the Baptists, one for the Episcopalians, a college, and 4326 inhabitants. The seminary, which is called the Transylvania university, is under a board of 21 trustees, and has a president, 5 professors, and a teacher of French. The number of students, exclusive of those of medicine, is about 70. The library contains 1500 volumes; and the annual revenue is about 2700 dollars. Frankfort, which is the seat of government, is situated on the east bank of the Kentucky, about 30 miles from Lexington. It has a population of 1090 inhabitants.

The following Table contains a view of the manufactures of this state in 1810.

	Number.				Value in Dollars.
Tanneries . .	267	Hides tanned		70,432	8,255,212
Distilleries . .	2000	Spirits . .	Galls.	2,220,773	740.242
Looms . .	24,450	Cloth . .	Yds.	4,685 375	2,057.081
Hemp . .		. .	Tons	5,755	690.600
Maple sugar .		. .	lbs.	2,471,647	308,932
Powder mills .	53	Powder . .	lbs.	115,706	38,561
Fulling mills .	33	Cloth . .	Yds.	53,038	78.407
Salt works . .	36	Salt . .	Bushels	324,870	324,870
Saltpetre . .		. .	lbs.	201,937	33,648
Paper mills . .	6	Paper . .	Reams	6200	18,600
Rope walks . .	38	Cordage . .	Tons	1991½	393,400
Cotton bagging manufactories	13	Bagging . .	Yds.	453,750	159,445
Spinning machines .	15		Spindles	1656	
Forges . . .	3				
Furnaces . . .	4				
				Total value	5,098,998

The principal articles of export, which are hemp, wheat, and tobacco, are carried down the Ohio and Mississippi to New Orleans; and the imports are brought up these rivers from the same place. The amount of exports, in 1801, was 626,673 dollars.

The legislature of Kentucky, called the general assembly, meets on the first Monday of November, and consists of a senate and a house of representatives. The members of the senate, who are limited to 38, are chosen by districts, and retain their seat for four years; and one-fourth must be rechosen annually. A member of the senate must be 35 years old, and a citizen of the United States; and he must have resided six years in the state, and the last year in the district. The members of the house of representatives, who are limited to 100, are elected on the first Monday of every August. They must be 24 years old, and citizens of the United States; and must have resided the two preceding years in the state, and the last of them in the county or town which they represent. The governor, to whom the executive government is entrusted, is elected by the people once in four years, and must be out of office at least seven years before he can be chosen again. He must be an American citizen, and 35 years of age, and must have resided in the state for the six preceding years. The lieutenant-governor is similarly chosen, and must have similar qualifications. He is president of the senate. If the governor dissents from any bill, it cannot become a law unless it is again agreed to by a majority of both houses.

Baptists, Presbyterians, and Methodists, are the leading sects in Kentucky; the Baptists being the most, and the Methodists the least numerous. There are a few Catholics, who have a bishop at Bardstown, and still fewer Episcopalians. The Prysbyterians have fifty clergymen, whose doctrines are, with a few exceptions, strictly Calvinistic.

This part of America was well known to the Indian traders many years before it was colonized. A map of it was made from their description in 1752; and it was afterwards explored in 1754 and 1769. It was again explored by Col. Daniel Boon, in 1770. The first family settled in it in 1775. In 1777, it was erected into a separate county by Virginia, and into a separate district in 1782. In 1786, it was entirely separated from Virginia; and on the 1st of June, 1792, it was received into the union. The first settlers were harrassed by the Indians, till General Clarke, in 1778, took their posts, as well as those of the French and English.

The population of Kentucky was, in

1790 . . .	73 677
1800 . . .	220.955
1810 . . .	406.511

The distance of Philadelphia by land to Kentucky is between 700 and 800 miles.

See Morse's *American Geography*, 8vo. Boston, 1817, p. 225. *The Medical Repository for February*, 1815, published at New York, vol. ii. p. 391; and *The Transactions of the Society of the Antiquaries of Scotland*, vol. i. p. 61, 62, &c. Edinb. 1818. Very copious information respecting this state may also be found in Michaux's *Travels to the Westward of the Alleghany Mountains*, chap. 16. 17, &c.

KEPLER, John, a celebrated astronomer, was born at Wiel, in the duchy of Wirtemberg, on the 27th Dec. 1571, and was the son of Henry Kepler, a respectable officer in the army, whom misfortunes had reduced to indigent circumstances. Notwithstanding this reverse of fortune, he was desirous to give his son the best education in his power; and though young Kepler was sent to different schools, and placed under different masters, yet his avidity for knowledge was so great, that he made the most rapid proficiency in his early studies. He was sent in the year 1589 to Tubingen; and in 1591, he studied mathematics at the university of that city, under the celebrated Mæstlinus, who had, in his early life, made an oration in favour of the Copernican hypothesis, which is said to have turned the attention of Galileo to the true system of the universe. He was first admitted to the degree of bachelor, and afterwards to that of master of philosophy; and after studying theology, he undertook the duties of the ministry for a short time. His passion for science, however, induced him to withdraw his views from the church, and to devote his whole leisure to his favourite studies. In 1594, he was invited to Gratz in Styria, to fill the mathematical chair in the university of that city; and it seems to have been after he accepted of the appointment, that he embodied those speculations respecting the analogies and harmonics of nature, which he published at Tubingen, in 1596, under the title of, *Prodromus dissertationum cosmographicarum continens mysterium cosmographicum de admirabili proportione orbium cælestium, deque causis cælorum numeri magnitudinis, motuumque periodicorum genuinis et propriis, demonstratum per quinque regularia corpora geometrica.* To this work is added a paper by Rheticus, on the Copernican system, and another by Maestlinus. In order to discover why the planets were *six* in number, and why the dimensions of their orbits were such as Copernicus had described them, he studied the properties of numbers and plane figures with success. It, however, occurred to him, that while the plane regular figures may be infinite in number, the number of regular solids was limited to five; and he attempted to discover a relation between their dimensions and the distances of the planetary orbits. A cube, for example, if inserted in the sphere of Saturn, would, he supposed, touch by its six planes the sphere of Jupiter; and, in like manner, the other regular solids would determine the intervals of the other orbits. When Kepler was afterwards asked by Thomas Lansius to which of his own works he gave the preference, he replied, that when he discovered the sublime secret of the five regular bodies, he valued it more than he would have done the possession of the whole electorate of Saxony.

Kepler sent a copy of his work to the celebrated Tycho Brahe, who had been too long familiarised with celestial observations, to place any value on such wild speculations. He wrote to Kepler, and urged him "first to lay a solid foundation for his views by actual observations, and then by ascending from these, to strive to reach the causes of things." This advice, which contains the whole substance of what is called the Baconian philosophy, no doubt induced Kepler to renounce these visionary speculations, and thus to lay the foundation of those substantial discoveries, to which he was afterwards conducted.

In the same year on which that work appeared, Kepler married a lady of a noble family; but in the year 1598, he was persecuted for his religious principles, and was driven from Gratz. He was, however, recalled by the states of Styria; but as he did not think his situation sufficiently secure against future molestations, he accepted of a very pressing invitation from Tycho to settle in Bohemia, and to assist him in his calculations; and he accordingly removed thither with his family and books in the year 1600. During this journey, he was seized with a quartan ague, which lasted eight months.

Tycho introduced Kepler to the acquaintance of the Emperor Rodolph, which led to his appointment as mathematician to the emperor, a title which he retained under the successive reigns of Matthias and of Ferdinand. Notwithstanding this kindness, Kepler complained of an unwillingness on the part of his friend, either to promote his interest, or to make him acquainted with his discoveries and improvements. The death of Tycho, however, in 1601, put an end to those feelings of discontent, which might soon have ripened into a serious quarrel.

The mind of Kepler was deeply tinged with the errors of astrology. In 1602, he published at Prague, his *Nova Dissertatiuncula de fundamentis Astrologiæ certioribus, ad cosmotheoriam spectans*, in which he speaks of the possibility of predicting future events by the aspects of the planets. And in another work on the same subject, which appeared at Frankfort in 1610, entitled *Tertium Interveniens*, he exhorts theologians, physicians, and philosophers, but principally Philip Feselius, to take care that they do not injure their own interests, by rejecting the errors of astrology; and he attempts to shew, that an influence may be communicated from the planets to the earth, through the medium of the light which they reflect.

In 1604, he published at Frankfort, his *Paralipomena ad Vitellonem, quibus Astronomiæ pars Optica traditur, potissimum de artificiosa observatione et estimatione diametrorum, deliquiorumque Solis et Lunæ.* This work contains the method of calculating eclipses, which is in use at the present day. In 1605, he published at Prague, his *Epistola ad rerum celestium amatores universos*, respecting the eclipse in the month of October 1605; which was followed in the same year, by his *Epistola de Cometa* 1604, *&c.* which was the prelude to his great work on the star in the foot of Serpentarius. In 1606, he printed at Frankfort, his *Sylva Chronologica;* and in the same year appeared his work, entitled *De Stella Novo in pede Serpentarii et qui sub ejus exortum de novo iniit trigono igneo. Libellus Astronomicis, Physicis Metaphysicis, et Astrologicis disputationibus endoxis et paradoxis plenus.* In 1608, Kepler published at Halle, a history of the new comet of 1607, with a discourse on the nature and motion of comets, and their indications. In looking at the sun in a camera obscura, he maintained that he had seen Mercury on the sun's disc. He published the same error at Leipsic, in 1609, in a pamphlet, entitled *Phenomenon singulare, seu Mercurius in Sole;* but in his *Ephemerides* for 1616, he acknowledges his mistake, and congratulates himself on having been the first that observed the spots of the sun. His famous work, entitled *Astronomia nova αιτιολογητος, sive Physica cælestis tradita commentariis de motibus stellæ Martis ex observationibus Tychonis Brahe*, appeared at Prague in 1609. This work, as we have already shewn, (see our article ASTRONOMY, Vol. II. p. 596,) conducted its author to the great discovery of the true form of the planetary orbits. In 1611, appeared his *Dissertatio cum Nuncio Sidereo nuper ad mortales misso a Galileo*, in which he announces to Galileo, the great satisfaction which his discoveries had given him. He expresses his hope, that he may discover other satellites round Saturn and Mars. He states his astonishment, that telescopes had not been made formerly, particularly after what Baptista Porta had said of them in his *Magia Naturalis;* and, in addition to many interesting observations, he conjectures that Jupiter had a motion of rotation about his axis.

In 1611, he published at Augsburg, his *Dioptricæ; item examen præfationis* Jo PENAE *Galli in Optica Euclidis; De usu Optices en Philosophia.* This work was reprinted at London, in 1653. Descartes is said to have borrowed freely from it. When Descartes was charged with this, he acknowledged that Kepler was his first master in optics, and that he understood more of the subject than all his predecessors. In the same year appeared his *Strena, seu de Nive sexangula*, in which he seems to have been the first that discovered the tendency of water to crystallize in angles of 60°.

In 1615, Kepler published his *Eclogæ chronicæ ex epistolis doctissimorum aliquot virorum et suis mutuis;* and in the same year at Lintz, his *Nova Stereometria doliorum vinariorum*, which he is said to have composed, in consequence of a revenue officer having made a false measurement of his wine at the time of his marriage. His *Ephemerides Novæ Mot. Celest. ab anno* 1617, appeared at Lintz in 1617.

On the 15th May 1618, Kepler has left it on record, that he discovered the beautiful relation between the squares of the periodic times and the cubes of the distances of the planets. In the same year, he published at Lintz, his *Epitome Astronomiæ Copernicanæ in septem libris conscripta.* This work contained only the three first books; the fourth appeared in 1622, and the three last in 1621. In 1619, he published at Lintz his *Harmonices Mundi libri quinque, geometricus, architectonicus, harmonicus, psychologicus, astronomicus, cum appendice continens mysterium cosmographicum;* also his treatise *De Cometis Libelli tres astronomicus, physicus, astrologicus. Ejusdem Cometarum physiologia nova et paradoxos;* and another work, entitled *Prognosticon, &c.* or the *Prediction of Misfortunes for Governments and Churches, principally from the Comet and the Earthquake in* 1618 *and* 19. The first of these works, viz. the *Harmonices*, is dedicated to James VI. of Scotland. Kepler attempts to shew, that there is a resemblance between the distances of the heavenly bodies, as seen from the sun in their aphelia and perihelia, and the division of the musical octave; but though this part of his book is in every respect absurd, yet he appears from this work to have studied music as a science, and also to have been practically acquainted with it. The discovery of the four satellites of Jupiter seems to have first pointed out to him the error which he had committed.

In 1624, appeared at Marpurg, his *Chilias Logarithmorum*, to which a supplement was added in 1625, when he also published his *Hyperaspistes, &c. quo libro doctrina prestantissima de parallaxibus, deque novorum siderum in sublima æthere discursionibus repetitur et confirmatur.*

After the death of Tycho, the emperor Rodolph commanded Kepler to complete the astronomical tables which had been begun by his friend; but he was not able to bring his labours to a termination till the year 1627, when they at last appeared at Ulm, under the title, *Tabulæ Rudolphinæ, quibus astronomicæ scientiæ, temporum longinquitate collapsæ, restauratio continetur, a Tychone Brahe primum animo concepta et destinata anno Chr.* 1564, *exinde observationibus siderum accuratissimus post annum præcipue* 1572, *serio affectata, tandem traducta in Germaniam, inque Aulam et nomen Rodolphi imp. anno* 1598. The delay in the publication of this work arose from the difficulties which Kepler experienced in obtaining the pecuniary means which were necessary for carrying it on. The emperor Rodolph had given orders in 1609, that, besides the expense of the edition, the arrears of his pension, amounting to 2000 crowns, and also 2000 crowns more, should be paid; yet it was not till two years after that these orders were executed. Under the emperors Matthias and Ferdinand, he experienced the same difficulties; but after the year 1621, Ferdinand paid all his arrears, and all the expenses necessary for completing the work.

As soon as these tables were completed, Kepler solicited, and obtained the emperor's leave, to take up his residence at Sagan in Silesia, where he spent the remainder of his life. Here he published, in 1629, his *Responsio ad Epistolam Jac. Bartschii præfixam Ephemeridi anni* 1629 *de computatione et editione Ephemeridum;* and, in the same year, his *Sportula Genethliacis missa de Tab. Rudolphi usu in computationibus astrologicis cum modo dirigendi novo et naturali.*

In this remote situation, Kepler suffered great inconvenience from the irregular payment of his pension. He was therefore obliged, in 1630, to make a journey to Ratisbon, to solicit the arrears which were due to him; and, in consequence of the fatigue (*ob nimiam equitationem*) which he experienced, he was seized with a fever, of which he died, in that city, on the 30th of November 1630, in the 59th year of his age.

As we have already given a brief view of Kepler's discoveries in our *History of* ASTRONOMY, and in the part of that article which treats of *Physical* ASTRONOMY, we have directed the reader's attention, in the preceding sketch, principally, to the events of his life, and the titles and general object of his various works. The abstracts which we have given, short and imperfect as they are, are not uninstructive.

It is a very difficult matter to form an estimate of the true character of Kepler's genius. The ingenious absurdities with which he began his career were a very unfavourable omen of his future success. But he seems, from his infancy, to have been impressed with the conviction, that there were analogies or laws to be discovered with regard to the distances of the planets; and every view which presented itself to his ardent fancy seems to have been embraced as the real law of the universe. The advice of Tycho, however, seems to have given a right direction to his inquiries; and the observations of that illustrious astronomer on the planet Mars, and on the other planetary bodies, presented him with the tests by which his speculations could be tried. But while we admire those brilliant discoveries to which Kepler was thus conducted, it is impossible to restrain our indignation against those wild and almost insane speculations, in which he afterwards chose to indulge. That he was a believer in astrology it is impossible to doubt; and though, in order to save his reputation, La Lande has affirmed that Kepler published his reveries merely in order to procure a sale for his works, by flattering the prejudices of the vulgar; yet, in drawing the character of this great man, we should be unwilling to apologise for his superstition, by such a heavy imputation upon his integrity. The physical notions of Kepler respecting the planets are still more ridiculous than his astrological convictions. In his *Harmonices Mundi*, (tab. iv. cap. vii.) he endeavours to prove, that the earth has a sympathy with the heavens, and, by a natural instinct, perceives the position of the stars. He maintains, also, that the earth is a vast animal, breathing out the winds from holes in the mountains; and that all the planets are animated, and have muscles proportioned to their bulk, by means of which they move through absolute space. He even supposes, that the faculty of the earth is terrified at the approach of a comet, that it "sweats out a great quantity of vapour through terror, and that hence arise great rains and floods."

In the year 1634 appeared a posthumous work of Kepler, entitled, *J. Kepleri Somnium, seu opus posthumum de Astronomia Lunari*, in which he treats of the phenomena which will be seen by the inhabitants of the moon and the other planets. Kepler himself died during the printing of this work; and his son-in-law Bartschius, who took the charge of the impression, did not live to complete it. Lewis Kepler, the son of our author, who was a physician at Koningsberg, was with difficulty prevailed upon to finish an undertaking, during which his father and his brother-in-law had died.

Kepler left behind him many volumes of MSS. Hevelius purchased these from his representatives, and has given a list of them in the *Philosophical Transactions* for 1674, No. 102, with the following remarks: "As to the MSS. of the celebrated Kepler, I purchased them all from his representatives for a certain sum, as well of those that have been published, as those that have never yet been published; among which are a great many letters that passed between him and other celebrated persons. Among these MSS. are found several well deserving to be published, not only many letters, but some works also; among which is his Hipparchus, which, though not quite digested, might be easily put in sufficient order for that purpose. I have also his MSS. Chronology; but I do not find a written account of his life, though there are numerous facts and traits, from which a clear account of it might be given." These MSS. were, after the death of Hevelius, purchased from his heirs by M. Gottlieb Hansch, a zealous mathematician.

With a view of giving them to the world, Hansch was presented to the emperor Charles VI. and obtained from him a thousand ducats to defray the expense, and a pension of 300 florins during the life of the emperor. With this pecuniary aid, he published at Leipsic, in 1718, in one volume folio, *Epistolæ ad Joannem Keplerum mathematicum Cæsareum, scriptæ insertis ad easdem responsionibus Keplerianis, quotquot hactenus reperiri potuerunt: opus novum, &c. cum Jo. Kepleri vita; jussu et auspiciis Caroli VI. Roman Imp.* Having spent all the 1000 ducats on this volume, and being obliged even to pledge the rest of the MSS. for 828 florins, Hansch was unable to publish the rest of the MSS. He addressed himself to the celebrated Wolfius to no purpose, and was equally unsuccessful in his application to the Royal Society of London, and to other quarters. At this time, M. de Murr of Nuremberg, happening to be in London in 1761, made great efforts to acquire the MSS. and Dr. Bradley had almost determined to purchase them. In 1773, 4000 francs were asked for them; and some time afterwards, M. de Murr succeeded in purchasing them for the Imperial Academy of St. Petersburg. The following are the contents of the 22 volumes of MSS. four of which were published by Hansch.

1. Hipparchus Kepleri, 279 leaves.
2. Kepleri Adversaria tabularum lunarium, &c. cum Calendario in annum 1603, 152 leaves.
3. De stellâ novâ Kepleri annotata et observationes, aliorumque epistolæ.
4. Commentaria in Ptolemæi Harmonicorum librum tertium. Aristoxeni, musici antiqui, Harmonicorum elementorum libri tres.
5. De genesi magnitudinum.
6, 7, 8. The letters which have been published and deposited in the imperial library.
9. Epistolæ Kepleri, partly in Latin and partly in German, with many calculations.
10. Epistolæ Davidis Fabricii ad Keplerum cum responsionibus 1601, 1609.
11. Litteræ.
12. Letters which have been published.
13. Demonstrationes motuum Mercurii et Veneris.
14. Commentaria ἀνέκδοτα in theoriam Martis.
15. Documenta observatarum et examinatarum eclipsium.
16. Chronologia reformata Kepleri.
17. Notæ in Scaligeri et Petavii Doctrinam temporum.
18. Kepleri astronomica genethliaca et genealogica varia.
19. Discursus de anno lunari.
20. Kepleri Schedæ authenticæ Tabularum Rudolphinarum.
21. In 4to. Canon rectanguli spherici inchoatus. Mediorum motuum lunæ correctio et constitutio Tabularum Rudolphinarum emendationes. Tabula proportionalis, sed canon hexacontaton sive sexagenorum.
22. In 4to. De quadrantibus libellus, along with other detached pieces.

For a very full and able account of the discoveries of Kepler, see Dr. Small's *Account of the Astronomical Discoveries of Kepler*. Lond. 1804 8vo.

KERBELA. See Meshed Hossein.

KERGUELEN'S Land, or the Island of Desolation, is an island in the southern Indian ocean, which was first discovered in 1772, by M. De Kerguelen, who afterwards visited it in 1773, and discovered some small islands in its vicinity. In December 1776, Captain Cook fell in with the same islands. One of them he describes as about three leagues in circuit, and very high. The other is of the same size, and situated one league to the westward. These islands seem entirely destitute of interest. They were almost completely barren, and the few botanical and mineralogical observations which Mr. Anderson made upon them, are not worthy of being repeated. The islands are situated in South Lat. 49° 20′, and East Long. 69° 30′. See Cook's *Third Voyage*, vol. i. and *Relation des deux voyages dans les Mers Australes et des Indes, faits en* 1771, 1772, *et* 1773. par M. de Kerguelen. Paris 1781. 8vo.

KERMAN, anciently Caramania, (but not the Caramania of Asiatic Turkey,) is a province of the kingdom of Persia. It is bounded on the east by the provinces of Seistan and Mekran; on the north by Seistan and Khorassan; on the west by Fars, Lar, and Irak; and on the south by Mekran and the Persian Gulf. The large district of Burkind, in the south of Kerman, is covered with mountains, which approach the sea between Cape Jask and the fort of Cohistry, situated in 57° 20′ East Long. They then suddenly retire behind Minab, and do not again advance to the south until beyond Gombroon. Their general name is, the mountains of the Silver Mines. The district of Nurmansheer is about 90 miles long, and from 30 to 80 broad. A range of mountains bounds it on the north and south, those to the south being the highest, and covered with snow during the greater part of the year. The soil is fertile, and the country well peopled.

The province of Kerman contains no river of importance, and hence it abounds in deserts. The climate, which is by no means salubrious, is in some parts very cold, and in others very hot. Between Jask and Sereek, plantations of palms were numerous, and the produce of wheat was considerable. On the coast road, between Minah and Gombroon, are a number of villages, and a good supply of water.

The principal towns of this province, are Kerman, Gombroon, Bumm, Regan, Darabjerd, Krook, Tehroot, Mahim, and Rayun.

Kerman, or Serjan, as it is sometimes called, is the ancient *Caramania*, and was formerly one of the most opulent and magnificent cities in Persia; but, from its having been exposed to destructive wars, it has now lost its former splendour. In 1794, it was defended with the greatest bravery for several months by Lutf Ali Khan, until it was betrayed into the hands of his rival. The city was given up for three months to the fury of the soldiers—the walls and the public buildings were levelled to the ground—great numbers of the inhabitants were massacred—and 30,000 were banished into the remote provinces of the empire. From this calamity it can scarcely ever recover. It is situated in an extensive plain, and so near the mountains, that it is nearly surrounded by two of them. The walls, which are of mud, are high, and have 19 or 20 bastions in each face; and a dry ditch, 20 yards wide and 10 deep. It has four gates; and the governor resides in the ark, or citadel, on the south side of the fort. There are nine principal caravanseras within the walls, and many others of inferior note. Kerman is celebrated for its manufactures of shawls, matchlocks, and carpets, which are exported chiefly to Khorassan and the northern provinces; and for which they receive, in return, drugs, furs, silk, steel, copper, and skins from Bockhara. These articles are sent to India, along with pistachio nuts, carpets, rosebuds, and bullion; and from that country they import tin, lead, iron, chintz, wrought silk, spices, indigo, muslin, kheem-khob, gold brocade, china and glass-ware, broad cloth, hardware, &c. The bazar, which, in one part, is neatly arched with a fine blue stone from the adjacent mountains, is well furnished with articles of every description. The population of Kerman is about 20,000, among whom are a small proportion of Gentoos. There are also Armenians, Jews, and Hindoos. In 1810, the revenues of the city were about

L.25,000. The position of Kerman is in North Lat. 29° 30′, and East Long. 56° 38′.

Gombroon has already been described in a separate article. The city of Bumm is strongly fortified by a high mud wall, flanked with towers, and encircled with a broad and deep dry ditch. It has only one gate; and its bazar is pretty well supplied with dates, milk, and fruit. Its former fountains are said to have thrown their water to a great height; and the gardens, which appear to have been inclosed by walls, and adorned with elegant summer-houses, produce the most delicious pomegranates. The former extent of the city is shewn by the magnitude of its ruins.

Regan is a neat little town, surrounded by a mud wall. The fort is quadrangular; and the walls, which are in good repair, are high, and flanked with bastions. The town has but one gate, upon which a guard is constantly kept.

Darabjerd, situated nearly at the western extremity of the province, was once a large city; but a great part of it is now in ruins. It is finely situated in an extensive plain, and on the banks of a river, and is surrounded with groves of orange and lemon trees. The juice of these is exported to every part of Persia; and tobacco is cultivated here to a great extent. Four streets, crossing at right angles, proceed from the four gates; and at their intersection is the market-place, which is covered with the largest dome in Persia. The principal streets have also been covered with domes. It contains from 15,000 to 20,000 inhabitants.

Krook is the capital of Nurmansheer, and is built like Regan. It is however large, and is surrounded with a deep ditch. The governor resides here.

Mahim, Tehroot, and Rayun, are small towns, surrounded with numerous gardens. The cattle belonging to the governor of the province are usually kept at Rayun. See Macdonald Kinneir's *Geographical Memoir of the Persian Empire*, p. 194, which contains all the information in the preceding article.

KERMANSHAW, is the capital of a fruitful and extensive district of Persia of the same name, in the province of Irak. It is the residence of Mahomed Ali Meerza, the eldest son to the king. It is situated in the southern extremity of a fine plain, through the centre of which runs the river Karasu. It contains no ancient ruins. It is adorned with many gardens, has fourteen hummams or public baths, four mosques, and yields an annual revenue of 15,000 tomauns a-year. Kermanshaw is a flourishing town, and contains about 12,000 houses. It is situated in East Lon. 46° 38′, and 34° 26′ North Lat. See Macdonald Kinneir's *Geographical Memoir of the Persian Empire*, p. 132.

KERMES. See Dyeing.

KERRY is the name of a maritime county of Ireland, in the province of Munster. It is situated on the south-west coast, and is bounded on the north by the Shannon, by which it is separated from the county of Clare; on the east, by the counties of Limerick and Cork; on the south-east by Cork; and on the south-west and west by the Atlantic Ocean. In consequence of two great projecting tongues of land, comprehending the baronies of Iveragh and Corcaguinny, the shape of the county is very irregular. Its extent, from north to south, is 67½ English miles; its greatest breadth, from east to west, is 52; and it contains 1793 square English miles. This county is covered with mountains, in the midst of which are the celebrated lakes of Killarney, (see Killarney); and a great portion of it is thus rendered unfit for habitation, and incapable of being cultivated. The northern baronies, which contain much good land, are by no means level; and the cultivated fields and fine pastures are often interruped by black and stoney hills, and occasionally by tracts of bog. The barony of Corcaguinny is the most western point of Europe. It is of a peninsular form, and is full of mountains, of which the high promontory of St. Brandon is the most conspicuous. The barony of Iveragh consists of a chain of rough mountains running into the sea; but it abounds with magnificent prospects, connected with the view of the ocean and Kenmare river. Glarerought is covered with very high and rugged hills, and is separated from the county of Cork by a ridge of rocky mountains, which is passable only at the Priest's Leap. The highest mountains in the county are those on the west and south of Kilkenny. The height of

	Feet above Sea.
M'Gillycuddy's Reeks are	3405
Mangerton	2698

as determined by Mr. Kirwan.

Kerry is watered with several fine rivers. The Cashing, formed by the Feele and the Gale, is navigable for eight or ten miles. The Lane flows out of the lake of Killarney, which receives the Flesk. The Roughy runs into Kenmare river. The Mang, which is navigable to Castlemain, runs into Castlemain harbour at Dingle bay, which only admits vessels of moderate burden. The roads of Dingle and Valentia, Ventry bay, and Ballynaskeligs bay, are small but convenient harbours. Kenmare river forms a secure haven. The chief towns of this county, are Tralee, where the assizes are held, Killarney, Milltown, and Dingle.

Kerry returns two members to parliament; and the principal influence belongs to Lord Kenmare. The Dingle mountains, which are dry and healthy, are very populous; but the district between Killarney and Bantry is very thinly peopled. The population of Kerry, in 1797, according to Dr. Beaufort, was 19,395 houses, or 107,000 inhabitants—the Catholics amounting to 105,663, and the Protestants to 1337. The population has, however, greatly increased. See Smith's *History of Kerry;* Beaufort's *Memoirs of a Map of Ireland;* and Wakefield's *Account of Ireland.*

KESHO. See Tunkin.

KESWICK is a small market town of England, in the county of Cumberland, situated 228 feet above the level of the sea, on the east side of the vale of Keswick, and near the lower end of Derwentwater, on the lake of Keswick. The town consists of a long street, protected from the north winds by the lofty mountain of Skiddaw; but contains no buildings of any interest. A cotton manufactory has been established here. Coarse woollen goods, carpets, blankets, kerseys, and some linens, are also made; but the town is principally supported by travellers who come to visit the lakes. In 1793, the number of visitors was 1540. There are two private museums in the town, which are open for public inspection. The Druidical stones at Castlerigg, about two miles to the south of the town, are worthy of being seen. In 1811, the population of the township was 352 houses, and 1683 inhabitants; of whom, 258 were returned as employed in trade and manufactures. The maximum quantity of rain that falls at Keswick is 84,605 inches, the minimum 34,506, and the mean 68. 5. See West's *Guide to the Lakes;* and the *Beauties of England and Wales*, vol. iii. p. 239.

KETTERING is a populous market town of England, in Northamptonshire. It is situated upon a small river runing into the New. The town is but poorly built, but is gradually improving. The church, which has a nave, north and south aisles, a chancel, and a handsome tower and spire, is a tolerably good building. There is here a sessions-house, a well endowed free-school, an alms-house, and two dissenting chapels. The manufactures of the town consist of sorting, combing, spinning, and weaving tammies and lastings of different sorts. In 1811, the parish contained 713 houses, and 3242 inhabitants; of whom, 587 were returned as employed in trade and manufactures. See Bridge's *History of Northamptonshire;* and the *Beauties of England and Wales*, vol. xi. p. 194.

KEW is a village of England, in the county of Surry, celebrated for the royal palace built there by George III. and the magnificent gardens which belong to it. There is a fine stone bridge of seven arches thrown over the Thames, from a design by Paine. There is here one of the royal palaces, which is held on lease. It is a small house, in a bad style of architecture. His present majesty, however, began, in 1802, a new palace in the Gothic style, and of an embattled form, from the designs of James Wyatt, Esq. This palace is still unfinished. A very full account of the royal gardens of Kew will be found in our article HORTICULTURE.

KEY, in Music, is a term ambiguously used by most practical musicians. Sometimes by this term they mean a scale or system of intervals; at others, it implies the lowest or fundamental note of the system, as above; and, on other occasions, this term also designates one of the short levers on which the fingers act, in performing on organs, piano-fortes, &c. Writers, who have aimed at greater precision in their terms and writings, have made the following distinctions, viz.

Key *note*, called formerly ison or mese, the fundamental or bass note of every mode or scale of intervals, as above; each tune, or piece of music, usually begins with its key-note, and invariably ends with it; otherwise, as experience has shewn, the ear would not be satisfied, or the subject of the tune seem closed and ended. The moderns consider C as the principal or first key of the major mode; and by a series of modulations into its successive or consecutive fifths, above and below, they derive all the other key-notes. Mr. Liston first shewed how this modulation could be conducted, without departing from the harmonic relations of the first key-note, or C, by returning sufficiently often to one of the consecutive 3ds or 6ths of this first key-note; and thus he extended the scale to 59 notes in the octave; and Mr. Farey has now extended the same to 612 notes. See our article INTERVALS.

Key, or *Mode*, implies a system, or scale of intervals. The practical, and less correct writers on music, have often asserted, that a key or mode, whether major or minor, consists only of seven sounds, which, in the first or principal key, or mode major, are C, D, E, F, G, A, and B; and in the principal minor key, or note, are A, B, C, D, E, F, and G; but Mr. Liston, in pp. 59 and 61 of his *Essay*, shews that the major mode C is not complete, or capable of correct or euharmonic performance in it, (such as violins and voices actually accomplish,) without 10 notes instead of 7; viz. C, D', D, E, F, ♯F, G, A, A', and B. In like manner, in pp. 64 and 67, he shews that the first or principal minor mode or key A, requires also 10 notes, viz. A, B, C, D, ♯D, E, F, ♯F, G, and ♯G.

Combining, therefore, these two scales together, it thus appears, that 12 notes are required instead of 7, as some still inconsiderately assert, for simply accompanying, or producing the harmonics to an ascending and descending bass octave, in the modes C major and A minor. It need, therefore, excite no surprise, that in modulating through all the keys or modes in use, so many as 59 notes become necessary; but rather, how so few notes should suffice, which is owing to so many of the notes answering in various keys.

Finger-Keys, manual-keys, or clavier, are the short levers of the keyed instruments, by means of which they are played upon; usually there are 12 of these to each octave of the compass or extent of the instrument; seven of them longer and broader than the other five, which are shorter and narrower, and stand up higher between the longer keys; according to the arrangement which is explained in our article FINGER-*Keyed Instruments.*

The organ in the Temple church in London has two of its short keys divided in their lengths, so as to produce two distinct levers or keys, by which means the fingers can act occasionally on 14 notes in each octave, instead of 12; we have read, or heard, of attempts formerly to divide more of the keys, one as early as 1683, by a Mr. Player, and thus to multiply the powers of the fingers in performance, as to improved harmony; but so many difficulties, and liabilities to mistakes, in the hurry of performance, were thereby introduced, that we believe these divided finger-keys no where remain in use, except two of them in the Temple organ scale, as already mentioned.

The late Dr. Robert Smith supplied the place of more finger-keys, in his improved harpsichord, by stops, to be moved by the hand, which put some notes out of action by the ordinary 12 finger-keys, and brought others into action in their stead; and this mode remains yet in use in the Foundling-hospital organ in London, for four additional notes; but, within a few years past, Mr. Hawkes, and, since him, Mr. Loeschman, and Mr. Liston have effected these occasional shiftings of the notes, belonging or attached to the ordinary finger-keys, by means of *pedals*, or short levers, to be moved by the feet of the performer, which seems an improvement of very considerable importance in the practice of instrumental music. In March 1811, John Trotter, Esq. took out a patent for finger-keys of equal width throughout, in two ranges, for facilitating the transposition of music into any key, during its performance, as may be seen in the second series of the *Repertory of Arts*, vol. xxii. p. 197. (*g*)

KHARASM, or CHORASM, is a country of Asia, bounded on the north by Turkestan, on the east by Great Bucharia, on the south by Khorasan, and on the west by the Caspian Sea. It is about 350 miles in length and breadth; and was once a powerful kingdom. The principal produce of the country is cotton, lamb-furs, and a small quantity of raw silk. Cattle, furs, and hides, which they obtain from the Kirghese and Turcoman Tartars, are the articles which they export to Bucharia and Persia. Khiva is the capital of the district. It stands on a rising ground, on the west of the river Gihon. It has three gates, and a thick strong wall of earth, with turrets at short intervals, and a deep broad ditch full of water. The houses are low, and built of mud, and the roofs flat and covered with earth. Khiva is 260 miles N. W. of Samarcand; and is situated in East Long. 58° 25', and North Lat. 41° 30'. See Hanway's *Travels*

KHATMANDU, KATMANDU, CATMANDOO, JINGBU, KATHIPOOR, YINDAISE, and GONGOOL-PUTTEN, or CASH THAMANDIR, signifying the Wooden Metropolis, are the different names which have been given to a city in the valley of Nepal Proper, and reckoned the capital of that kingdom, from being the residence of the Ghoorkali Rajah. It is situated on the eastern bank of the Bishenmutty, along which it stretches for about a mile. Its breadth is seldom greater than a quarter of a mile, and never exceeds half a mile. The houses are built of brick and tile, with pitched or pent roofs. Towards the street, they have frequently enclosed wooden balconies of open carved work, and of a singular fashion; the front piece, instead of rising perpendicularly, projects in a sloping direction towards the eaves of the house. The houses, which, not excepting even the Rajah's residence, are of a mean appearance, are generally two, three, and four stories high. The streets are extremely narrow and filthy.

The most striking objects of Khatmandu are numerous wooden temples, not only in the town itself, but scattered over its environs, and particularly along the sides of a quadrangular tank, or reservoir of water, at a short distance from the north-east quarter of the town called Rani-pokra. They resemble, both in their form and construction, the wooden munduts in other parts of India. Some of them are very large and high. Khatmandu likewise possesses several rich temples on a large scale, with two, three, and four sloping roofs, diminishing gradually as they ascend, and terminating generally in pinnacles. These pinnacles, as well as some of the superior roofs, are splendidly gilt, and have an agreeable and singular effect. The number of idols is about 2733.

During the time of Jye Purkhaush, Khatmandu was supposed to contain 22,000 houses, including, no doubt, the dependent villages, to the amount of 20 or 30, as the area of the city cannot hold more than 5000 houses. The population of the town is estimated at 48,000 by Colonel Kirkpatrick, and that of the capital and its district at 186,000, not including Doona-baise, Noakote, Nerjah, or any of the dependencies beyond the valley. The view of the town from the west bank of the river, with the bridge on the right hand, and the lofty Himalaya mountains in the back ground, is remarkably fine. The distance of Khatmandu from the Himalaya mountains is 40 miles; and it is situated in 85° 39′ East Long. and 27° 33′ North Lat. See the *Asiatic Researches*, vol. ii. p. 307.; Colonel Kirkpatrick's *Account of the Kingdom of Nepaul*, p. 158, &c. London, 1811; and Dr. Francis Buchanan's *Account of Nepaul*, which is now in the press.

KHIVA. See Kharasm.

KHOEE is a town of Persia, and the capital of a rich and extensive district in the province of Azerbijan. It is the emporium of a considerable trade carried on between Turkey and Persia. It is said to be built on the site of *Ataxata*, the former metropolis of Armenia. It stands in a plain celebrated by the battle in 1514, in which 30,000 Persians encountered 300,000 Turks. It is reckoned one of the most beautiful and best built towns in Persia. The streets, which are regular, are shaded with avenues of trees; the walls are in good repair; and the ceilings of many of the houses covered with paintings in good taste, which are supposed to have been executed about the period of Shah Ismael. According to Captain Sutherland, it contains a population of 25,000. East Long. 45° 11′, North Lat. 38° 30′. Distance from Tabreez 22 fursungs. See Macdonald Kinneir's *Geog. Mem. of the Persian Empire*, p. 154.

KHONSAR is a town of Persia, in the province of Irak, situated in a most interesting and romantic manner. It stands at the base of two parallel ranges of mountains, so very close, that the houses occupy the bottom, and at the same time the face of the hills to some height. Every house is surrounded by its own garden, so that the town is connected only by plantations. It is about six miles long, and about one-fourth of a mile broad. "The hills," says Mr. Kinneir, "afford an ample supply of water; and the appearance of the black and barren mountains, without a particle of vegetation upon them, hanging over these gardens, forms a contrast with the luxuriant and variegated foliage of the plantations, which can hardly be imagined by a person who has never visited this little paradise." The traveller, in approaching it from the west, passes over a road completely shaded on both sides, for about five miles, by every kind of tree which the country produces. There is no corn produced in the valley; but the abundance of fruit enables the inhabitants to procure every necessary in exchange for it. A kind of cider is made of the apples, but it does not keep above a month. The women are celebrated for their beauty and vivacity. The town contains about 2500 families, and yields an annual revenue of 5000 tomauns. East Long. 50° 26′, North Lat. 33° 2′. See Macdonald Kinneir's *Geog. Mem. of the Persian Empire*, p. 128.

KHORASSAN, or the *Country of the Sun*, is an extensive province of Persia, bounded on the north-east and east by the Oxus and the country of Bulkh; on the south by Cabul and Seistan; and on the west by Irak, Asterabad, and Dahestan. The northern and eastern parts are said to be a level country, intersected with sandy deserts, and irregular ridges of lofty mountains. The climate is in some parts temperate, and in others cold. The wind called *Bad-e-semum*, which blows for forty days every year in the deserts, is instantly fatal to those who are exposed to it. The soil, which is in general good, produces wine, fruit, corn, rice, and silk, in great quantities, and of the best quality; but, in consequence of the incursions of savage tribes, its princely cities have been demolished, its commerce ruined, and its fertile districts converted into solitary wastes. The cities of Meshed, Nishapour, Turshish, and Tabas, with their dependencies, belong to Persia; but the southern parts, including the city of Herat, are in the possession of the Afghans.

The different ridges of mountains appear to be connected with each other, and with the Hindoo Koh, and the range of Elburz. The mountains of Bamian and Goor, which separate Khorassan from Cabul, send out an immense branch to the south-west, as far as 34° of North Latitude, and 65° 20′ of East Longitude. Turning suddenly to the north-west, it cuts the latitude of 88°, and the longitude of 60°, and joins the mountains of Meshed. In passing from Seistan to Herat, and thence to Yezd, Capt. Christie found that the country was mountainous, diversified with tolerably cultivated plains. Some of the mountains were very lofty; and at Okul, half way between Ferah and Herat, an immense range was seen to the east.

The Oxus, which is the chief river in the province, rises in the mountains of Pameer, and is said to form a junction with the Jaxartes, before it throws itself into the Caspian. The Oxus is described as navigable for more than 200 miles, in which distance there are many ferries, with from 8 to 10 boats each. The cultivated lands extend only about three or four miles from the river. The Tedzen, or the ancient *Ochus*, is next in size to the Oxus. It seems to have its origin near Seraks, and, after receiving many tributary streams, and particularly the Meshed river, it falls into the Caspian in North Lat. 38° 41′. Herat, or Herirood, (anciently the *Aries*,) rises a little to the north of Herat, and running southerly, is lost in the sands between that city and the lake of Zerrah. The Murgab, anciently the *Margus*, issues from the mountains of Goor, and is also said to be swallowed up in the sands near Herat. The Ester, anciently *Siderius*, which is navigable for a short distance, is a considerable river, and gives its name to the province of Asterabad, where it flows into the Caspian.

The capital of the Persian division of Khorassan is Meshed; and Herat is the capital of the Afghan part of it. See Herat and Meshed; and Macdonald Kinneir's *Geog. Mem. of the Persian Empire*, for a fuller account of the province

KIANG-NAIS. See China.

KIANG-SI. See CHINA.

KIDDERMINSTER, anciently *Chideominster*, is a market-town of England, in the county of Worcester. It is divided into two unequal parts by the river Stour. The town consists chiefly of two good streets, one of which runs parallel to the canal, and the road from Bewdly to Birmingham runs through the other, which is nearly a mile in length. The houses in the last street are the best; but both of them are well paved, and cleanly kept. The houses are, in many places, cut out of the solid rock. The church is a handsome Gothic structure, standing on a very commanding situation on the brow of a knoll, at the end of a street. The tower is uncommonly fine, the windows have a rich tracery; and, externally, it is in excellent order. At the east end of the church is a handsome Gothic chapel, which is now converted into a free school. There are here no fewer than eight charity schools for boys and girls, to which several Sunday schools have lately been added. There are at Kidderminster 12 alms-houses, a dispensary, and 25 friendly societies. The town-hall stands in the centre of the market-place, and performs the several functions of a council-room, a market-house, and a prison.

Kidderminster has long been celebrated for its manufactures. It was once famous for linsey woolseys, then for frizes, and afterwards for tammies and flowered stuffs; but the carpet trade was not introduced till 1735; and in 1749, the woollen carpets with a cut pile were begun. About 44 years ago, there were here 1700 silk and worsted looms, 250 carpet looms, and about 5000 persons occupied in preparing the materials. The silk and worsted looms have been reduced to 700, while the carpet looms have increased to 1000. The Staffordshire canal passes through this town in its progress to Stourport. The government of the town is in the hands of a recorder, a bailiff, and the justices; and the corporation consists of 12 aldermen, and 25 common council men. There are three reading societies at Kidderminster.

In 1811, the population of this town was,

Inhabited houses	1546
Families	1737
Do. employed in trade and manufactures .	1569
Males	3848
Females	4190
Total population	8038

See the *Beauties of England and Wales*, vol. xv.

KIDNEY. See ANATOMY and PHYSIOLOGY.

KIDWELLY is a town of South Wales, in Caermarthenshire. It stands on both sides of the lesser Gwendraeth, which is crossed by a handsome stone bridge. The new township stands on the esat bank of the river, and the old township on the west bank. The town was formerly surrounded with a wall, one of the gates of which is now standing. It once had a flourishing trade; but from the obstruction to the navigation of the river by a sand bank, its commerce has long been trifling. Engineers have, however, been employed, with every prospect of success, upon a new plan, for improving its harbour. Some iron and tin manufactories have been carried on here; and the neighbouring country abounds in coal and iron ore. The parish church, which is a plain structure, stands in New Kidwelly. The castle, which occupies a bold rocky eminence on the west side of the river, has a grand and imposing appearance, and the remains are in a very perfect state. In 1811, the parish contained 329 houses, 389 families, and 1441 inhabitants. See the *Beauties of England and Wales*, vol. xviii. p. 369.

KIEL, is a town of Denmark, in the duchy of Holstein, situated at the bottom of a bay of same name, which forms a convenient harbour, resembling that of Palermo The town contains three churches, an university, founded in 1650, and a college, established in 1768. In 1785, when Mr. Coxe visited Kiel, there were 24 professors in the university, and about 300 students. The town is well built: and the castle, which is finely situated, has an observatory. The buildings, and the collections of the university, the hospital of St. George, and the manufactories of the place, are well deserving of being visited. Kiel is one of the most commercial places of Holstein. The trade has been much facilitated by the junction of the two seas, across the duchy of Holstein, by the canal of Kiel, and the river Eyder, which passes by Rendsburgh, and falls into the German Ocean at Tonningen. This canal was begun in 1777, and was nearly finished in 1785. It will be able to navigate merchantmen of 120 tons burden.

The promenade on the ramparts, and the promenades of Schlossgarten, Dorfgarten, and the road of Viburg, are beautiful, and well frequented. Population of the town 7000. See Cox's *Travels in Poland*, &c. vol. v. p. 239.

KIEF. See KIOF.

KILDA, ST. The name given to one of the western islands of Scotland, is situated about twenty leagues westward of North Uist. Its exact position has not been ascertained; but its latitude is about 57½°, and its longitude somewhat more than 8°. The natives call it Herst, and it is also called Hirta. It is not easy to discover the origin of the name St. Kilda. Among the numerous springs of fresh water, is one called Kilder; and the name Kilda being given to some springs of cold water in Iceland, it is not improbable, that the appellation St. Kilda, may have originated from the abundance of springs in this island. Bede (*Hist. Eccl.* lib. 3. cap 24,) and Camden (*Brit.* pp. 89, 906,) mention a religious woman named Kilda; who possibly may have wandered to this distant island, and left her name attached to it. That this remote and minute portion of the British empire was deemed worthy of attention from the zealous promoters of the Roman Catholic faith, appears from the names given to the ruins, still visible, of some small religious edifices. In St. Kilda are the remains of three, one called Christ's church, another St. Brianan's, and a third Columba's. In the island Boreray, a few miles westward of St. Kilda, there are the remains of a building, and of a crucifix. On a rock, forming the east side of the bay, at the head of which stands the village of St. Kilda, is a ruin called Dun-fir-Bholug, "the castle of the men of quivers;" and here also are remains of what have been supposed to have been altars. There is a similar appearance on the islands of Boreray and Soay. In the former island, is to be seen what is called *Staller's House.* It is built on four pillars, and between these are recesses, each distinguished by its name, viz. *Simmidran*, *Bearran*, *Ralli*, and *Raistalla.* The whole is roofed with stones, and covered with earth. In a glen of St. Kilda, opening to the south west, is a structure similar to this, called the *Female Warrior's House.*

This island extends in length about two miles, and in breadth nearly one. It is precipitous on all sides but one, on which there is a bay opening eastward, having a narrow sandy beach at the extremity, uncovered at low water. As there is almost constantly a heavy swell breaking on the beach, it is necessary to land on a shelving rock on the north side, and in doing so there is frequently much difficulty. It is sometimes practicable to land among the rocks at the opening of the glen, on the opposite side of the island. Like many others, this island has the appearance of a portion of a more extensive country no longer in existence. Two mountains, joined together by a ridge, seem to have been broken, and a portion of each left. The rocks rising from the sea in the vicinity appear also as the remaining halves of detached mountains; one side sloping, and the other presenting a lofty perpendicular face. The highest point of St. Kilda appears, from barometrical observations made by the writer of this article, to be 1453 feet above the sandy beach mentioned above. The mountain Conagra is the highest; and next the sea it is perpendicular almost to the very summit. The rocks called Boreray, Soay, Lavinish, &c. all present forms highly picturesque; and the whole group forms a scene truly magnificent.

From the first appearance of the village, a stranger might suppose that the island was very populous. A great number of huts are built for preserving the fuel, which is turf, and for the stores of dried birds. The number of inhabited huts is small compared to these. The inhabitants in number are considerably under a hundred. At the time when the writer visited the island, there were 97; 40 males, and 57 females, distributed in 24 families. According to Martin, the number, in 1692, was 200. Mr. Macdonald, the author of the *Survey of the Hebrides*, found in 1795,87 inhabitants; and, in 1809, the number was 103.

Like the people of some of the islands nearer the main land, the natives of St Kilda are very dirty in their persons; and a very indifferent nose may be sensible of their approach. Their huts are cleaned but once in the year from the filth which is carefully accumulated in them, and which is preserved for enriching their fields. The straw is also removed from the roofs of the huts every spring, and spread upon the arable land.

The women of St. Kilda are constantly employed with the distaff, and spin very good worsted, which is made into plaids and stockings. Every man is his own weaver, tailor, and shoemaker. They manufacture horn spoons; needles and fish-hooks out of nails and bits of iron; and brooches out of halfpence and buttons. They also make earthen pots of clay brought from the long island, and use them for boiling milk.

M'Auley's account of St. Kilda is not very accurate, Martin's description is more correct; but as St. Kilda was scarcely known to exist in his time, the propensity to amplify, and to raise trifles into importance, pervades the description. We doubt not, however, that, making some allowance for these, our readers will be entertained by a perusal of a work now become somewhat scarce. See also Macdonald's *Account of the Hebrides*.

KILDARE, anciently *Chili-dair*, or the *Wood of oaks*, is an inland county of Ireland, in the province of Leinster. It is bounded on the north by Meath; on the east by Dublin, and Wicklow; on the south by Carlow; and on the west by King's county and Queen's county. It extends from north to south 40½ English miles, and from east to west 26½ English miles, forming an area of 389,198 English or statute acres, of which 41,035 are bog. There are no mountains in Kildare. The county is a flat plain, exhibiting a general appearance of desolation and misery, from the wretchedness of the cottages, and the want of gentlemen's seats. The *Curragh* of Kildare, the celebrated turfy plain on which the races are held, is nearly 5000 acres in extent, affording pasture to an immense number of sheep. It consists of the softest turf, and lies on a fine dry loam.

The county of Kildare is full of springs and rivulets. The river Barrow forms its south-west border, and receives the Green. Southwards from Athy, where it meets the Grand Canal, it is a considerable stream, and is navigable, and is ornamented with many delightful retreats. The Liffey runs in a circular direction through the north-east part of the county; and the river Boyne rises in the Bog of Allan. The Grand Canal from Dublin crosses the Liffey on an aqueduct bridge; and near Claire there is a collateral cut to the Shannon. The county derives great advantage from the Royal Canal, which passes through the northern part of it.

The chief towns are Naas, the assize town, Athy, Monasteraven, and Kildare. Naas, situated on the great post road between Dublin and Munster, lies near the Grand Canal. Near the entrance of the town is one of the Danish mounds, or Raths, at the foot of which are the remains of a house of Augustines; and in the center of the town are the remains of a monastery of Dominicans. Naas was once the residence of the kings of Leinster. Many of the houses testify the dreadful effects of the last civil war. Athy stands on the river Barrow, and is a neat little town. Kildare is pleasantly situated on a rising ground. There are here the remains of several religious houses; and there is a round tower, in good preservation, and built of white granite, to about twelve feet from the ground. The rest of it is of blue stone. It is 130 feet high, and the door is 14 feet above the ground.

There is no burgh in Kildare of sufficient extent to return a member to parliament. The county is represented by two members; and the political influence belongs principally to the duke of Leinster.

The population of the county is estimated at 11,205 houses, and 56,000 inhabitants. The Catholics are to the Protestants in the ratio of 30 to 1. The proportion of Catholics to Protestants called on the grand jury, is as 40 to 41 See Beaufort's *Memoir*; Rawson's *Statistical Account of Kildare*; Wakefield's *Account of Ireland*; and W. Shaw Mason's *Statistical Account of Ireland*, vol. i. p. 447, for an account of the parish of Kilberry in Kildare. See MAYNOOTH, for an account of the Catholic college.

KILKENNY is an inland county of Ireland, in the province of Leinster. It is bounded on the south by the river Suire; on the east by the Barrow; and is intersected by the Nore, which flows through its centre. Its greatest length, from north to south, from the Slewmagy hills to the Suire, is 45½ English miles; and its greatest breadth, from east to west, is about 24 English miles. Dr. Beaufort makes its superficial contents 482 464 English acres; but Mr. Tighe states, that, from a survey lately made for the use of the grand jury, it amounts to 510,882 English acres.

This county is mountainous; and though much furze is still seen on the hills, cultivation is making considerable progress. In consequence of the declivity of the county from north to south, which is about 500 feet, and, from the rapidity of the Nore, which descends 13 feet in a mile, the water is carried off, and the county is dry. Kilkenny has also a favourable exposure to the south-east. There is little bog, or marsh land; and the substratum is limestone, brittle schistus, or porous argillite; and retentive clay in a very small part of the county. From these causes, the crops are earlier in general than in the tillage counties to the north. The soil is in general good. The northern parts are poor; but, by the judicious application of lime, and limestone gravel, they may be rendered productive in corn and grass. The baronies of Ibercon, Idagh, and Iverk, are all cultivated. In the plains and vallies of the southern portion, the soil is more fertile. The banks of the Nare contain many delightful prospects and luxuriant fields.

The rivers of Kilkenny are remarkable both for their beauty and utility. The Suire, which separates for about sixteen miles Kilkenny from Waterford, has a winding and majestic course, and conveys the trade that passes between Waterford, Carrick, and Clonmel. It flows with great rapidity, and has a considerable width till it approaches Waterford, where it becomes contracted between two rocks, beyond which there is a wooden bridge. The banks afford very beautiful prospects. It is navigable for large lighters from Waterford to Clonmel, a course of about twenty-five miles. It abounds with excellent trout and salmon. The Barrow skirts, for about twenty miles, the eastern borders of Kilkenny. It is navigable to Carton, and thence communicates with the great canal. From the new bridge of Ross, to its junction with the Suire, it in general flows between very high land, and affords most romantic scenery. The Nore, or Newre, flows through the county for thirty-six miles. It receives many tributary streams, and is navigable for small vessels to Inistioge.

There are no manufactures of importance in Kilkenny. The common farmers and cotters manufacture frieze, stockings, linseys, and flannels, for their own use, but very little for sale, except in Ivesk. There was a school at Kilkenny, where 12 children were taught the art of making lace.

The towns in this county are, Kilkenny, the capital, described in a separate article, Callan, Inistioge, Thomastown, Gowran, Knocktopper, Graigue, Durrow, Castle Coomer, and Freshford. The county sends two members to parliament, and the political influence is in the hands of the Earls of Ormond and Besborough.

In 1792, the population, as given by Dr. Beaufort, was 17,569 houses, and 100,000 inhabitants. The population in 1800, as computed for the hearth returns, is 17,212 houses, and 108,000 inhabitants. There are 127 parishes, but only 31 churches. The Catholic population in 1800 seems to have been about 95,000. See Beaufort's *Memoir*; Tighe's *Survey of Kilkenny*; Wakefield's *Account of Ireland*; and W. Shaw Mason's *Statistical Account of Ireland*, vol. i. which contains a description of the parishes of *Fiddown* and *Grange-Silvæ*.

KILKENNY is a city of Ireland, and the capital of the county of Kilkenny. It is delightfully situated on the river Nare, over which there are two handsome stone bridges; and with the borough of St. Canute, or the Irish town, it forms a large town, which is considered as one of the neatest and pleasantest in the kingdom. The houses are decorated with the marble dug in the neighbourhood, and the streets of the town are paved with the same material. Many of the buildings are large and good. The most remarkable are, the bishop's palace, the castle of the Earl of Ormond, and the celebrated college or free school, a theatre, an asylum for decayed house-keepers, &c. The college, of which there is a fine view from the walks, on the banks of the river, was founded by James Duke of Ormond, in 1682. The present building was erected in 1784, at the expence of *L.*5000, granted by parliament. The number of students is about 70, of whom 50 are boarded in the house. The appointment of the master belongs to the provost and senior Fellow of Trinity College, Dublin. Ormond Castle is a magnificent and noble building, on the banks of the river, having its entrances flanked by two large and unequal round towers. The stables on the opposite side of the road are very fine. The little cathedral is a fine gothic structure, with round towers. The theatre is small, but neat. It is private property, and is opened about a month annually. Amateurs of the first rank perform, the female performers being engaged from Dublin. The ruins of three monasteries, St. John's, St. Francis, and the Black Abbey, still exist. The windows of the latter are much admired. There are only two churches in the city, but there are several Roman Catholic chapels, each of which has congregations more numerous than both the churches. The city sends only one member to parliament. The Earls of Ormond and Desart are alternately the patrons.

The principal manufactures are those of starch, coarse woollens, and very fine blankets. The town contains 2870 houses, and 14,975 persons. West Long. 7° 15′, North Lat. 52° 38′. See the works quoted in the last article, and Carr's *Stranger in Ireland*.

KILLARNEY is a market and post town of Ireland, in the county of Kerry. It is neat and populous, and is situated on the side of the lake of the same name. The town contains many handsome houses, and an admirable public school for Catholic children. The venerable ruins of Mucross abbey are in the neighbourhood of that town. They are half embosomed in a group of luxuriant and stately trees. A prodigious yew tree, about seven or eight feet in circumference, springs from the centre of a cloistered court, the roof of which it covers with its leaves and branches. The town is much frequented by the strangers who come to see the charming lakes of Killarney. The population of the town is about 5000. For an account of the lakes of Killarney, see our article IRELAND. Young's *Tour in Ireland*; Smith's *Survey of Kerry*; Weld's *Account of the Lakes*; Carr's *Stranger in Ireland*; and Wakefield's *Account of Ireland*, vol. i. p. 66 &c.

KILLICRANKIE, BATTLE OF. See BRITAIN. A full account of the battle will be found under the Life of GRAHAM, JOHN, Viscount Dundee.

KILMARNOCK is a large and flourishing town of Scotland, in the northern district of Ayrshire, 22 miles from Glasgow, and 12 from Ayr. It extends about a mile and a half along the banks of a small river of the same name, which flows into the Irvine at the southern extremity of the town. It is finely situated in the heart of a rich, extensive, and fertile tract of land, which abounds not only in all the products of agriculture, but also in rich mines of coal, an article so necessary to the growth of manufactures, and to the comfort of life. Such is the abundance of coal in the neighbourhood of this town, that, in the summer of 1817, they were laid down to the consumer at somewhat less than fourpence per hundred weight, and vast quantities are constantly shipped for Ireland, at the commodious harbour which has lately been constructed at Troon Point, by his Grace the Duke of Portland. This enlightened nobleman has connected the Troon harbour with the town of Kilmarnock, by a railway of ten miles in length, which not only affords an easy and expeditious conveyance for the coals from his estates, but promises one day to be highly beneficial to the town in a commercial point of view.

The appearance of the town is, in general, mean; the greater part of the houses being roofed with straw; a great proportion of them consisting of only one story; and many of the streets being narrow, and ill arranged. Great improvements, however, have lately been made, under the provisions of an act obtained for that purpose. Many commodious and elegant houses have been built; and such an alteration has been made upon the appearance of the place, that, in those parts which are adjacent to the cross, it may bear a comparison with most other towns of the same magnitude. Among the late improvements of the town, may be mentioned a handsome town-hall, and an elegant and commodious reading-room. The butcher market also deserves to be mentioned as an improvement, which is built upon an arch thrown across the river. A handsome academy has lately been erected here, which is furnished with teachers in Latin, French, English, and the various branches of mercantile education.

Kilmarnock is a borough of barony, and is governed by two bailies and a town council. Its original superiors were the noble family of Boyd, who possessed extensive estates in the vicinity of the town, and in the neighbouring country. To this family it gave the title of earls of Kilmarnock, which was forfeited in the rebellion of 1745. The superiority of the town, with a considerable part of the property which belonged to this family, is now possessed by the Duke of Portland, in right of the duchess. There are two churches in this town, one of which is a collegiate charge, and four or five meeting-houses, belonging to different denominations of dissenters. The population, in December 1816, was 10,244.

KILSYTH, BATTLE OF. See BRITAIN.

KINCARDINESHIRE, or THE MEARNS, is situated on the east coast of Scotland, between 56° 43′, and 57° 5′ of North Lat. and between 1° 47′ and 2° 30′ of West Long. from Greenwich. It is bounded on the east by the German Ocean, for the space of nearly 35 miles; on the north, by the river Dee and part of Aberdeenshire; and on the west and south by the county of Forfar, from which it is separated, almost through the whole boundary line, by the river of North Esk. It is of a triangular form, extending 32 miles in length from south-west to north-east, and 24 miles at its greatest breadth from north to south; and comprehends an area of about 380 square miles, or more accurately of 243.444 English acres.

There are only two lakes in the county worthy of notice, both of which are in the northern part of the Dee-side district. The one is the loch of Drum, in the parish of Drumoak, but partly lying within the limits of Aberdeenshire. The other is the loch of Leys, in the parish of Upper Banchory, the water of which is in general shallow, and capable of being drained, by deepening the channel by which it flows into the Dee. These lakes are nearly of equal extent, each being about three miles in circumference. Both of them are well stored with pike; and frequented by geese, ducks, and other aquatic wild fowls.

Kincardineshire is well supplied with rivers and small streams flowing in a multitude of directions. The principal of these are, 1. The Dee, reckoned the sixth river in Scotland in point of magnitude, which rises at the head of Braemar, and flows nearly due east, through a course of seventy-five miles, eight of which are within the shire of Kincardine, and fourteen more form the boundary line with the county of Aberdeen. It is a pure limpid stream, flowing over a light gravelly bed, and is well stored with salmon, trout, and occasionally with eels, which pass up the stream in immense numbers during the months of May and June, and return to the ocean in September and October. Its banks, almost every where clothed with wood, abound in the most picturesque scenery, and produce some of the largest natural firs in Britain, particularly near the source of the river, where many of these trees are from three to four feet in diameter, and from 50 to 60 in height below the branches. 2. The North Esk, which forms the boundary between the counties of Kincardine and Forfar, and has already been described in the account given of the latter in this work. 3. Bervie Water, a small river, but good trouting stream, rises in the centre of the county, among the braes of Glenbervie, about 12 miles west from Stonehaven, and falls into the sea at the town of Bervie. 4. The Cowie, a small river flowing from the foot of Kirloak, through a winding course of 12 miles, and falling into the sea at Stonehaven. There are, besides, the Carron, reaching the coast at Stonehaven; the Fuech, rising in the forest of Birse; the Avon, which waters the vale of Strachan, or Strathavon; the Dye, which flows from the Grampians into the Fuech, at the church of Strachan; the Black Burn, which runs into the loch of Drum; the Canny, which falls into the Dee at Invercanny; and the Luther, which rises above the castle of Drumtochty, and, passing the church of Fordoun, flows westward through the How into the North Esk.

The principal mountains in the county are the Grampians, which, proceeding across the island from Dumbartonshire, terminate on the north of Stonehaven, within about three miles of the sea. This elevated and dreary ridge of dark brown hills stretches through the whole breadth of the county from west to east, occupying a space of above 18 miles in length, and eight in breadth. These hills, at the eastern extremity, are only 500 or 600 feet in height; but rapidly rising into a range of lofty summits, they reach an elevation, in the west side of the county, of 3500 feet above the level of the sea. The more remarkable of these mountains are, Mount Battock on the west, the highest in the neighbourhood, on the top of which the three counties of Forfar, Kincardine, and Aberdeen, join their limits; Cloachnabane, or the White-stone-hill, about six miles farther east, remarkable for a protuberance of solid rock on its summit, about 100 feet in perpendicular height, which appears from the sea like a watch-tower, and forms a decided land-mark to the coasting vessels; Kerloack, about four miles from the last mentioned, from the top of which a most extensive view may be commanded over the greater part of Aberdeenshire to the north, and southwards as far as the hills of Lammer Muir, in the Lothians; Cairnmanearn, six miles more to the north-east, almost covered over its whole surface with large blocks of hard stone; Cairnamount, in the south front of the Grampians, about 2500 feet high, over which passes the public road from the How to Dee-side; Strathfenella, also on the south, remarkable for its being cut off, on the north side, from the main body of the ridge by a narrow but pleasant cultivated vale. Besides the Grampians, there are the Garvock hills on the south, and the Arbuthnot hills on the east of the How, both of which are low ranges, never rising above 500 feet, and in most places cultivated nearly to their summits.

Formerly, this county was united with Forfarshire, from which it was disjoined by Kenneth II. about the year 838; and, according to traditionary history, was given to his brother Mernia, from whom it takes the name of Mearns. But it is observable that it is always denominated *The* Mearns, and is considered as deriving this designation from the ancient inhabitants, the Vernicones of Ptolemy. In the Gælic language, it is still called *Mhearn*, pronounced *Vearn*. It is divided into 18 entire parishes, and contains also part of Nether Banchory, Drumoak, and Edzel. Thirteen of these parishes, composing the whole of the districts to the south of the Grampians, form the presbytery of Fordoun, which is comprehended in the synod of Angus and Mearns. On the north of the Grampians, the two western parishes are attached to the presbytery of Kincardine O'Neil, and the more easterly to that of Aberdeen. In what regards the administration of justice, the whole county is considered as one district, of which the county town is Stonehaven; and is classed in one justiciary circuit with Aberdeen and Banffshire. But, in maritime matters, it is divided into two districts, one of which, north from Stonehaven, and inclusive of that town, is connected with the seaport of Aberdeen, and the other to the south with that of Montrose.

The principal antiquities observable in this county are, a small artificial island, founded on oak piles, in the loch of Leys, on which are the ruins of an ancient edifice; tumuli raised over the slain in the battle of Corrichie, near the estate of Glassil; Fenella's castle, about a mile and a half west from Fettercairn; Green, or Queen castle, on the end of the hill of Strathfenella; Kame of Mathers, about six miles north from Montrose; Whistleberry castle, about two miles north from Bervie; and Dunnotar castle, about a mile south from Stonehaven, all placed on the summits of lofty insulated rocks on the sea shore; a Roman camp, remarkably entire, near the mansion house of Fordour, and similar vestiges near Stonehaven and Ury, supposed to have been the encampments of Agricola and Galgacus.

The number of freeholders is about 75. There is only one royal burgh in the county, namely, Bervie, which unites with Montrose, Brechin, Arbroath, and Aberdeen, in sending a representative to parliament; but Stonehaven, a burgh of regality, and Laurencekirk, a burgh of barony, are more populous and flourishing towns; and there are also many thriving villages in the county, particularly Fettercairn, Auchinblae, Drumlithie, and Johnshaven.

The population of Kincardineshire contained,—

In 1801, males	12,102	In 1811, males	12,722
Females . .	14,245	Females . .	14,859
	26,347		27,581

Of these, about one half are engaged in agriculture, and the other half in manufactures, fisheries, &c.

The manufactures of Kincardineshire are extremely limited; and it is chiefly in the towns upon the coast that any articles are produced beyond what the wants of the vicinity require. In Stonehaven, Bervie, and Johnshaven, about one half of the population is supposed to be occupied in the manufacture of osnaburgs, sacking, canvas, and coarse linens; and there are a few spinning mills and bleachfields on a small scale. At Laurencekirk is an elegant manufacture of beautifully varnished snuff-boxes; but the art is carefully kept concealed, and the few hands employed in it are not able to supply the demand for these articles. See Robertson's *Agricultural Survey of Kincardineshire; Description of the Strata which occur in the Eastern District of the Grampians*, by Lieutenant Colonel Imrie; *Trans. Royal Soc. Edinburgh;* and *Statistical Account of Scotland* (q)

KING. See Government and Law.

KING'S BENCH, *Court of*, (*Bancus regius*,) is the supreme court of common law in England. It is called the King's Bench, because the king used to sit there in person, and is still supposed to do so. This court consists of a chief justice, and three *puisne* justices; who are, by their office, the sovereign conservators of the peace, and supreme coroners of the land.

The Court of King's Bench is the remnant of the *Aula Regia;* and although it hath, for some centuries past, usually sat at Westminster, yet it is not fixed to any certain place, but may follow the King's court wherever it goes; for which reason, all process issuing out of this court is returnable "*ubicunque fuerimus in Anglia*" And we find that, during the reign of Edward I. it actually sate at Roxburgh.

The jurisdiction of this court is very high and transcendent. It keeps all inferior jurisdictions within the bounds of their authority; superintends all civil corporations in the kingdom; commands magistrates and others to do what their duty requires, in every case where there is no other specific remedy; protects the liberty of the subject by speedy and summary interposition; and takes cognizance both of criminal and civil causes; the former in what is called the crown-side, or crown office; the latter, in the plea-side of the court. It has an original jurisdiction and cognizance of all trespasses, and other injuries, alleged to have been committed *vi et armis;* and by a fiction of law, whereby it is surmised that the defendant is arrested for a supposed trespass, which, in reality, he has never committed, it has for ages held pleas of all personal actions whatsoever.

This court is likewise a court of appeal, into which may be removed, by writ of error, all determinations of the court of common pleas, and of all inferior courts of record. An appeal also lies from this court to the House of Lords, or the Court of Exchequer Chamber, according to the nature of the suit, and the mode in which it has been prosecuted. Blackstone's *Comment.* B. iii. ch. 4. and Jacob's *Law. Dict.*

KING'S COUNTY is an inland county of Ireland, in the province of Leinster. It is bounded on the north by Westmeath and Meath; on the east by Kildare and Queen's County; on the south and south-west by Tipperary; and on the west by part of Galway and Roscommon. It is separated from Galway by the river Shannon, and the Barrow and the little Brosna mark its boundary for a few miles. It received its name out of compliment to Philip II. of Spain, the husband of Queen Mary.

It is 39 English miles broad, contracting rapidly to the south, and it extends from north to south 43 English miles. Its superficial extent is 707 square English miles, or 453, 370 acres.

The general appearance of the county is flat, the only mountains being the Sliebhfloor mountains, which divide it from Queen's county. This range extends 15 miles, and is traversed only by one pass, called the Gap of Glendive, which is only five feet wide, and is very steep and craggy, and difficult of approach.

The principal rivers in this county are the Shannon, the Little Brosna, the Great Brosna, which falls into the Shannon after winding through a great part of the county. The principal loughs are Lough Pallis and Lough Annagh. The northern part of the county derives much advantage from the grand canal which passes through it.

The principal towns are Philipstown, Birr, or Parson's town, and Tullamore, of which Birr is the largest. Tullamore contains about 4000 inhabitants, of whom 2,500 are Catholics.

This county contains 52 parishes, and 15 churches. According to Dr. Beaufort, a population of about 74,500. Since the completion of the grand canal, however, the population has increased. See Beaufort's *Memoir of a Map of Ireland;* Sir C. Coote's *Statistical Survey;* and Wakefield's *Account of Ireland.*

KINGHORN is a royal burgh of Scotland, in the county of Fife, situated on the coast of the Frith of Forth, nearly opposite to Leith, and on the sides of a dell opening towards the sea. It consists of a number of lanes, composed of mean looking houses, heaped together without regard either to convenience or uniformity. King David I. invested it with the privileges of a royal burgh. Not many years ago were to be seen the ruins of a castle, which was one of the usual seats of our ancient Scottish kings. An old building, called St. Leonard's Tower, stands in the middle of the town, and is used as a court-house and a prison. Thread stockings have long been manufactured here; and machinery for spinning cotton and flax has lately been erected. A little to the west of the town there are two basaltic rocks, composed of parallel columns of different diameters, and about 12 or 14 feet high. There is also in the neighbourhood a medicinal spring, called the Kinghorn Spa, which is altogether neglected. In 1618, Dr. Anderson wrote a treatise on the nature of its waters. He says that it is impregnated with crystal, gypsum, and nitre, and recommends it as a powerful diuretic. The population of the town and parish, in 1811, was 329 houses, and 2204 inhabitants.

KINGSTON, a sea-port town, and the principal seat of commerce in the island of Jamaica, is situated on the south side of the island, in 18° N. Lat. and on the north side of a bay or inlet of the sea, formed by the low neck of land, at the point of which the town of Port Royal stands. This neck of land is nine miles in length, and two miles in width, at the broadest part, fronting the city. The channel is deep enough to admit ships of any burden. A thousand may anchor in perfect safety; and vessels of considerable burden may lie alongside the wharfs to deliver their cargoes.

Kingston was founded in the year 1693, after the almost total destruction of Port Royal by an earthquake the preceding year. The plan of it, drawn by Colonel Lilly, an experienced engineer, was a parallelogram, one mile in length, by half a mile in breadth, regularly traversed by streets and lanes, crossing each other at right angles, except at the upper part, where a large square was left; but the town has extended considerably, within these few years, to the west, east, and north, so that this square is now nearly in the centre of the city. On the south side of the square stands the church, a large elegant building, with four aisles, and a fine organ. The tower, with a large clock, and the spire, are well constructed, and are a great ornament to the city. On the north side of the square are barracks of brick for 200 men and their officers. The theatre is likewise on this side of the square; it was nearly thirty years without any performers, but it has lately undergone a thorough repair. It is neatly fitted up, and at present the inhabitants are amused by a tolerable company of performers. A free school was established in May 1729. There is likewise a poor house and public hospital, and a very handsome church has been lately erected for those of the Presbyterian persuasion. The houses are in general built of brick, two stories high, the fronts being shaded by a piazza below, and a covered gallery above. Accidents from fire rarely occur here, the kitchens being detached buildings, and there are wells and pumps in the principal streets, and fire-engines and leather buckets in the court-house, and the inhabitants are obliged to keep a certain number of these buckets, according to the value of their house.

The well water in general is bad, a few wells being fed by subterraneous drains from the Hope river or other mountain streams. The rest are brackish, and very apt to cause a dysentery in habits not much accustomed to it; but the inhabitants of this town observe that the same effect is produced by the water of Spanish Town, which is taken from the Rio Cotese, and undergoes filtration.

In the lower part of the town is the market-place, which is plentifully supplied with butcher-meat, poultry, fish, fruits and vegetables. Of the latter, besides those usually found in a tropical country, are many American and European, such as pease, beans, cabbage, lettuce, cucumbers, artichokes of the finest kind, carrots, turnips, radishes, onions, leeks, and other small sallads. These are brought from the Liguanea mountains. There are also great quantities of the finest pine apples, which grow on the Long Mountain. Strawberries and apples likewise grow on the higher mountains, and grapes might be cultivated to any extent in the lower parts of the island.

Kingston was constituted a city in 1802. It is governed by a mayor, 12 aldermen, and 12 common councilmen, a recorder, two solicitors, and a treasurer.

The population of the town is nearly 7500 whites, with 2500 strangers, 2500 free people of colour, 2500 free negroes; 8054 male, and 9900 female slaves, total 17,954; but as all may not have been returned, the number of slaves may be rated at 20,000, so that the population cannot be less than 35,000.

Kingston returns three members to the House of Assembly, and furnishes to the militia of the island two troops of horse, two companies of artillery, two battalions of infantry, nine companies in each, viz. six of whites, two of Jews, four of Mulattoes, three of quadroons, and three of free blacks, well appointed; the batteaux, one captain, three lieutenants. The Surrey assizes are held here three times in the year, January, April, and August.

The situation of Kingston is highly favourable, rising from the sea with sufficient acclivity to give it the command of the sea breezes, which blow regularly during the greatest part of the year, and likewise to have a view of the ships coming down the coast to the harbour of Port Royal, and up to the town. The heat of the night is tempered by a land wind. The plain on which it stands rises with a gradual ascent to the foot of the Liguanea Mountains, a distance of about six miles, and is covered with country residences of the admiral, and many of the inhabitants, and towards the mountains with sugar estates.

A hill, called the Long Mountain, crosses this plain diagonally, beginning near Rock Port, and extending to near the Liguanea Mountains. Over this towers the first range of mountains in great grandeur, to the height of 5000 feet, and covered to the height of 4000 feet with coffee plantations, villas, &c.; and above this range are seen the Blue Mountains.

The city being situated on a dry soil, is not incommoded by any stagnation of water, and it is thoroughly ventilated; but the slope upon which it is placed is attended with one inconvenience, that it admits a free passage to torrents of rain, which descend the streets during the rainy season with such impetuosity, as to render them impassable for wheel carriages, and carrying accumulations of rubbish and mud to the wharves. It would be a great improvement to have the streets paved, and a cut made above the town, to prevent the torrents from pouring through the streets.

The thermometer, in the hottest part of the year, sometimes rises to 96°, and is seldom below 76°. Kingston is hotter by about 3° than Spanish Town, but is not so subject to storms of thunder.

The following return of imports and exports, from the 29th Sept. 1816, to the 29th Sept. 1817, laid before the House of Assembly on the 10th of November 1817, will show the scale of importance in which Kingston stands as a sea port.

Imports.—56,217 barrels flour; 2863 barrels, 4064 bags, 1085 kegs, bread; 1591 tierces, 396 barrels, 4476 bags, rice; 19.827 bushels, 1243 bags, 7804 barrels, corn and corn meal; 202 barrels, pease; 1481 hogsheads, 5181 casks, 2553 boxes, 397 quintals, dry fish; 289 tierces, 28,757 barrels, 866 kegs, pickled fish; 1,805314 staves and heading, 8.261006 shingles, 7.672387 feet of lumber; 680 horses; 1998 mules; 202 asses; 2808 cattle. No account is here given of the beef, pork, and herrings, imported from Great Britain, Ireland, and North America. In 1816, 15,070 barrels of herrings, and about the same quantity of beef and pork, as also dry goods, iron, and hardware, to a great amount; wines, brandies, &c. &c. In 1817, 16.915 gallons of brandy and gin were entered at the Custom House.

Tonnage, from 29th Sept. 1815, to 29th Sept. 1816.

North of the tropic—from Great Britain and Ireland 35,162; America 36 032. Within the Tropic—from the Spanish Main and neighbouring islands, 20 803. droggers, 1889, trading under the free port act, 12 520; total, 95.138—1470 horses, 4735 mules, 438 asses, 3628 cattle imported.

KINGSTON-UPON-HULL. See HULL.

KINGSTON-UPON-THAMES, is a town of England, in the county of Surry. It is situated 11 miles from Westminster bridge, on the southern bank of the Thames, which is crossed by a wooden bridge to Hampton Wick. It consists of two principal streets, and several smaller ones. It is upon the whole well built; but the mixture of the modern and the ancient houses gives it an irregular appearance. The church is spacious and handsome, and has a tower with eight bells. There is here a free school, founded by Queen Elizabeth; a charity school for 30 boys; and an alms-house for 6 men and 6 women. In the market-place is the town-hall, built by Queen Elizabeth. The Lent assizes for the county of Surry are held here.

Kingston was either a royal residence or demesne so early as the union of the Saxon heptarchy. Close to the north side of the church is a large stone, on which, it is said, the Saxon kings were crowned. Here was formerly the chapel of St. Mary, on the same side, adorned with the figures of the different sovereigns that had been crowned at this place. It fell in 1730, and buried in its ruins the sexton, who was digging a grave, his daughter, and another person. The sexton's daughter was dug out alive, at the end of eight hours, and succeeded her father. The bridge over the Thames is said, by Mr. Lyson, to be the most ancient on the river, except that of London; and the corporation has a revenue for keeping it in repair. In 1811, the town and parish, including Ham, Hatch, and Hook, contained 716 houses, 738 families, and 4144 inhabitants.

KINIC Acid. See Chemistry.

KINROSS, a town of Scotland, and the capital of the county of the same name, is situated on a plain at the west end of Loch Leven. It consists principally of one long street, which contains many excellent houses. This place was once celebrated for its manufactory of cutlery goods, but this branch of trade has greatly declined, and the inhabitants are principally employed in the manufacture of cotton goods, and of coarse linen, called Silesias, of which about *L*.4,441 worth were stamped annually. The population of the town and parish, in 1811, was 2214, of whom 287 were employed in trade and manufacture. See the following article.

KINROSS-SHIRE, one of the inland counties of Scotland, is bounded on the north and west by the county of Perth, and on the south and east by Fifeshire. It is situated between 56° 9′, and 56° 18′ of north lat. and between 3′ and 21′ of long. west from Edinburgh. Its greatest length, from east to west, is about 13 miles, and its greatest breadth, from north to south, about 11 miles. It is supposed to contain about 83.83 square miles, or 42,536 Scottish acres.

The climate of this county is, upon the whole, mild and genial. It is well sheltered from the north winds by the range of the Ochil hills, which form its northern boundary. It is, however, much exposed to the westerly winds, as it is situated in a plain, which is prolonged on the west towards Alloa, and joins the *How* of Fife on the east. The grounds on the southern extremity are uneven, but not hilly. The more level and hilly part of the county is elevated but a few hundred feet above the level of the sea.

There are few springs in this county remarkable for the quantity of water which they pour out, or for their medicinal qualities. But the fresh water lake, of which it boasts, has at all times been considered as one of the most picturesque and beautiful collection of water to be found in the lowland district of Scotland. The scenery on the south and east sides of the lake, composed of the Lomonds and Benartie, forms a very striking contrast with the level grounds which skirt the opposite margin, while the scattered islets relieve the eye in wandering over the surface of the water. There is here little that is very striking or bold, but a great deal that is soft and soothing.

The lake contains about 346,987 Scottish acres. Its height above the level of the sea is supposed to be three hundred and nine feet. Its greatest depth about eighty-seven feet. It contains four islands, the largest of which is called by way of eminence, the *Inch*, and contains 28,444 acres. The next is the castle, 1700 acres; the third is called Paddock Bower, containing 0.360; and the last, or Reed Bower, contains 0.160.

This county originally formed a part of Fifeshire, from which it was disjoined about the year 1426. At first it contained only the parishes of Kinross, Orwell, and Portmoak, but in 1685, the king and estates of parliament disjoined from Perth and Fife other lands in the parish of Portmoak, and in the parishes of Cleish and Tulliebole, and annexed them to Kinross. At present it consists of the parishes of Kinross, Portmoak, Cleish, Orwell, Tulliebole, annexed to Fossaway, and part of the parishes of Abernethy and Arngask.

In the year 1811, this county contained 7245 souls. It sends, alternately with the county of Clackmannan, a member to parliament. The number of freeholders at present on the roll amounts to twenty. The sheriff court is held at Kinross, where are likewise the courts of taxation, and all the state public meetings.

The population of this county is chiefly supported by agriculture. The soil, though rather light, is well adapted for all kinds of crops; and lime for manure is to be obtained in abundance. If we consider the proximity to fuel, the abundance of fresh water, it seems rather surprising, that in this county there are so few manufactures. Weaving is carried on in some places, chiefly of coarse Silesias, and different sorts of muslin.

The objects of antiquity in this county are numerous and interesting, and have been very faithfully described by the industrious and intelligent Sibbald. The one which attracts the greatest share of the travellers' notice is the old *Castle of Lochleven*, situated on a small island, already mentioned, at the north-west end of the loch, and about half a mile distant from the shore. It is said to have been the ancient habitation of Congal, son of Donqart, king of the Picts. It has been the scene of many memorable events in Scottish history. In the year 1335, it was valiantly defended by Sir Allan Wypont for King David the Second against the English party then in Scotland. In this castle Queen Mary Stewart was imprisoned on the 16th June, 1567; resigned the crown with reluctance, in favour of her son James VI. on the 24th of July in the same year; and escaped from her confinement there on the 3d of May, 1568, by means of George Douglass, youngest son of Sir Robert Douglass of Lochleven.

The ancient monastery of Portmoak, on the north side of the Leven, near the lake, was founded by Eogachmen, king of the Picts, and consecrated to the Virgin Mary. This monastery is supposed to have been the first place in Scotland, given by the Pictish kings, after their conversion to Christianity, to the Culdees.

On the Inch in Lochleven, anciently called St. Serf's isle, are the remains of an old priory, built by Achaius, king of the Scots, "in honorem et ad gloriam Dei omnipotentis et Sancti Servani." In this isle the first archbishop of St. Andrew's was interred. *Scotland-Well* was a ministry of the "Fratres Sanctæ Trinitatis de redemptione captivorum," and founded by William Malvoisin, bishop of St. Andrew's, who died in 1238.

As connected with the antiquities of this county, the House of Kinross, the seat of Thomas Graham, Esq. ought not to be passed over in silence, as it is said to have been the first house of regular architecture in Scotland. It was built by the celebrated architect, Sir William Bruce, the proprietor, in 1685. See *Statistical Account of Scotland;* Sir Robert Sibbald's *History of the Sheriffdoms of Fife and Kinross;* and Dr. Walker's *Essays on Natural History and Rural Economy.*

KINSALE, which has been called the Plymouth of Ireland, is a sea-port town in the county of Cork. The town is situated at the mouth of the river Bandon, and is built under Compass-hill. It is about a mile in extent. The chief street runs round Compass-hill, and there are others above, which are connected with the main street by steep lanes. The streets are narrow, but they contain many good houses. There are six parishes in the town and suburbs. The harbour is very commodious, and secure. The distance between Sandy Cove Point and Prehain Point, which form the entrance to the harbour, is not half a mile, and between them is a safe passage in four fathoms of water. There is a light-house on a narrow point of land about five miles southward. The river is navigable for large vessels for nearly twelve miles above the town, but large ships of war are prevented by a bar from coming into the basin.

A fort, to which the Duke of Ormond gave the name of Charles' Fort, defends the entrance to the harbour. It was begun by the Earl of Orrery in 1670, and cost upwards of 70,000l. It stands at some distance from the town, on a neat and strong place; is garrisoned with a regiment of foot, and commands the harbour so completely, that vessels must pass within pistol-shot of it. When it was built, the old fort on the other side of the river was turned into a block-house.

This harbour was so much frequented, in time of war, with homeward and outward bound East and West India fleets, and also by large squadrons of our ships of war, that there was a provision in the leases, that the inhabitants should pay double rent in such a season. Kinsale sends one member to the imperial parliament. There are 12 burgesses, who elect each other. The political influence of the burgh belongs to Lord de Clifford. There are two well-built villages, Cove and Scilly, on the opposite shore.

Kinsale is a town of great antiquity. It was incorporated by charter in the reign of king Edward III. Henry VIII. conferred upon the town a large standard, embroidered with the arms of England. When the Spaniards took possession of the town in 1601, the charter was forfeited; but after the place was reduced, and the Spaniards taken prisoners, it was restored. James II. landed here on the 12th March, 1688; but, in the autumn of 1690, the earl of Marlborough took the old fort by storm, and obtained possession of Charles' Fort and the town.

There are at Kinsale about 400 boats, of about 20 tons each, called Hookers, which are employed in fishing, and which supply the markets of Cork, Kinsale, and Bandon. These vessels are good sea-boats, and are serviceable to ships in the way of pilotage. Four men is the general number for each boat, and they are exempted from impressment. Money was coined in Kinsale in 1672. Some of the penny pieces still remain. Population 10.000. Distance from Dublin 136 miles, south-west. West Long. 8° 38′, North Lat. 51° 42′.—See our art. IRELAND.

KIOF, KIEF, or KIEV, is the capital of a government of Russia of the same name. It is situated on the Dnieper, and consists of three small towns, namely, the fortress of Pethersky and its suburbs, the old city of Kiof, and the town of Podol, otherwise called the low, or the new town. The fortress is built regularly on an eminence facing the south, and has a rampart of nine bastions in good condition, besides barracks for the garrison, magazines, officers' houses, some churches, and a beautiful and rich convent. The suburbs of this fortress are very large, and contain several churches and convents, of which the principal is that of St. Nicholas. The convent, which was founded in the 11th century, was called Pethersky, because the monks formerly lived in Petshera, a cavern in the mountain upon which it now stands. The vaults of the convent, which is like a labyrinth, and consists of cells and chapels, contain numbers of undecayed bodies, supposed to be the relics of saints. The old city of Kiof stands upon a rising ground facing the north. It is fortified and defended by several horn-works. The cathedral, which stands here, is the seat of the archbishop, tutelar of Kiof, and metropolitan of all Russia. Most of the houses belong to the cathedral, and to the convent of St. Michael. The new town is situated below old Kiof, on the plain, on the banks of the Dneiper. It contains several churches and convents, the hotel de ville, and the academical college, which is a large and well built structure. East Long. 30° 56′, and north Lat. 50° 32′.

KIRNBERGER'S TEMPERAMENT OF THE MUSICAL SCALE, is an irregular douzeave, which he published at Berlin in 1771, and which has been strongly recommended to musicians; but the Rev. C. J. Smyth, one of the minor canons of Norwich cathedral, in the ***Phil. Mag.*** vol. xxxv. p. 449, after examining its pretensions, very decidedly condemns this system, as undeserving the pains that had been bestowed on it, and inferior to the ***Mean Tone*** system, and others which have been proposed. (ε)

KIRCHER, ATHANASIUS, a celebrated natural philosopher, was born at Fulda in 1601. At the age of 17, he began his studies under the Jesuits, and was soon distinguished by the rapidity of his progress, both in science and literature. When his studies were completed, he was appointed to teach philosophy, mathematics, Hebrew, and Syriac, in the university of Wurtzburg in Franconia; and he filled this situation with great credit till the year 1631, when he withdrew into France, during the war between Ferdinand II. and Gustavus, and spent some time in the Jesuits' college at Avignon. In this situation he published, in 1635, his *Primitiæ Gnomonicæ*, a work which contains the description of many curious dials, a subject to which he had paid particular attention. In 1643, he published at Cologne his *Magnes sive de Arte Magnetica.* Kircher was after this called to Rome, in order to fill the mathematical chair in the Roman College. After discharging this duty for 6 years, he undertook the professorship of Hebrew. In 1646, he published at Rome, in folio, his *Ars magna Lucis et Umbræ,* a work which contains much interesting matter, but particularly an account of Kircher's attempt to imitate the burning mirrors of Archimedes, and a description of the *magic lantern*, of which he was the undoubted inventor. In order to ascertain the possibility of Archimedes having burned the gallies of Marcellus, he made a voyage to Syracuse, in company with his pupil and friend Schottus, in order to examine the harbour of that city. In 1650, he published his *Musurgia Universalis*, which he dedicated to Leopold, Achduke of Austria, and afterwards Emperor of Germany. This work occupies 2 vols. and treats principally of the theory and practice of music. In 1656, he published his *Iter extaticum cæleste quo mundi opificium per ficti raptus integumentum explanatum. nova hypothesi exponitur.* A second edition of this was published in 1660, to which was added the *Iter extaticum terrestre seu Mundus subterraneus.* Another edition of both these works was published in 1671, with additions and illustrations by Gaspar Schottus.

Kircher died at Rome in the year 1680, in the 80th year of his age. Besides the works which we have mentioned, he published a work entitled *Obeliscus Pamphylius*, *Oedipus Egyptiacus*, in 4 vols. folio; *Obeliscus Egyptiacus*, in 4 vols. folio; and *China Illustrata.* His works extended to 22 vols. folio, 11 in 4to. and 3 in 8vo. He employed himself in collecting, for the Roman college, a cabinet of antiquities, consisting of medals, mathematical instruments, rare animals, minerals, &c. This collection was finished by Father Bonanni, who published a description of it, which appeared at Rome, in 1707, under the title of *Museum Kircherianum*.

KIRKALDY, a royal burgh of Scotland, in the county of Fife, lies in the bosom of the bay of the same name. It stretches along the foot of a steep bank, and consists chiefly of one street, nearly a mile in length, with a few smaller streets and lanes opening on each side. The principal street is in general narrow, crooked, and inconvenient; but, in 1811, an act of Parliament was obtained for widening and paving the streets, lighting and watering the town, which, so far as the trustees have been enabled by their funds to go, has been attended with the most beneficial consequences, and there is now on each side of the street an excellent pavement for foot passengers. The town is lighted, and is well supplied with water. There have been a few substantial, and even elegant buildings, erected in the town and neighbourhood of late; but the houses are generally rather mean, and many of them awkwardly placed, with their ends to the street, without any regard to uniformity. The only public buildings worthy of notice are the church and town house. The former stands on a rising ground behind the town. It was rebuilt in 1807, and is rather a handsome structure. The town-house and prison is a plain old building of hewn stone, projecting a little into the street, and is ornamented with a tower and spire: it contains also the guard-house and public weigh-house. The inhabitants have long felt the want of a suit of rooms for public meetings, assemblies, &c. and are now (1818) engaged in erecting a handsome building to remedy this incovenience. The harbour, which is tolerably safe, but has no great depth of water, is situate at the east end of the town, and has been much improved of late years. In 1796, an inner harbour or basin was added to it, capable of containing 15 sail of vessels of 150 to 200 tons. The outer harbour can accommodate 30 to 35 sail of ships.

Kirkaldy was very early erected into a royal burgh; but the precise date is unknown. It was granted in the year 1334, by David II. to the abbey of Dunfermline, in whose possesion it continued till the year 1450, when the commendator and monastery sold to the bailies and inhabitants the burgh and harbour, with all the rights and privileges. This charter was renewed by Charles I. in 1644. The government of the burgh is vested in a council annually chosen, consisting of 21 members, of whom 10 must be mariners, eight merchants, and three craftsmen; out of these are elected a provost, two bailies, a dean of guild, and a treasurer, which form the magistracy.

In former times, Kirkaldy enjoyed considerable prosperity and opulence, and in public assessments and similar documents, it was rated as the sixth burgh of Scotland; the only burghs on which higher assessments were imposed being Edinburgh, Dundee, Aberdeen, Glasgow, and Perth. During the reign of James I. and the commencement of that of Charles I. it possessed 100 sail of vessels, many of which were of considerable tonnage. From this latter period it appears to have fallen rapidly into decay. Between the years 1644 and 1650, and shortly after, in the subsequent struggle with England, in less than 10 years 96 of its ships were taken at sea. The distress of the inhabitants was aggravated by the oppression of the then existing government, to which they had become obnoxious, by the active part which they took in the religious differences which then agitated the kingdom. The battle of Kilsyth, in 1645, it is said, left 200 widows of Covenanters in Kirkaldy.

At the Revolution in 1688, the vessels belonging to the town were only 20 in number, and of small tonnage, and in 1760 they were reduced to two ferry-boats and one coaster. The trade has now greatly revived. There are at present belonging to Kirkaldy, five vessels employed in the West India trade, two in the whale fishery, 26 chiefly in the trade to the Baltic and British North America, five coasters, and three ferry-boats, making in all upwards of 6500 tons, and employing 350 seamen. Ship-building was carried on here with spirit about 15 years ago, but it has now greatly declined. The manufactures consist principally of ticks, checks, and sheetings, the greater part of which was formerly sent to the London market, but now these goods are chiefly sent to Glasgow, whence they are exported to the West Indies and America. On an average of the last three years, the goods manufactured here, and in the contiguous villages of Linktoun and Pathhead, amount to 2,032,321 yards, valued at 166,219*l.* sterling.

Like every other manufacturing town, Kirkaldy felt severely the stagnation of trade in 1816 and 1817, which has reduced this average; the value of the goods manufactured in 1815 being 125,981*l.* The trade is now again on the increase. There are several mills in the town and immediate neighbourhood for spinning yarn, which is chiefly consumed by the manufacturers. There were also mills for spinning cotton yarn, but these being found unprofitable, have been given up several years since. Of late years a considerable trade has been carried on in importing linen yarn from Ireland and Germany. Flax and ashes are the chief articles of import from the Baltic. There are two tan-works, and four salt-pans, which make annually 15,000 bushels of salt. Immediately adjoining the town, to the east, is an extensive distillery; and close at the back of the town there is a coal-work, where 15,000 tons of coal are raised yearly. There is a weekly market held on Saturday for the sale of grain, which is well attended. Kirkaldy is the seat of a custom-house, the jurisdiction of which extends from Largs to Aberdour, and in all this district, Kirkaldy has the only legalised quay for the shipping and landing of goods. A subscription library was instituted about 20 years ago, and now consists of 3000 volumes, in general well selected. There are branches of 4 banks, viz. the Bank of Scotland, Fife Bank, Glasgow Bank, and the Commercial Bank of Scotland, for the accommodation of this and the neighbouring towns. The house rents of the burgh are about 6,800l. per annum. The corporation once possessed a considerable extent of land, but this was, at different times, sold, with the consent of the convention of Royal Burghs, to defray the expence of repairing the harbour. The revenue of the town now consists of the shore-dues and anchorage, the impost of two pennies Scots per pint on all ale and beer brewed or sold in the burgh, the petty customs, and some trifling feu-duties. It amounts annually to about 550l. Kirkaldy has produced several men eminent in their day; amongst others, Michael Scott, who flourished in the 13th century; and in the last century, Dr. John Drysdale, the celebrated Dr. Adam Smith, and that able statesman Mr. Oswald of Dunikier. Kirkaldy joins with Dysart, Kinghorn, and Burntisland, in returning a member to the British Parliament. Population in 1811, 3679. West Long. 3° 10′, North Lat. 56° 8′.

KIRKGHISES. See TARTARY.

KIRKCUDBRIGHT is a town in Scotland, and the principal in the stewartry of the same name. It is the seat of the steward courts, and is situated on the river Dee, about 6 miles above its confluence with the Solway Firth, in Lat. 54° 49′ N. Long. 4° 43′ W.; and is therefore about 31 leagues S. S. W. of Edinburgh, and 9 leagues S. W. of Dumfries.

KIRKCUDBRIGHT, (*Stewartry of.*) The stewartry of Kirkcudbright, forming the eastern division of the ancient province of Galloway, is bounded on the east, north, and west, by the counties of Dumfries, Ayr, and Wigton; and on the south, by the Irish sea and the Solway Frith. It is divided into 28 parishes, and, according to the survey of Mr. Ainslie, contains 449,316 Scots, or 564 840 English acres.

The stewartry of Kirkcudbright is generally hilly, and uneven in its surface: But the district lying to the north-west of a line, drawn from the middle of the parish of Irongray to Gatehouse, may be termed mountainous, when compared with the other or lowland district, where the hills, with a few exceptions, are much less high, and where, if the surface is not rocky, they are generally cultivated. At first view, one would be apt to conclude, that even the lower district of the stewartry was much better fitted for pasture than tillage, and this, in many instances, is really the case. But the soil of the hollows between the little knolls or hills, consisting chiefly of a gravelly or hazelly loam, is often of an extraordinary fertility; and in a wet summer, the arable knolls are covered with luxuriant crops. A considerable extent of alluvial land along the Solway Frith, is endowed with the usual productive powers of such soils. In the greater part of the mountainous districts, the hills have a bleak and barren appearance, being almost entirely covered with heath and moss; but in the parish of Carsphairn, on the confines of Ayrshire, the heath disappears, and the mountains are covered with grass, affording excellent sheep pasture. The varied surface of the country, affords many fine situations for building; and several proprietors have judiciously availed themselves of the natural advantages of the soil, whose beauties they have heightened by ornamental plantations.

The stewartry is watered by several fine streams. The Ken and the Deugh rise on the borders of Ayrshire, and, after uniting, pass near New Galloway, and expand into the beautiful and romantic Loch Ken. The Dee falls into this lake, and gives its name to the refluent river, which falls into the sea five or six miles below Kirkcudbright. It is navigable for vessels carrying 200 tons to Tongueland bridge, about two miles above Kirkcudbright; and a little below the town it forms a spacious bay, termed the Manxman's Lake, where 100 vessels may lie in perfect safety, defended from the fury of the sea by a small island at the mouth of the river. The different salmon fisheries on the Dee let for about *L.*900 per annum. The other rivers in the stewartry, are the Urr and the Fleet, navigable for small vessels to Dalbeatie and Gatehouse, about four miles from where they fall into the sea; and the Nith and the Cree, which have their sources in Dumfries-shire and Wigtonshire, and divide these counties from the stewartry.

The climate of the lower district of the stewartry, is rather moist in summer, but extremely mild in winter, where the snow seldom lies for any length of time. In the upper district, however, the frost is often severe; and heavy falls of snow frequently cause considerable losses to the sheep farmers. The climate has perhaps been ameliorated, by the improvements of the soil. Intermittent fevers, once very prevalent, are stated to have now entirely disappeared; and if any reliance can be placed on the ratio of the deaths to the whole population, given in the statistical account of the parish of Crossmichael, the chances of longevity are there greater than in any other district of the empire.

Several remains of antiquity are to be met with in the stewartry. The magnificence of the ruins of Sweetheart and Dundrennan abbeys, attest the wealth and power of the clergy in remote ages. The baronial and feudal residences must at one time have been numerous; and the remains of Craignair Castle, believed to have been a favourite residence of John Baliol; of Threave castle, the residence of the Douglasses, lords of Galloway, Kenmore Castle, Garlie's Castle, Cardonness Castle, &c. &c. are still more or less entire. The moat of Urr is reckoned one of the largest artificial mounds in the kingdom.

The ancient history of Galloway is extremely obscure and perplexed. Previous to the invasion of Agricola, the *Selgovæ*, a British tribe, in addition to Dumfries-shire and part of Cumberland, occupied the district lying between the Nith and the Dee; and the division of the stewartry to the west of the Dee formed, with Wigtonshire, the territory occupied by another tribe, named *Novantæ*. During the Roman dominion, the greater part of the stewartry was included in the province of *Novantium*, whose capital, *Candida Casa*, supposed to have been built on the site of the present Whithorn, is mentioned by Ptolemy. After the subversion of the Roman power, Galloway was long a prey to every species of disorder. Successively overrun by the Cruithne or Picts, and the Angli, it still, however, preserved a kind of independent existence; and, according to Lord Hailes, so late as the 12th century, the lords of Galloway were merely feudatories of the Scottish kings. This opinion has been controverted by Mr. Chalmers, though, as it appears to us, on no very satisfactory grounds; but, at all events, it is certain that Robert Bruce confirmed the Gallovidians in the possession of those special and ancient laws, of which Edward I. had attempted to deprive them. The first authentic mention of the lords of Galloway, occurs in the account of the battle of the Standard in 1138, when Ulric and Dovenald, invested with that rank, were both slain. They were succeeded by Fergus, commonly called the first lord of Galloway, whose descendants continued to enjoy this title, until the expulsion of the abject Baliol, who had married the heiress of the family. Bruce then bestowed the lordship of Galloway on one of the branches of the house of Douglass, in whose hands it continued till 1455, when their estates were forfeited, and annexed to the crown.

Long subsequent to this era, Galloway, as well as the other districts of Scotland, continued in a very uncivilized and unsettled state. But the gradual decline of baronial influence, and the increasing authority of the crown, and of the public law, were ultimately attended with the happiest effects; and, in conjunction with the reformation, and the consequent destruction of the exorbitant powers of the clergy, paved the way for the rapid improvement that has since taken place.

The inhabitants of this district are a strong, active, and healthy race. The general diffusion of elementary instruction has enabled them to acquire extensive and solid information. But their dispersion over a large extent of country; the want of public meetings; of political privileges; and of all collision of political opinion; by depriving them, in as far at least as matters of public interest are concerned, of all stimulus to mental exertion; occasions a morbid uniformity of character, and an extreme sameness and insipidity of conversation. These circumstances do not indeed affect the inhabitants of the stewartry, more than those of any of the other agricultural counties of Scotland. But they have a curse almost peculiar to themselves. The extraordinary prevalence of cattle-dealing, and the kind of universal jockeyship to which it gives rise, is attended with the very worst consequences. It not only has a strong tendency to induce habits of dissipation, but is often accompanied with an extreme degree of vulgarity. The whole ideas of such persons are centered in cattle, and extend to nothing else. They frequent markets, when they neither need to buy nor sell. And the most important tillage operations are neglected, or left to the care of servants, in order that the master may be able to attend a market where he cannot have any particular business. We do not mean to say, that in every instance this would be a just character of the Kirkcudbright farmers. On the contrary, many of them are men of enlarged minds, who manage their farms on the most approved principles, and who despise the kind of gambling and agiotage indulged in by their neighbours. It is only a general outline that we are now sketching; and as such, we are afraid, it will not be found very inaccurate.—This article has chiefly been drawn up from private information; but several works, and, among others, Smith's *Survey of Galloway*, have been consulted. (J. R. M.)

KIRKWALL is the principal town of the Orkney Islands, of which a full account will be found under the article ORKNEY ISLANDS.

KIRRIEMUIR is a small town of Scotland, in the county of Forfar. It is situated on the south-west side of a hill, near a romantic glen, traversed by the small river Garie. The parish church, which is a tolerably neat building, is the only public edifice of importance. The town contains some good houses; but it is principally celebrated for its manufactories of Osnaburgs and coarse linen. In 1792, the amount of these articles manufactured in the town and neighbourhood was about *L* 30,000. Kirriemuir is a burgh of barony, of considerable antiquity. The baron bailie is appointed by Lord Douglas, the superior. In 1793, the population of the town was 1584 inhabitants. In 1811, the town and parish contained 955 houses, 1201 families, 643 families employed in trade and manufactures, and 4791 inhabitants, being an increase of 370 since the census of 1801. Distance from Forfar six miles, and from Dundee twenty miles.

KISHMA, KISHMISH, or more properly *Jezira Derauz*, or the Long Island, is an Island of Persia, and the largest in the Persian Gulf. It is the *Oaracta* of the Greeks. It stretches for about sixty miles parallel to the Persian coast; but its breadth no where exceeds twelve miles. The channel by which it is separated from the continent is navigable for the largest vessels. It is about eight miles wide at the north point of the island, and less than three opposite to Old Luft, from which it is said to wind among several wooded islands, as far as Bassadore, the extreme point of the island. Kishma formerly contained 300 villages, but not one half of these remain. Dates, wheat, and barley, are produced in sufficient quantity for the subsistence of the inhabitants, and it was formerly the granary of Ormuz. They breed cattle and sheep, and are much occupied in fishing. An independent Arab Sheik, who pays homage to the Imam of Muscat, possesses the island. He resides in the fort of Kishma at the eastern extremity of the island, but is not able to defend his subjects against the incursions of the tribes on the Arabian coast. The town of Kishma, situated close to the sea opposite the island of Larrek, is surrounded with a wall, and vessels may ride securely in the roads; but there is a bank which is said to extend nearly two miles from a point southward of the town. The principal places in this island are the ports of Luft and Khan on the north-west coast, and Mion at the western extremity of the island. On approaching the port of Old Luft, which stands in North Lat. 26° 55′, the tide falls about 12 feet, the soundings become irregular, and the bottom rocky. The harbour is however safe. On the south coast is an excellent harbour formed by the island of Angar. It is so completely surrounded by the two islands, which are only three miles distant from each other, that a ship can anchor close to either shore at all seasons. A line-of-battle ship may lie within half a mile, and small vessels within an hundred yards of the shore. The island of Angar is uninhabited; but Mr. Macdonald Kinneir observed upon it the ruins of a considerable town, and many reservoirs of water. It is covered with pits of salt and metallic ores, and also a soft rocky substance resembling lava. The hills are covered with shells of oysters and other fish, and abound in wild goats, rabbits, and partridges. In 1642, the Dutch endeavoured to take this island; but they failed in the attempt, and were obliged to make their peace with the inhabitants by considerable presents. On the west side of the island, there was a nest of pirates, who were destroyed by the English in 1809. The position of Kishma is in East Long. 56° 8′, and North Lat. 26° 57′ 30″. See Macdonald Kinneir's *Geographical Memoir of the Persian Empire*, p. 14, 15; Milburn's *Oriental Commerce*, vol. i. p. 130; and Morier's *Travels in Persia*, p. 6.

KISTNAH, or KRISTNAH. See INDIA.

KLAUSTHALL is a town of Germany, in the principality of Grubenhagen, and the kingdom of Hanover. It contains two churches, an orphan's hospital, a mint for coining money, and a small garrison. The town is open and regularly built, and derives its importance from the mines of the Hartz mountains in its vicinity. It is situated 1374 Paris feet higher than Gottingen; and the lowest point of the mine of Roschofer is only 248 of these feet below the level of the same town. The richest mines here are the Caroline, which is 630 feet deep; and the Dorothea, which is 612 feet. The Georgestollen is a remarkable conduit, nearly seven miles long, and 930 feet deep. It was begun in 1777 for the purpose of carrying off the subterraneous water of the mines. The Caroline mine, in the year 1780, produced every three months 54 crowns at each part of the mine, and the Dorothea mine 04. This is a smaller produce than formerly, when the Dorothea mine yielded, in 67 successive quarters, 110 crowns. In the year 1735, there were coined at Klausthall every week 600 marks of silver, at the rate of 12 crowns the mark, which amounted to 374,000 crowns a year. At Ludwiger Rechenhaus is a very curious collection of all the machines either employed in mining, or that have been prepared for that purpose. Bosenhof is the Vauxhall of Klausthall and Zellerfeld. New Klausthall is the small town of Gittelde, which has several forges, and is remarkable as containing the ruins of Stauffenbourg, a chateau built by Henry Oiseleur; and also the place called Heinrichswinkel, where Henry was occupied in catching birds when the German deputies came to offer him the imperial crown. Population 8000. An account of the remarkable conduit called Georgestollen will be found in a work by M. Gotthard, written expressly on the subject, and entitled, *Authentisch Beschreibung vom des Georgestollens*. Wernigerode, 1801.

KLEIST, CHRISTIAN EWALD DE, an eminent German poet, was born at Zeblin in Pomerania, in the year 1715. He studied law at Koningsberg, and afterwards went to visit his relations in Denmark, at whose desire he endeavoured to obtain a civil appointment; but his solicitations having proved unsuccessful, he resolved to devote himself to the military profession. Soon afterwards he entered into the Prussian service, and distinguished himself in several of the great Frederic's campaigns, as a brave, enterprising, and accomplished officer. He attained the rank of major, and terminated his life at the battle of Kunnersdorf, on the 12th of August 1759, after performing the most gallant exploits. Being attached to the corps of General Fink, he attacked the flank of the Russians, assisted in storming three batteries, and received a wound in the right hand, which obliged him to hold his sword in his left. Having missed the commander of his battalion, he immediately put himself at its head, and led on the men, under a heavy fire of cannon, to the attack of the fourth battery. There he was wounded in the left arm, and compelled to carry his sword again in the disabled right hand. As he approached the battery, his right leg was shattered by a grape-shot; and he fell from his horse, with the exclamation, "My lads, don't forsake your king!" As the enemy now rushed forward in great numbers, his body could not be removed from the field. Some Cossacks having come up, stripped him naked, and threw him into a bog. In this situation, he was found by some compassionate Russian soldiers, who laid him on straw before a watch-fire, put a covering over him, and gave him some bread and water. He was again stripped of his covering by the Cossacks, and lay for several hours in a state of nakedness, until a Russian officer ordered him to be carried to Frankfort on the Oder, where he was delivered over to the care of medical men. He died of his wounds 11 days after.

Kleist was well advanced in years before he discovered any decided genius for poetry, and his talents were first called forth by an accidental impulse. The productions, however, which afterwards flowed from his pen, have secured for him a distinguished rank among the poets of his country. He attempted various kinds of poetry—descriptive, lyrical, and epic; but he excelled chiefly in the faithful delineation of rural scenes. His most admired poem is that entitled, "The Spring, or Vernal Season," which has been lately translated into English. See Kleist's *Sämmtliche Werke*, with the author's life, by Körte, in 2 vols. 8vo. Berlin, 1803. (*z.*)

KLOPSTOCK, Frederic Theophilus, a celebrated German poet, was born at Quedlinburg, in the year 1724. Having received the rudiments of his education at home, he was sent to the public school of Quedlinburg, where he distinguished himself by his intellectual powers, and excelled in bodily exercises. At the age of sixteen, he went to the college of his native place; where he made great proficiency in his classical studies, and acquired a taste for elegant literature. His poetical genius already displayed itself in some pastorals; and even at this early period, he conceived the design of his great epic poem, *The Messiah.*

In the year 1745, he commenced the study of divinity at the university of Jena. But his thoughts were constantly turned towards the great work he had projected, of which he composed the three first cantoes in prose. Afterwards, however, he resolved to adopt the versification of Homer and Virgil as his model; and having succeeded in his first attempts, he, at length, determined to execute the whole poem in German hexameters.

In 1746, he removed to Leipsic, where he became acquainted with a number of young men of poetical talents, who published their essays in an occasional paper, called the *Bremische Beytrage*, or "Bremen Contributions." In this paper were published the three first cantoes of Klopstock's *Messiah*, with a number of his odes; which were received with such general approbation, as encouraged him to persevere in his poetical labours.

He left Leipsic in 1748, and went to reside at Langensalza; where, in consequence of a disappointment in love, he was, for some time, thrown into a state of mental dejection. About this time he published ten books of his *Messiah*, by which his reputation as a poet was completely established. The work, indeed, was hailed with rapture by the lovers of poetry and devotion; the critics looked upon it as forming an era in the poetical annals of Germany; and the author was generally regarded as the Homer of his native country.

In 1750, he made a journey into Switzerland, in consequence of an invitation from Bodmer to visit him at Zurich. Here he was received with great respect; and he appears to have formed a strong attachment to the country and its inhabitants; among whom he would, in all probability, have spent the greater part of his life, had not Baron Bernstorff, who had conceived a high regard for the talents of Klopstock, invited him to Copenhagen, with the assurance of conferring upon him such a pension as would make him independent. He accordingly set out for Copenhagen, in the year 1751; and, in passing through Hamburgh, he became acquainted with a young lady, Miss Moller, of amiable qualities and literary accomplishments, whom he soon afterwards married. The congeniality of their dispositions seemed to promise much happiness to both; but Klopstock was very soon deprived of his partner, who died in childbed; and he lamented her death, and cherished her memory, to the last hour of his existence. He remained chiefly at Copenhagen until the year 1771; after which period he remained at Hamburgh, in the capacity of Danish legate, and counsellor of the Margrave of Baden, from whom he enjoyed a pension. He died at Hamburgh in the month of March, 1803, in the 79th year of his age.

The moral character of Klopstock was exceedingly amiable; and this, no less than his poetical talents, made him be regarded with sentiments of veneration by all those who enjoyed his acquaintance. His natural diffidence was so great, that he seldom felt at his ease in the presence of strangers, especially persons of rank.

As a poet, Klopstock has been justly placed among the number of those who have attained the very first eminence. His productions display a fertile imagination and a cultivated taste; and they abound in sublime imagery and pathetic sentiment. The *Messiah*—which extends to twenty cantoes—is perhaps too long for a devotional poem. There is in it a paucity of incident, which the inspiration of genius finds it difficult to supply; and it cannot be denied, that the sublimity of his conceptions frequently carries the muse of Klopstock into the obscure regions of mysticism. His lyrical effusions are remarkably spirited; yet not altogether free from the characteristic defect to which we have alluded. His dramatic pieces are also written with great spirit and force, but are not properly adapted for theatrical representation. (*z*)

KNARESBOROUGH is a town of England, in the West Riding of Yorkshire. It is situated on a rocky eminence, on the north-eastern bank of the river Nid, which issues from the bottom of the Craven hills, and flows below precipitous rocks, in a beautiful glen. The town, which is tolerably large and well built, and contains many handsome modern houses, consists of two principal streets, and some smaller ones, along one of which runs the high road through Harrowgate to Boroughbridge; while along the other street, which crosses it at right angles, runs the road from Ripley to Wetherby. On an abrupt bank, overlooking the river, are the venerable remains of a castle, built by Serlo de Burgh, baron of Tonsburgh in Normandy. It contained nearly two acres and a half within its walls, which were flanked with eleven towers. Part of the principal tower still remains, and seems to have been built about the time of Edward III. It consists of three stairs above the keep, or dungeon. The roof of the dungeon is arched with stone, and supported by one round pillar, three feet in diameter.

The parish church is neither spacious nor elegant. It contains several handsome monuments, particularly of the

Slingsby family. There is here a spacious market-place, with a neat cross, erected in 1719. Besides a free schoolhouse, built by subscription in 1741, there is a dissenting chapel, built in 1778—a Quaker's meeting-house, built in 1701—and a good stone bridge over the Nid. The principal manufactures are coarse linens and sheetings; and a great trade is carried on in corn. Very fine liquorice is grown round the town. More than 1000 pieces of linen, each twenty yards long, have often been woven here in a single week. Knaresborough sends two members to parliament, and is governed by a bailiff, who is also the returning officer at the election. The right of election belongs to the possessors of 84 burgage holds.

This town has long been celebrated for its fine medicinal spring, and was a place of great resort before Harrowgate and Scarborough came into such repute. The *Sweet Spa*, or vitriolic well, discovered in 1620, is situated in Knaresborough forest, about three miles from the town. The *Stinking Spa*, or sulphur well, is very fœtid, and is used only for bathing. It changes silver to the colour of copper. *St. Mungo's Well* is a cold bath, about four miles distant from the town. The famous *Dropping or Petrifying Well* is in the long walk on the south-west bank of the Nid, and opposite to the castle It rises in the declivity of the hill, at the foot of a limestone rock, about forty yards from the banks of the river; and, after a course of twenty yards, it spreads itself on the top of a rock, from which it trickles down in about forty places, creating a musical kind of tinkling. The quantity of water delivered in a minute is about twenty gallons. The rock, which is covered with plants, flowers, and shrubs, projects in a circular curve from the bottom to the top, so that its brow overhangs its base nearly fifteen feet. It is about 30 feet high, 48 long, and from 30 to 48 broad. The ground that receives the water before it forms the well has been converted into a solid rock, through a distance of 24 feet; and the spring water, in running into the river Nid, has formed a rock some yards long.

The walk from the Dropping Well to the high bridge is remarkably fine, exhibiting a great variety of charming prospects. On the other side of the river, near Grimbald Bridge, and at the foot of a perpendicular rock, is St. Robert's chapel, which is elegantly hollowed out of the solid rock. It is 10 feet 6 inches long, and 7 feet 6 inches high. The roof and altar are finely enriched with Gothic ornaments. Behind the altar is a large niche, where there was formerly an image. There are also three heads, supposed to represent the Trinity; and another, supposed to be that of John the Baptist, to whom the chapel was dedicated. On one side of the entrance, shaded with spreading ivy, is the figure of a warrior, cut out of the rock, in the act of drawing his sword to defend the entrance. The borough and township of Knaresborough contained, in 1811, 888 houses, 994 families, 837 families employed in trade and manufactures, and 4234 inhabitants. See Hargrave's *History of the Castle, Town, and Forest of Knaresborough*, 1798; and the *Beauties of England and Wales*, vol xvi. p 634.

KNELLER, Sir Godfrey, a celebrated portrait painter, was born at Lubeck about the year 1648, and was the son of M. Kneller, surveyor-general of the mines, and inspector of Count Mansfeld's revenues. Having exhibited an early passion for painting, his father, though he had destined him for a military life, sent him to Amsterdam to receive instruction from Bol, and he had also the good fortune to be honoured with instructions from Rembrandt. He went to Italy in 1672, where he spent some time in Venice. In 1674, he came to England, without any intention of taking up his residence in this country; but having been accidentally recommended to Mr. Banks, a Hamburgh merchant, he took portraits of him and his family. The Duke of Monmouth having induced the king to sit to Kneller, his majesty, who was engaged to have his portrait taken by Lely, insisted that he should sit to both artists at the same time. Kneller executed his portrait with such expedition, that he had finished it before Lely's was dead coloured. This little event gained him reputation, and induced him to take up his residence permanently in England. Kneller was patronised by Charles II. James II. and William III. and he had the rare honour of taking the portrait of ten sovereigns. He was knighted in 1692, by William III. for whom he painted the beauties of Hampton Court, and who presented him with a gold medal and chain worth *L.* 300. He likewise took a portrait of George I. who raised him to the dignity of a baronet.

In 1722, he was seized with a violent fever, of which he languished for a considerable time, and which carried him off in October 1723, in the 75th year of his age. A monument was ereeted to him in Westminster Abbey, for which he left *L.* 300.

KNIGHT-HOOD, Orders of. In the article Chivalry, an account has been given of the origin of knighthood among the northern nations; of the ceremonies with which that dignity was in general conferred; of the obligations which it imposed; and of the powerful influence which the spirit of chivalry long exerted, and in all probability still continues to exert, over the people of Europe. One very important topic connected with the subject of that article remains to be discussed in the present, viz. the origin, history, or influence of those separate *orders of knighthood*, as they were called, which had their rise, as is generally supposed, about the time of the crusades, and proceeded indeed from an union of the two principles of valour and devotion, which we should seek for in vain among the records of any other period.

The wars of the cross, which had originally been excited by the eloquence of a priest, and recommended to all believers by the promises of a pope, presented to the eastern world the strange spectacle of churchmen contending, sword in hand, for the truth of the tenets which they professed, and the destruction of infidels. The more hardy tribes of the west had, indeed, been long familiarized with such spectacles. Although ecclesiastics, both regular and secular, were absolved, by their tenure, from rendering military service in person, they were far from being always disposed to make use of their legal exemption from duties, to which they were so much inclined. They feared, or pretended to fear, the degradation of their fiefs, should the obligations of their tenures be fulfilled by mercenary hands. The chapter of St. Germain l'Auxerrois, accordingly, continued to furnish the Bishop of Paris with horse and straw *for the army of the king*, till the middle of the 11th century. Even the church had, long before the period of the crusades, sanctioned this military rage by their example. Leo IX. marched against the Normans at the head of an army, refused them peace, although they professed their willingness to comply with all his demands, and continued, in spite of all their entreaties, to ravage their country in the most cruel manner, with a force chiefly composed of banditti, and outcasts of every kind, who were glad to make their booty under so sanctified a standard. Benedict VIII. one of his predecessors, had violated, in a manner even more shameful, the precepts of that religion, of which he pretended to be the first minister. Not only did he arm all his bishops to fight with him against the Saracens, but, after having overcome these infidels, and slaughtered a prodigious number of them in the field, he did not scruple to stain himself with the blood of their queen. He commanded her head to be cut off; and reserved for his own share in the booty her ornaments of gold and jewellery. In Spain, nothing was more common than to see bishops following the king in his wars. When, about the end of the ninth century, the Normans made a descent on the coast of Galicia, they carried every where fire and desolation, and met with no check till they reached the territory of Rosinus, bishop of Compostello. That prelate, having called together the counts of the neighbourhood, advanced himself at their head, *covered* (as Ferrera expresses it) *with the harness of charity*—rushed upon the barbarians—slew their chief with his own hand—and forced them to seek for safety in their vessels. Not even the authority of the council of Coyença could overcome the public applause of this valorous action; and, in spite of their fourth canon, which so expressly disapproves of all sacerdotal combatants, St. Rosinus still occupies his place in the calendar, among the most eminent of the holy.

The consideration of these facts, and of the state of manners of which they are the evident marks, will prepare us to inquire, with advantage, into the true origin of the orders of knighthood.

The ambitious desire of an ancient origin is not less conspicuous among bodies of men associated for particular purposes, than it is among families. There is no church which is not *apostolic*, if we are willing to believe its bishop; even those of Troyes and Clermont, the most insignificant in France, have long since added that epithet to their titles. Monks, who make profession of humility, and renounce the world, are in this particular the vainest of men. The Carmelites think they have made out a clear title and precedency, by taking Elijah or Mount Carmel for the patron of their order. They were desirous to increase the antiquity of their order, even at the expense of making it Jewish rather than Christian. But the hospitallers made light of this Jewish antiquity, and made bold to reckon among their founders Abraham, Lot, and Laban; for this last, although his character is none of the best, was, notwithstanding, according to them, a good knight hospitaller.

A letter,[*] written by Maffei in the year 1712, was suppressed by papal authority, because that illustrious writer had succeeded in proving what he undertook, and had for ever put an end to all rational belief in the remote origin of orders of knighthood. The fable is, that Constantine the Great, after his defeat of Magentius, received from heaven an express command to institute an order of knighthood for the defence of the Christian religion; and as this command was brought by an angel, who held in his hand a cross of gold, inscribed with the well known words *εν ταυτω νικα*, Constantine gave his knights the title of *Equites Angelici et Aureati.* The only authority for the existence of Constantine's order is that of a pretended antique—a stone dug up at Rome, which gives, moreover, a different account of its origin. On it appears Constantine seated on his throne, giving a collar to several knights; and the inscription relates, that *the emperor, being cured of the leprosy, and baptised by Pope Sylvester, created*, for the defence of Christianity, *Milites Equites aureatos.* The leprosy and the baptism by Sylvester are now given up on all hands; and the use of the word *milites* has no great resemblance to the language of the fourth century. The real founder of the *Ordo Constantinianus*, was without doubt the Emperor Isaac Angelus Comnenus, who took the idea of it from the Franks, and in whose family the mastership so long remained.

The knights of St. George are an order of great antiquity, who have extended themselves from the east to the west. Their patron saint is now, however, supposed to be fabulous, as well as all their legends respecting their own very remote origin and exploits. St. George was, according to them, a Christian saint, who suffered martyrdom in Persia during the reign of Diocletian. But he is commonly confounded with that famous Arian bishop, who was substituted in the room of Athanasius in the see of Alexandria. There is every appearance that they are in fact the same person. Both were born in Cappadocia, and both were called George. George, taking possession of his bishopric, entered Alexandria armed cap-a-pee, and on horseback; and the other is represented as combating the devil, in the shape of a dragon, on horseback also, and armed in the same fashion. George of Alexandria was massacred by the Pagans; so he also has his claims to the character of a martyr. The entire silence of all historians is sufficient to negative all belief in the legends of the order of St. George. These are not even in concord with each other. Their patron has suffered death in almost every possible way, and in each way upon equally good authority.

> *Carcere, cæde, site, vinclis, fame, frigore, flammis,*
> *Confessus Christum ducit ad astra caput.*

A martyr so exemplary could hardly have been omitted by all the fathers. It is true that the Emperor John Cantacuzenus made, as is recorded by himself, some knights in the church of *St. George Παλαικαϛϱιτης.*[†] But the very name of the saint is sufficient to prove that he had nothing in common with either George the champion of Cappadocia, or George the bishop of Alexandria. Notwithstanding, it appears, that the removal of some relics of this St. George *the Candian* to Italy, after the Franks had obtained possession of Constantinople, was the real origin of this order, the ensign of which has since become so popular. Of all these legends, we may well say—

> *Sunt spinæ, tricæque et si quid vilius istis.*

In order to discover the true origin of the orders of knighthood, we must come down to the time of the crusades, during the 12th century. The piety of some merchants of Amalfi, who traded in Judea, induced them to build a church in Jerusalem, which long after preserved its name of *the Latin*, originally conferred upon it on account of the language and rites of which its founders had made use. Near to this church they built an hospital, dedicated to St. John the Almoner, for the reception of the sick and the pilgrims who frequented the holy sepulchre. It is impossible to wish any better authority for these facts, than that of William of Tyre, who wrote in the same century.[‡] He asserts, that, as the founders had been Latin merchants, the monastery still retained the name of *the Latin.* He asserts, what is now to our purpose, that these hospitallers, who had so small a beginning, became by degrees wealthy, and that their first step was to withdraw themselves from the jurisdiction of the abbot of the *Monasterium Latinum*, till at length, their power increasing to a great degree, the Roman church emancipated them from the authority of the patriarch of Jerusalem. "Sic ergo de tam modico incrementum habentes prædictæ do-mus fratres prius e jurisdictione Abbatis se subtraxerunt, deinde, in immensuum multiplicates divitius, per ecclesiam Romanum a manu et potestate Domini Patriarchæ sunt emancipati."

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[*] Vide *De Fabula equestris ordinis Constantiniani, Scipionis Maffei Marchionis Epistol. Tigur.* 1712.

[†] Vide Johan. Cantac. L. iii. Pontani Notae ad Cantac.

[‡] Gul. Tyr. L. xviii. c. 546.

When the princes of the west entered the Holy Land, the hospitallers took up arms in their cause. Some remained attached to the purposes of their institution, and took care of the sick. Persons afflicted with leprosy were admitted into their body, that they might undertake the care of others in a similar situation; and the rule was, that the grand master himself should be a leper. But after all the sick persons in the hospital at Jerusalem had been massacred by the Infidels, the order was obliged to retire into Italy, and received from Innocent IV. a dispensation, absolving them from the obligations of their original oath, together with permission to elect a grand-master of full and vigorous health. Those who were inclined for war, distinguished themselves by actions of valour, which soon attracted great reputation to their order. Such was the origin of the knights of the order of St. John of Jerusalem, the most ancient of all; who afterwards, under the names of knights of Rhodes, (which island they occupied from 1308 till A. D. 1522), more lately of Knights of Malta, were of such signal service in repressing the progress of the Ottoman arms.

The government which this order afterwards established was a mixture of monarchy and aristocracy. The grand-master exercised the rights of sovereignty over the people of Malta and its dependencies. He coined money; and had the disposal of the priories, bailiages, and commanderies attached to the order. All the knights, of whatever rank they might be, professed obedience to his commands in every thing not contrary to the rules of the society, or the obligations of religion. In all affairs, however, which respect religion in the interests of the knights, an absolute authority was exerted by the grand-master and the council in conjunction; the grand-master having no other prerogative than that of a casting vote. There were two councils. The ordinary council consisted of the grand-master, the prior of the church, the conventual bailies, the grand priors, and the capitular bailies. The *council complete* was composed, in addition to these, of all the grand crosses, and of the two senior knights of each language.

These languages were those of the different nations of which the order was composed; and these were in number eight, Provence, Auvergne, France, Italy, Arragon, Germany, Castile, and England. Of each of these languages, there were knights of different kinds, as, 1. *Equites Justiciæ*, who made proof of nobility at their entrance, of four descents in all other nations except Germany, where 16 quarters were held necessary.—2. *Equites Gratiæ*, who made no proof of nobility, but had the order conferred on them on account of merit. These were, however, incapable of attaining the rank of bailie, grand prior, or grand master. Besides these, there were *serving brothers* of two kinds; 1. those *of arms*, who took a part in all the customary duties of the knights; and, 2. those *of the church*, who were priests entirely devoted to the services of religion in the different churches of the order.

The influence of this order was extended through every part of Europe. Their achievements were conspicuous, and they were long regarded as the most essential bulwark against the Turks. Ashmole is of opinion, that at one time their power was so great, that "they possessed in Christendom about 19,000 manors."* In England, their prior sat in Parliament as the first baron of the kingdom, by the title of "Prior hospitalis Sancti Johannis de Jerusalem."

The knights of St. John made profession of poverty, obedience, and chastity, according to the rule of St. Augustin, whose black habit they wore, originally with a plain white cross on the breast, but afterwards with one of eight points. In time of war they put the cross on a scarlet cassock.

The order is now merely nominal, and the cross is conferred by several sovereigns, who lay claim to the title of grand-master. Among others, Paul of Russia celebrated a mock election of himself, with the concurrence of a company of comedians, and sold the insignia.

Scarcely had the hospitallers succeeded in transforming their society into one, uniting within itself the profession of religion and that of arms, before certain canons regular of St. Augustin, who, during the reign of the Saracens, had been entrusted with the care of the holy sepulchre, became desirous of imitating their example. Baldwin accordingly gratified them in this matter, and they assumed the title of knights of the holy sepulchre. They were conspicuous for their valour and fidelity during the time of the Christian kings of Jerusalem; but, on the loss of the Holy Land, took refuge in Perugia, and afterwards were incorporated with the knights of Rhodes. Their ensign was *argent, a cross potent, or.*

The origin of the order of the knights of the temple succeeded close on that of the sepulchre. Geoffrey of St. Omer, and Hugh de Paganis, were its founders. These, along with a few other pious persons, animated with the desire of serving God, and bearing with much impatience the insults which the Turks poured on the pilgrims, established a society for the purpose of protecting the highways to Jerusalem. Guarimond, patriarch of Jerusalem, and king Baldwin, willingly granted them their approbation. They took vows of poverty, obedience, and chastity, and engaged to keep the high-ways free of robbers; to be hospitable to the poor, and to protect all who should be inclined to visit the holy sepulchre. Baldwin permitted them to build an hospital near the temple of the sepulchre, whence they derived their name; and they established themselves, in all respects conforming to the rule of St. Basil. The services which they rendered by their care, as to the safety of the high-ways, soon spread their fame throughout Europe, and were the means of attracting to them great riches and splendid endowments. The wealth which they possessed was, indeed, in all probability, the chief cause of the destruction of their order, which was accomplished by the machinations of Philip the Fair, in the year 1312. A council was held at Vienne, at which the Pope, (Clement V.) king Philip, and Louis of Navarre, his eldest son, were present. There the Templars were accused of drunkenness, incontinence, and blasphemy, which crimes were confessed by many of the knights on being put to the torture. The council ordered all their possessions to be confiscated, and bestowed on the knights of St. John of Jerusalem; but the kings of France, Arragon, Castile, and England, appropriated a great part of their possessions to their own use. The order contrived to get the decree of the council reversed, in so far as regarded Germany, where they remained long after, but with little power. Jacques de la Maude, their grand master, was burnt in Paris along with many of the brethren; and the whole body were in England declared convicts and felons by a statute of the first year of Edward II.

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* See Ashmole, *Introduction to the History of the Order of the Garter.*

In the same year with the creation of the order of the Templars, took place that of the Teutonic order. A German nobleman, observing the inconvenience to which pilgrims of his nation were exposed in the hospitals at Jerusalem, where their language was unknown, erected an hospital in Jerusalem for their use. This hospital soon became rich by the liberality of its German visitants. Pope Celestine created these hospitallers into an order of knighthood, under the obligation of living according to the rule of St. Augustin, and continuing to fight against the Infidels *during life*. The emperor Frederic II. brought them with him into Europe, and proposed to them to occupy their arms in the conquest of Prussia. The infidelity of the people of that country was the pretence; but his real motive in this proposition, was nothing more than to get rid of a band of warriors whose unemployed valour began to incommode him. Being joined by the marquis of Turingen, they soon rendered themselves masters of Prussia, and built Marienburgh in honour of their patroness, the Virgin Mary. This country they possessed till A. D. 1525, when Albert of Brandenburgh, their last grand-master, became feudatory to Sigismund, king of Poland, who created him first duke of Prussia. From him the present royal family of Prussia derive their right. The ensign of this order was a plain black cross on a white cassock.

In addition to these, there were, about the same time, founded various other orders of the same kind, which all distinguished themselves in their day by a diligent use both of the sword and the breviary; but few of these succeeded in obtaining any settlements in Europe after the failure of the crusading expeditions; and the few remaining knights were gradually incorporated into the orders of the Temple, or of St. John, or into the Teutonic order.

In Spain, however, the encroaching spirit of the Saracens kept alive the flame of devotion, and of patriotism; and the same cause which produced in the Holy Land the first religious orders of knighthood, gave birth to a variety of similar establishments in the kingdoms of Castile and Arragon. The four principal orders in Spain were those of Santiago, or St. James of Gallicia; of St. Saviour in Arragon; of Alcantara; and of Calatrava. During the subsistence of the Moorish kingdom of Grenada, the influence possessed by these orders was immense. The grand-masters controlled the sovereign in every thing respecting the administration, either of foreign or of domestic affairs. The rich commanderies distributed through every province of the peninsula, attracted the young nobles to enter into these orders; and nothing could exceed the insolence of their demeanour. By a dexterous piece of policy on the final expulsion of the Moors, Ferdinand, having his power already increased by the junction of the two kingdoms of Castile and Arragon in the persons of himself and his wife, contrived to have the grand mastership and principal commanderies united to the crown; an event which has, more than any thing else, contributed to the subsequent political degradation of the Spanish people.

There is little doubt, that the establishment of orders of men so constituted as to be liable to all those excitements of the imagination, which are inseparable from a retired mode of life, and at the same time to have full opportunity for putting all their romantic dreams into execution by their military profession and pursuits, must have exerted a powerful influence on the idle and high-spirited nobility of the 12th century. These orders laid hold of human nature by the strongest of all attractions; and the magnificent possessions which they so soon obtained, are a sufficient proof how well their founders had calculated their measures, when they broached the novel idea of enhancing the ardour of chivalry by the enthusiasm of perpetual devotions, and the undiverted constancy of a life of celibacy.

One very singular effect of the establishment of these orders in Europe, cannot fail to attract the notice of every one who peruses the history of those times. The practice of duelling increased immediately to a most alarming degree. Distinguished valour was the only means of acquiring the rich rewards which these orders had it in their power to bestow. The young knight, newly admitted into an order, had no ambition but that of making himself remarkable by some feat of arms. This ambition, which easily found a proper channel of displaying itself in the East, where they lived in a state of perpetual war, and amidst a succession of skirmishes, found no other vent, on their establishment among the peaceful kingdoms of the West, except in personal rencounters. The capricious impatience of insult, at all times the characteristic of the northern nobility, was now tenfold increased in each individual by the desire of personal or social distinction. The protection, too, afforded to the absurd punctilios of honour, and ridiculous ideas of satisfaction, by bodies so set apart as the religious orders, was more constant, as well as more powerful, than any thing they had ever before enjoyed. What had heretofore been tolerated abuse, became now a commended and a constant rule of practice. Doctors and jurisconsults set about reducing to order the fanciful rules invented by illiterate bravoes, and Europe soon became acquainted with a new science—the *science of knighthood*, as it was called, or *scienza cavallerescha*.

The authors who were desirous of distinguishing themselves by a proficiency in this new science, went about the matter with all the coolness and precision so necessary in juridical writings. They entered into the most minute details concerning the nature of insults, the very mention of which can excite in us nothing but laughter. They examined them according to all the rules of logic, and arranged every thing which concerned them by the Aristotelic predicaments.

The various modes of giving and returning the lie, formed another most ample subject of decisions; for there were affirmative lies, and negative lies; lies universal, particular, conditional, absolute, positive, privative, certain, and doubtful.[*] Each of these species had its subdivisions: there was one, "*demente general pour la personne;*" a second, "*pour l'injure;* and a third, "*regardant l'injure et la personne.*"

Honour was a thing very difficult to be defined; for they had to weigh exactly the cause efficient, the cause formal, the material, and the final; insomuch that there were twenty different modes of defining it, each supported by one set, and condemned by all the rest. It is not to be wondered at after this, that the business of duels was treated of in the most lengthy manner: it was necessary to hold the balance even among no less than fifty formulas of *cartels*. In a thousand situations, the challenge was to be accepted—in many, there were difficulties whether it should be accepted or refused. Out of the equality or inequality of conditions and of persons, arose an infinite variety of speculations and specialties.[†] The very existence of such a science is sufficient to shew to what a dangerous extreme the derangement of the human faculties may be carried, under the grave shelter of academic formalities; into what a total absurdity of principle, and into what a lamentable, yet ludicrous, train of actions and manners must not they have fallen, who had learned to regard, as oracles of wisdom, the hair-brained and drivelling professions of this chivalric science.

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[*] See Maffei, *Della Scienza Cavall.* l. ii. c. iv.

[†] See *Basnage*, p. 81.

As an instance of the height to which this infatuation was carried, it may be mentioned, that, in the year 1450, Pozzo, one of the first jurisconsults of his day, published *decisions* touching this science, not only in Latin, but in Italian also, ("*ut nemo rerum tam gravium ignorantiam simulare possit*,") by which his fame became extended throughout the whole of Europe. This author cited not only the maxims of the Greek and Roman writers as his authorities, but had the assurance to quote the martyrs and the fathers as defenders and practitioners of duelling. He asserted that God himself had sanctioned *the duel* between Cain and Abel.[*] He entered into a serious disquisition as to which of the combatants ought to be held victor, in case one had lost an eye, and the other a nose. He sought out different expedients for saving the honour of a person who died after the challenge, but before the day of contest; but the one to which he gave the preference was this, that a relation should occupy the place of the defunct, to prove that he had not died of fear. As he was a stickler for fighting on equal terms, he contended, that a robust and healthy appellant should be sweated, bled, and purged, till he had attained a degree of gracility and feebleness equal to those of the respondent. If one party wanted an eye, the other must wear a patch; if one was lame, the other must have a leg tied up behind, &c. &c. Pozzo is only one out of an enormous list of similar writers to be found in Ducange. In all of these authors we find *forms of prayer* proper for duels. The combatants uniformly prepared themselves by taking the sacrament. The religious orders attended all duels in pompous array; and their masters, priors, &c. were commonly appointed umpires of the fight. The pernicious influence which all this had upon the manners of Europe is still but too apparent, in the subsistence of a practice which could only have originated in a barbarous and credulous age. The belief in the interference of providence in all duels, (the only apology for duelling that could ever have had a shadow of reason on its side,) is now no more; and we therefore surpass our ancestors in the absurdity of our conduct, in the same proportion that we have the advantage over them in the justice of our opinions.

KNISTENEAUS. See CANADA, and INFANTICIDE.

KNOX, JOHN, the celebrated Scottish reformer, was born in the year 1505, in the village of Gifford, in the county of East Lothian. His father was descended from an ancient and respectable family, who possessed the lands of Knock, Ranferly, and Craigends, in the shire of Renfrew; but the particular period when his paternal ancestors removed from the western to the eastern coast of the kingdom, cannot be exactly ascertained. His parents were so far affluent in their circumstances, as to be able to give their son a liberal education, (which was by no means common in that age); and, after acquiring the principles of the Latin language in the grammar-school of Haddington, he was sent, about the year 1524, to the university of St. Andrew's, at that time the most distinguished seminary in Scotland. The celebrated scholar Buchanan, (by whom he is always mentioned in terms of high respect,) was his contemporary and fellow-student; and their preceptor, John Mair, or Major, professor of philosophy and theology in the university, who had acquired in France more enlightened sentiments, both in ecclesiastical and civil policy, than were generally prevalent in those times, appears to have early inspired these distinguished men with some of the leading principles, which they subsequently matured and advocated in the cause of the Reformation. Knox, in the mean time, applied to the scholastic studies of those days with great success; and, after being created Master of Arts, he taught philosophy (probably as a private lecturer in the university) with extraordinary celebrity. About the same time, he was advanced to clerical orders, and was ordained a priest before he had reached the age (25) which the canons of the church required. His studies, however, soon received a new direction, which led to a complete revolution in his religious sentiments, and future pursuits. Having entered upon a fuller perusal of the ancient authors and earlier fathers of the Christian church, he was attracted by the simplicity of their method of investigating and communicating truth; and was especially engaged by the writings of Jerom, an Augustine, to a closer study of the sacred scriptures, as the only pure fountain of divine knowledge. From this time, (about the year 1535,) he renounced the study of scholastic theology; and was gradually led to a more comprehensive view of evangelical religion; but it does not appear that he professed himself a Protestant before the year 1542.

This change of sentiment first appeared in his philosophical lectures, in which he began to forsake the scholastic path, and to recommend to his pupils a more rational and useful method of study; and the suspicions of heresy which this innovation excited, were soon confirmed by his proceeding to reprehend the corruptions that prevailed in the church. Finding it impossible to remain in safety at St. Andrew's, which was wholly under the power of Cardinal Beatoun, the most determined supporter of the Romish church, he retired to the south of Scotland; and in a short time avowed his full belief of the Protestant doctrines. The cardinal, not satisfied with passing sentence against him as a heretic, and degrading him from the priesthood, hired assassins, says Beza, to waylay him, by whose hands he must have fallen, had he not been taken under the protection of Hugh Douglas of Langniddrie, into whose family he had entered as private tutor to the children; and in whose service he so conducted the religious instruction of his pupils, as to allow the people of the neighbourhood to derive advantage from the lessons.[†] But he was not permitted to continue long in this employment. Hamilton, the successor of Beatoun, sought his life with so much eagerness, that he was obliged to provide for his safety by removing secretly from place to place; and at length, wearied out with such a state of continual apprehension, he came to the resolution of leaving his native country. He was persuaded, however, by the lairds of Langniddrie and Ormiston, to relinquish this design, and to repair, along with their sons, to the castle of St. Andrew's, which was then held, in defiance of the regent, by the conspirators against Cardinal Beatoun, and where a number of persecuted reformers enjoyed the free exercise of their religion. In this place, our reformer conducted the education of his pupils in his usual manner, catechising them in the parish church belonging to the city, and continuing his expositions of scripture in the hearing of all who chose to attend; but he was soon constrained to take a more public part in the promulgation of protestant principles, in consequence of his election to act as colleague with John Rough, preacher to the garrison. His labours were so successful, during the few months that he preached in St. Andrew's, that, besides the garrison in the castle, a great number of the inhabitants of the town renounced popery, and made profession of the protestant faith, by partaking of the Lord's supper after the mode of the reformed churches. After the capitulation of the castle to a French armament in July 1547, Knox was conveyed to France along with the other prisoners; and, in violation of the terms of surrender, was confined on board the galleys, and exposed to all the ordinary rigours of such captivity, with the additional indignities which the Papists were accustomed to heap upon the heads of heretics. In the summer of 1548, when the galleys, in which these sufferers were confined, were stationed on the coast of Scotland, his health was so greatly impaired by the severity of his treatment, that he was seized with a fever, which reduced him to the greatest extremity. But even in this state of depression, his fortitude of mind remained unsubdued, and he comforted his fellow prisoners with the most animating hopes of release. When free from fever, he relieved the tedious hours of captivity by committing to paper a confession of his faith, which he found means to convey to his religious friends in Scotland, accompanied with an earnest exhortation, to persevere undaunted in the faith which they had professed.

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[*] See *Pozz.* lib. i. c. 15. l. 6. c. 21. l. viii. c. 25.

[†] The ruins of the chapel at Langniddrie, in which he publicly catechized his scholars, and expounded to them the scriptures, are still apparent; and the place is popularly denominated *John Knox's Kirk*.

After enduring a severe and tedious imprisonment of nineteen months, he was at length set at liberty, in the month of February, 1549, according to the modern computation; and immediately repaired to England, where he was immediately noticed by the English council, and sent down as a Protestant preacher to Berwick. During the two years that he continued in this place, he gained numerous converts from the errors of Popery; and triumphantly maintained, before Bishop Tonstal of Durham, his charge of idolatry against the sacrifice of the mass. In 1551, he was removed to Newcastle; and, about the end of the same year, was appointed by the privy council one of king Edward's chaplains in ordinary. About this time he was consulted respecting the *Book of Common Prayer*, which was undergoing a revisal; and was employed also in revising the *Articles of Religion*, previously to their ratification by parliament. In this commission he had the influence to procure an important change in the communion office, by completely excluding the notion of the corporeal presence of Christ in the sacrament, and guarding against the adoration of the elements, which was so much countenanced by the practice of kneeling at their reception. About the end of the year 1552, he was summoned to London, in consequence of certain charges against him by the popish faction; but was honourably acquitted by the council, and employed to preach before the court. He acquired much favour with the young king, who first procured for him a presentation to the vacant living of *All-Hallows*, in the city, and afterwards, with the concurrence of the privy council, offered him a bishopric; but he declined both of these promotions, in consequence of his disapproval of many points in the worship and government of the English church. After the accession of Mary, he continued to preach for some time in the southern counties; but was at length reduced to the necessity of seeking safety by flight; and, having procured a vessel through the good offices of his friends, he landed at Dieppe, on the 28th of January, 1554. A short time before his departure from England, he married Miss Margery Bowes, a young lady of honourable family, to whom he had become attached during his first residence at Berwick, but whom he was obliged to leave behind him in that city, with her mother.

One of his first cares, after arriving at Dieppe, was to employ his pen in writing suitable advices to those, whom he could no longer instruct by his sermons or conversation; and, with this view, he transmitted to England a practical exposition of the sixth psalm, and a long letter addressed to his former hearers in London, and other parts of the kingdom. He then travelled through France towards Switzerland, without any settled plans or prospects; and spent some time in conferring with the most eminent divines of the Helvetic churches, by whom he was treated with the most affectionate hospitality. After a short visit to Dieppe, for the purpose of receiving information from England, he repaired to Geneva, where he speedily formed an intimate friendship with Calvin, and fixed his ordinary residence during the continuance of his exile. About the end of the year, he published his *Admonitions to England*; and, though now nearly 50 years of age, applied himself to the study of the Hebrew language, which he had not previously enjoyed any opportunity of acquiring. While thus engaged in the prosecution of his studies at Geneva, and supported principally by remittances from his friends in England and Scotland, he was invited to become one of the pastors of a congregation of English refugees in Frankfort on the Maine, who had been permitted to use the place of worship allotted to the French Protestants in that city, upon condition of their conforming, as much as possible, to the mode of worship used by the French reformers. But a short time after his settlement in that office, Dr. Cox, who had been preceptor to Edward VI. having arrived at Frankfort with some other English exiles, they insisted upon introducing their own liturgy into the congregation; and employed such crafty machinations to render our reformer obnoxious to the German government, that he was obliged again to seek a refuge in Geneva. Soon after his return, he received such information from Scotland, as encouraged him to revisit his native country, where he landed in the month of August, 1555; and, after remaining some time with his wife and her mother at Berwick, he set out secretly to visit the Protestants in Edinburgh. Here he found a number of the reformers assembled from different parts of the country, with whom he continued longer than he had intended, preaching in a private house to successive assemblies with little intermission. He particularly exerted himself, and not without success, to accomplish a formal separation from the Popish church, by persuading the reformers to abstain from attendance on its public rites, to which they had hitherto conformed. He accompanied several of the Protestant gentlemen to their country residences, where he preached almost daily to the neighbouring nobility and gentry; and was, particularly, the guest of Sir James Sandilands, at Calder House—of the Earl of Glencairn, at Finlayston—and of Erskine of Dun, in Angus-shire; where the greater part of the gentlemen of the Mearns made profession of the reformed religion, and entered into a mutual bond, or covenant, for its furtherance and support. In consequence of these proceedings, he was summoned to appear before a convention of the clergy at Edinburgh; whither he repaired, before the day appointed, accompanied by Erskine of Dun, and several other friends of distinction; but his adversaries, afraid to encounter a meeting which they did not expect he would dare to give them, deserted the diet, and left him undisturbed in his daily instructions to large audiences, in the midst of the city. While he was thus employed in Scotland, he received letters from the English congregation at Geneva, urging him to become one of their pastors; and, after visiting his Protestant friends in the different places where he had preached, he repaired to that place, with his wife and mother-in-law, in the month of July, 1556.

Here he spent two of the most peaceful years of his life; and enjoyed all the comforts of literary society, domestic happiness, and ministerial success. All these personal advantages he shewed himself ready to forsake, upon receiving encouraging letters from Scotland; and actually set out, in the autumn of 1557, on his way to that country, when he was met on his journey by such unfavourable accounts, as determined him to remain some time longer on the continent. By his letters, however, and various publications, transmitted to his native country, he greatly contributed to encourage his friends, and to extend the reformed opinions; and, about the end of the year 1558, he received another and more animating invitation from the Protestant lords of Scotland, to join them in their struggle for the religious liberties of the nation. In the beginning of the following year, our reformer took leave of Geneva for the last time; and, having spent some time in France, landed at Leith on the 2d of May.

His arrival struck terror into the hearts of the Popish clergy, who instantly informed the queen-regent of the event, and procured the publication of a sentence of outlawry against him, which had been pronounced after his former departure from the kingdom. He nevertheless hastened, without a moment's hesitation, to present himself voluntarily at Stirling, and to share in the defence and danger of the Protestant preachers, who were summoned to stand trial in that city. On his way, he preached at Perth against the idolatry of the mass, and of image worship; when a priest having imprudently attempted, as soon as the audience was dismissed, to exhibit his images, and celebrate mass, the indignation of the mob was excited, and, in spite of all the exertions of Knox and the other preachers, the ornaments of the church were trampled under foot, and the monasteries of the place laid in ruins. The protestant lords, having resolved to commence publicly the reformed worship wherever their authority extended, invited Knox to meet them at St. Andrew's for this purpose; and there, in defiance of the archbishop's threatening to cause the soldiers to fire upon him in the pulpit, he boldly preached in the cathedral several successive days, and engaged the magistrates and inhabitants harmoniously to abolish the Popish service and ceremonies. Accompanying the forces of the congregation, he soon appeared also in the churches of Edinburgh, where a similar reformation had taken place, and accepted the invitation of the Protestant inhabitants, assembled in the Tolbooth church, to become their minister. Being soon after obliged to leave the metropolis, in consequence of its occupation by the regent's army, he undertook a tour of preaching through the kingdom; and, within less than two months, travelled over the greater part of Scotland, diffusing the knowledge, and strengthening the interests of the Protestant principles wherever he went. He greatly exerted himself, by letters to Secretary Cecil, and even to Queen Elizabeth, to procure assistance from England; and was invited to meet the agents of that court upon the important business. He received their dispatches at Berwick, and hastened to lay them before a meeting of the Protestant leaders at Stirling; whom he was the principal means of urging to such a renewal of their applications, as at length proved successful in securing the powerful support of the English government. The management of this political correspondence devolved, for a time, chiefly upon his hands; but this was a task for which he had no relish, and he expressed great satisfaction when he was relieved from the burden, by the accession of the younger Maitland to the party of the reformers. "His zeal and activity exposed him to the deadly resentment of the Papists and the queen-regent. A reward was publicly offered to any one who should apprehend or assassinate him; and not a few, actuated by hatred or avarice, lay in wait to seize his person. But all this did not deter him from appearing in public, and from travelling through the country, in the discharge of his duty. His exertions at this period were incredibly great. By day he was employed in preaching; by night, in writing letters on public business. He was the soul of the congregation; was always found at the post of danger; and by his presence, his public discourses, and private advices, animated the whole body, and defeated the schemes employed to corrupt and disunite them."

He had a principal share, along with some other ministers, in drawing up the Confession of Faith and First Book of Discipline; and one of the six ministers who assisted in the first General Assembly, in the year 1560. About the close of the year, he sustained a heavy domestic loss by the death of his valuable wife; and, in addition to his other cares, was left with the charge of two young children. By the arrival of Queen Mary, he was called to new vigilance and vigour in support of the reformed cause; and had even been personally denounced by his sovereign as the ringleader of her factious subjects, whom she would not fail to call to a strict account. A few days after her landing, she required his attendance in the palace; and held a long conversation with him, in the presence of her brother the prior of St. Andrew's, apparently with the hope of awing him into submission by her authority, if not of confounding him by her arguments. "The bold freedom, however, with which he replied to all her charges, and vindicated his own conduct, convinced her that the one expectation was not more vain than the other; and the impression which she wished to make on him was left on her own mind." It required all his energy to counteract the influence of her arts upon the Protestant nobles, and to keep alive the zeal of the nation; and some idea of his pulpit-orations may be formed from the words of the English ambassador, who said of him to Cecil, "the voice of one man is able, in an hour, to put more life in us than six hundred trumpets continually blustering in our ears." His influence appears also from his having been frequently employed in "composing differences of a civil nature among the Protestant nobility, and acting as mediator with the town council in behalf of the inhabitants who had incurred their displeasure. In the church of St. Giles, at that time the only place of worship in Edinburgh, he performed all the parts of ministerial duty, with the assistance only of a reader." He preached twice every Sabbath, and thrice on the other days of the week. He met regularly once every week with the kirk-session for discipline, and with the assembly in the neighbourhood for the exercise on the scriptures. He attended, besides, the meetings of the provincial synod and general assembly; and, at almost every meeting of the latter, he received an appointment to visit and preach in some distant part of the country." As he did not indulge in extemporaneous effusions, but devoted a part of every day to study, those labours must have been oppressive to a constitution already much impaired; and on this account the town council, with the approbation of the assembly, appointed the Rev. John Craig, minister of the Canongate, to be his colleague. His public services daily became more extensive and important, and he seemed to fill the office of a Protestant premier in the state, as much as the situation of a Presbyterian pastor in the church. During the rebellion excited by Huntly in 1562, he contributed most essentially by his journies, preaching, and letters, to preserve the southern counties in a state of peace, while the vigorous measures of the council crushed the insurrection in the north. He maintained a public disputation in the course of the same year, in the town of Maybole, against Quintin Kennedy, uncle to the Earl of Cassilis, and Abbot of Crosraguel. He employed all his influence, without success, to induce the Parliament, which met in the summer of 1563, to ratify the treaty made in July 1560, and to secure the establishment of the Protestant religion. Having failed in this object, he laboured to prevent any farther injury to the cause, by publicly protesting against the queen's marriage with any person of popish sentiments, and sustained unmoved all her indignation on account of this interference. He wrote a circular letter, (agreeable to his commission from the church,) to the principal gentlemen of the Protestant persuasion, requesting their presence in Edinburgh to counteract the oppressive measures of Mary against certain individuals, who had insulted her priest at Holyrood-house during her absence. This application was pronounced by the privy-council to be treasonable; and Knox was summoned to stand trial for the offence before an extraordinary convention of the counsellors and other noblemen. In spite of all the artifices employed to prevail upon him to acknowledge his error, and throw himself on the queen's mercy, he boldly determined to encounter the storm; and was triumphantly acquitted of the charge, as well as commended for his demeanour before the court.

In March, 1564, he contracted a second marriage with Margaret Stewart, daughter of Lord Ochiltree, a nobleman of amiable dispositions, who had long been a familiar and stedfast adherent of the reformer. In the same year, he defended, against all the acuteness of Secretary Maitland, in a long conference before the General Assembly, the liberties of the pulpit, and the doctrine of the resistance to wicked and tyrannical rulers; and continuing, in full conformity with his avowed principles, to preach with the utmost freedom in the church of St. Giles, he gave so much offence to the king, (Lord Darnley,) that an attempt was made to inhibit him from preaching as long as their majesties resided in the capital. This was resolutely resisted by the town-council; but after the murder of Rizzio, and the banishment of many of the Protestant lords, he was obliged to withdraw from the violence of the queen's resentment, and embraced this opportunity of paying a visit to his two sons, who had been sent to reside with their mother's relations in England. He endeavoured to render this journey subservient to the great cause which engaged his whole heart, by carrying a letter from the Assembly to the bishops and ministers of England, interceding for lenity to such of their brethren as scrupled to use the sacerdotal dress enjoined by the laws. He returned to his charge about the time of the queen's flight with Bothwell to Dunbar; and was delegated by the General Assembly to repair to the west country, for the purpose of persuading the Hamiltons to join the confederated lords, in settling the distracted affairs of the kingdom. On the 29th of July 1567, he preached the sermon at the coronation of James VI. in the parish church of Stirling; and was among the number of those, who strongly urged the trial of Mary for the alleged murder of her husband, and adulterous connection with Bothwell. He did not fail, at the meeting of parliament at the end of the year, to urge the ratification of all the acts passed in 1560, in favour of the Protestant religion; and was appointed one of the commissioners for drawing out the particular points, which pertained to ecclesiastical jurisdiction, to be presented to next meeting of parliament. "Our reformer had now reached that point, from which he could take a calm and deliberate view of the bustling scene through which he had passed, and of the arduous struggle, which he had been so long engaged in, and which he had at length brought to a happy termination."—"He now congratulated himself on the prospect of being released from all burden of public affairs, and of spending the remainder of his days in religious meditation."—"He even secretly cherished the wish of resigning his charge in Edinburgh, and of retiring to that privacy, from which he had been drawn at the commencement of the Scottish reformation." But he had yet to undergo farther trials of a public nature, and to see the security of the reformed religion endangered, and the peace of his country disturbed, by a civil war among the Protestants themselves. It is impossible to describe the anguish which he experienced at the assassination of the good regent Murray; and the grief, which he indulged on account of this mournful event, preyed so deeply on his spirits, as to inflict a serious injury on his health. In the month of October 1570, he had a stroke of apoplexy, which affected his speech to a considerable degree; and, though in a few days he was able to resume his duty of preaching, he never recovered from the debility produced by the attack. But, though so much weakened in body, that he never went abroad except on Sabbath days to the pulpit; yet, whenever he saw the welfare of the church and commonwealth threatened, he entered into the cause with all the keenness of his more vigorous days.

His situation became very critical in April 1571, when Kirkcaldy, the governor of Edinburgh Castle, who had gone over to the queen's party, received the Hamiltons into the garrison; and their inveteracy against him was so great, that his friends were obliged to watch his house during the night. Intimations were often given him of threatenings against his life; and, one evening, a musket ball was fired into the window of the apartment in which he was sitting. At the earnest entreaties of his friends, who declared their determination, if he should be attacked, to shed their blood in his defence, he reluctantly withdrew to St. Andrew's; where he continued with undiminished boldness to denounce the enemies of the reformed faith, and to withstand the encroachments made by its false friends upon the polity and revenues of the church. "While he was engaged in these contests, his bodily strength was every day sensibly decaying; yet he continued to preach, although unable to walk to the pulpit without assistance; and when warmed with his subject, he forgot his weakness, and electrified the audience with his eloquence." During his stay at St. Andrew's, he published a vindication of the reformed religion, in answer to a letter written to a Scots Jesuit, called Tyrie; and seemed to have intended this work as a dying testimony to the truth, which he had long taught and defended. From the rapid decline of his health, in spring 1572, there was every appearance of his ending his days at St. Andrew's; but, in consequence of a cessation of hostilities, he was invited to resume his charge at Edinburgh, where he arrived about the end of August, and continued his public labours till the 9th of November following. On that day, he presided at the installation of Mr. Lawson as his colleague and successor, and never again left his own house. On the 11th of the same month, he was seized with a severe cough, which greatly affected his breathing; but was able to see and address his friends till within a few hours of his death. Persons of every rank came in great numbers to visit him during his illness, none of whom he suffered to go away without exhortations, which he uttered with such variety and suitableness, as astonished those who waited on him. He expired on the 24th day of November, 1572, in the 67th year of his age, exhausted by his extraordinary labours of body and anxieties of mind, rather than worn down by the number of his years. He was interred in the church-yard of St. Giles, (now the area of the Parliament square;) and his funeral was attended by Morton, the newly-elected regent, by all the nobility who were in the city, and by a great concourse of people. When his body was laid in the grave, the regent emphatically pronounced his eulogium in the well-known words, "there lies he, who never feared the face of man."

This eminent reformer was possessed, unquestionably, of strong natural talents; and, notwithstanding his many disadvantages, was a stranger to none of the branches of learning cultivated in that age by persons of his profession. He united, in a high degree, the love of study with a disposition to active employment. A desire to propagate the reformed tenets, and to deliver his countrymen from the delusions of popery, was his ruling passion. An ardent attachment to civil liberty held the next place in his breast; and he laboured to advance these great objects with a zeal of the most disinterested kind. His integrity was above the suspicion of corruption; and his firmness was proof equally against the solicitation of friends, and the threats of enemies. His impetuosity frequently exposed him to danger; but he never neglected the precautions of prudence. He discharged his ministerial functions with the greatest assiduity, fidelity, and fervour; and no avocation or infirmity prevented him from appearing in the pulpit. He lived in the utmost cordiality with his brethren in the ministry; and there is no record of his having had the slightest variance with any of his colleagues. In private life, he was both beloved and revered by his friends and domestics. When free from melancholy depressions, to which he was subject, and the morose influence of which he often lamented, he used to indulge among his acquaintances in innocent recreations, and in sallies of humour; to which, notwithstanding the gravity of his general deportment, he had naturally a strong propensity. Although, in the course of his public life, the severer virtues of his character were most frequently called into action, yet repeated instances of acute sensibility occur in his history; and the unaffected tenderness, which occasionally breaks forth in his private letters, shews that he was no stranger to "all the charities" of human life. Most of his faults may be traced to his natural temperament, and to the character of the age and country in which he lived. His passions were strong; he felt the utmost keenness on every subject which interested him; and as he felt, so he expressed himself, without disguise and without affectation. But he protested, in his last sickness, that, in his sharpest rebukes, he was influenced by hatred of vice, not of the vicious; that his great aim was to reclaim the guilty; and that, in using the means which were necessary for this end, he frequently did violence to his own feelings. He was austere, not unfeeling; stern, not savage; vehement, not vindictive. "Those very qualities which now render his character less amiable, fitted him to be the instrument of Providence for advancing the Reformation among a fierce people; and enabled him to face danger, and surmount opposition, from which a person of a more gentle spirit would have been apt to shrink back." (Robertson's *History of Scotland.*) He bore a striking resemblance to Luther in personal intrepidity and popular eloquence; to Calvin, in his religious sentiments, severity of manners, and an impressive air of melancholy; to Zuinglius, in his ardent attachment to the principles of civil liberty, and in his exertions to advance, at the same time, the reformation of the church, and the political welfare of the people; and though not, perhaps, equal in all respects to any of those eminent characters, is well entitled to be ranked next to them in honour, whether we consider the talents with which he was endowed, or the important services which he performed.

In this article, we have attempted nothing more than to abridge, (as far as our limits would admit, and as nearly as possible in the words of the author,) the able and accurate life of the reformer by Dr. M'Crie; and content ourselves with referring to that standard-work alone, both for farther details on the subject, and for the fullest notices of the most authentic sources of original information. (*g*)

KNOXVILLE. See TENESSEE.

KNUTSFORD is a town of England, in Cheshire. It is pleasantly situated on the banks of a small stream, called Birken, which divides it into two parts, called High Knutsford and Low Knutsford. The town contains several good houses, and has a handsome modern church, with a very fine organ. The town is supposed to derive its name from Canute's ford, as that king forded the river here after having obtained a victory in the neighbourhood. Races are held annually in the vicinity; and at that season the town is crowded with company. There are extensive cotton works in the town, and a silk mill, in imitation of the one at Stockport. Shag velvets, and the best sewing threads, are also manufactured. The flax, from which the thread is manufactured, is brought principally from Ireland, Russia, and Hamburgh. The two townships of Upper and Lower Knutsford contained, in 1811, 497 houses, 529 families, 318 families employed in trade and manufactures, and 2357 inhabitants. See the *Beauties of England and Wales*, vol. ii. p. 286.

KOANG-TON. See CHINA.

KOAN-SEE. See CHINA.

KOEI-TCHEEO. See CHINA.

KOLIVAN, or KOLHYVAN, is a village of Russia, situated on the rivulet Bielaia, in the district of Kusnetz. The silver mines, for which it is principally celebrated, lie between the rivers Oby and Irtish, near the mountains which separate Siberia from China. They were discovered in 1728, by Akinfi Nikitich Demidof; and were for several years wrought as copper mines for his own private benefit. The secret was concealed till the year 1743, when he made the discovery to the Empress Elizabeth, who appropriated them to the crown. These mines are situated near Voskeresensk, in the Mountain of Serpents; and receive the name of Kolyva Mines, because the ore was formerly smelted at that village. From the scarcity of wood, however, about Kolyva, new founderies have been erected at Barnaul, Novopaulofsk, and Susunsk, to the north-east of Kolyva. The following is a state of the produce of the mines at different periods:

	General Produce in Pounds of Silver.
Years between 1749 and 1762	8,000 to 16,000
. . . . . 1763 . 1769	20,000 . 32.000
. . . . . 1769 . 1778	40,000 . 48 000
Since 1771	44 000 of silver, and 1,200 of gold.

The total produce, up to the year 1771, amounted to 400,000 lbs. of silver, and 12,720 of gold. The silver contains above 3 per cent. of gold.

No fewer than 40,000 colonists are employed in the mines and foundries of Kolyva. The silver melted in the foundries, is carried twice a year to St. Petersburgh on large sledges. East Long. 81° 20′, North Lat. 54° 20′. See Coxe's *Travels in Russia*, vol. iii. p. 360; and ALTAI MOUNTAINS.

KOLYMA, or KOVIMA, a great river of Siberia, which rises in the Virchayansky chain of mountains, and falls into the Frozen Ocean after a course exceeding 1200 miles.

The Kolyma is frozen over about the 20th of September, and the ice breaks up about the 24th of May, when it deluges all the low country; nor do its waters retreat within their proper boundaries before the end of June. The cold is then excessive, the thermometer falls to from 60° to 70° below zero; Mercury itself freezes. It becomes almost impossible to fell timber, for the hatchets break like glass. The ice on the river, and the timber of the houses, crack with a report resembling that of a musket. On the approach of thaw, the river, in little more than a week, rises 27 feet of perpendicular height. The face of the country is like an immense lake, and only the tops of some of the trees are visible above the water: The river now becomes navigable.

Near the source of the Kolyma there are three huts, and a storehouse for preserving provisions belonging to government; and barks are constructed there for conveying them down the stream. Several Russian stations also stand along its banks. Virchni, or the upper Ostrog, about the middle of this river, is situated on the Yasashnoi, a mile from its discharge into the Kolyma. The most northern station is called Nischney Kolymsk, situated on an island in Lat. 68° 17′ N. and Long. 163° 17′ E. It consists of a church, 70 houses, and a fort, enclosed in a square of palisades 8 feet high. Another station, called Seredni Kolyma, of 15 houses of Russians, and a church, stands in Lat. 67° 10′ N., and Long. 157° 10′ E. About 40 miles below the former, the river divides into two channels, and falls into the ocean in Lat. 69° 16′ W., and Long. 166° 10′ E., its course being N. E. in general from the source. Between Seredni Kolyma, and Nischney Kolyma, a distance of 306 miles, the eastern banks are uniformly mountainous, affording porphyry, agates, jasper, and crystals. The western banks are low. The most remarkable fossils found here are the tusks of the mammoth, which lie at a considerable depth in the high sandy shores of the river, and on the margin of the Frozen Ocean. They are exposed by the washing of the spring floods; and it does not appear singular that they are buried so deep, as the flood every spring leaves immense quantities of earth and sand, which perhaps accumulates to the depth of two or three inches among the bushes. The tusks are equal in whiteness and beauty to those of the elephant, but of a different figure.

This river contains a considerable variety of fish, few of which ascend higher than about half way to the source. Great shoals of salmon ascend in September, and depart shortly after the river closes. Some of the others are common in the European rivers. Numbers are caught with the sein in summer, and by means of other expedients in winter.

KONGSBERG, or CONISBERG, is a town of Norway which is traversed by the river Lowe. It is chiefly celebrated for its silver mines, which are about two miles distant from the town. No fewer than 36 mines were working when Mr. Coxe visited them. The deepest, called Segent Gottes in der Nord, is 652 feet perpendicular. In 1769, these mines produced 79,000*l.*; but when Mr. Coxe visited them, they produced from 50,000*l.* to 54,000*l.* About 2500 men were then employed. Kongsberg contains 1000 houses, and 6000 inhabitants. See Coxe's *Travels in Norway, &c.* vol. v. p. 33, 34. See also NORWAY.

KONIGSBERG, or KROLEWIECZ, in the Polish language, is a city and seaport town of Prussia, situated on the river Pregel, which flows into the Frische-Haf, and is crossed with seven bridges. It was founded in the year 1255, and was rebuilt on another site in 1264. Konigsberg is composed of 4 towns, and 16 suburbs, and is surrounded by a rampart about seven English miles in circumference. Aldstadt, or the Old Town, contains 16 streets, and 550 houses, of which about 100 are breweries and malthouses. It has six gates, four bridges, and two well built towers. Newstadt, or Lobenicht, was built in the year 1300, and Kneiphof was founded in 1324. This last part of Konigsberg is situated on an island formed by the Pregel, and the houses stand on piles made of the alder tree, which has become as hard as iron from remaining long in the earth. It contains 13 streets, and 5 large gates. The principal public buildings and curiosities at Konigsberg are, the chateau; the arsenal, (containing the Muscovite saloon, and the octagonal table, valued at 40,000 rix-dollars;) the gardens, stables, and mint, belonging to the arsenal; the parish church of St. Nicholas; the hotel de ville, where the magistrates of the three towns, who were incorporated in 1724, hold their meetings; the Junkerhof, the church of Rossgarte; the widows' and orphans' hospital; the cathedral, containing the tombs of the margraves and the grand masters, and also an organ, which has more than 5000 pipes, and which was completed in 1721; the Albertine college; the church of Haberberg, which is the finest in Konigsberg; the exchange; the hotel de ville of Kneiphof; the citadel; the palace of Kayserling; and the anatomical theatre. The university of this place was founded by the Margrave Albert, in 1544. It has 38 professors, exclusive of tutors, and in 1802 it contained 300 students. There is also the lyceum of Frederic William, and the German Society. The citadel, which is called Fredericksburg, was erected in 1657, at the conflux of the two branches of the Pregel. It is a regular square, surrounded with broad ditches and the river Pregel. The principal collection of cabinets in the town are, the royal library: the collection of antiquities and yellow amber at the chateau; the library at Wallenroth; the university library; and the town library.

The chief manufactures of Konigsberg are woollen stuffs, flannels, stockings, ribbons, Danish gloves, sailcloth, wax, soap, English pottery, and works of yellow amber, which amounted, in 1776, to 977,639 crowns. There are here no fewer than 224 breweries of beer, 135 distillers of brandy, and 80 turners of yellow amber.

Konigsberg, which was formerly one of the Hanse towns, has always carried on a thriving commerce. Vessels, which draw more than eight feet of water, cannot ascend the Pregel, and remain at Pillau, which is the port of Konigsberg. On the other side, this town communicates with Poland by the Niemen, by means of a canal. Large Polish barks, called *wittinnes*, carry to Konigsberg grain, hides, skins, oak, and fir timber. About 600 or 700 ships arrive here annually from the Baltic, and almost as many set out.

Konigsberg contains about 4308 houses, and 54,000 inhabitants. East Long. 20° 29′ 15″, North Lat. 54° 42′ 12″.

KOOM is a city of Persia, in the province of Irak. It is supposed by D'Anville to be the ancient *Choana*; and was built in the year of the Hegira 203, out of the ruins of seven towns, which formed a small sovereignty. The Arabian prince, to whom it belonged, having been overthrown, the inhabitants of the seven towns founded the city of Koom, which was divided into seven parts, each of which received the name of one of the towns. Koom is situated on an extensive plain, and on the banks of a small river, which is absorbed in the Great Salt Desert, and was long celebrated for its manufactures of silk. In 1722, this city was destroyed by the Afghans. A part of it has since been rebuilt, but it still resembles a vast ruin. The principal public building is a beautiful college, with a celebrated mosque and sanctuary, erected in memory of Sidi Fatima, the daughter of Iman Reza, and grand-daughter of Mahomet. The tombs of Sefi the First, and Shah Abbas the Second, are still in the mosque, and are frequented by pilgrims from all parts of Asia. The public squares of Koom are small. The walls are lofty, with seven gates. The bazar crosses the town, from one gate to the other. In the time of Chardin, the chief manufactures were white earthen-ware, soap, sword-blades, sabres, and poniards; and the number of houses was 15,000. Its lofty dome has been gilt at the expence of the king. East Long. 50° 29′, North Lat. 34° 45′. See Chardin's *Travels*; and Macdonald Kinneir's *Geographical Memoir of the Persian Empire*, p. 116.

KRAKEN is the name of a fabulous animal, which has been described by Bishop Pontoppidan in his *Natural History of Norway*. Under the head of *Sea* Serpents, we shall have occasion to discuss this curious subject.

KRISHNA. See India.

KUMISS is the name of a beverage made of fermented mare's milk, and originally used by the Tartars. A full account of the process of making it may be found in the *Edinburgh Philosophical Transactions*, vol. i. p. 181. It is prepared nearly in a similar way in Orkney and Shetland. See also Pallas' *Travels*; and Clarke's *Travels*, vol. i. An account of this beverage, and the method of manufacturing it among the Calmucks, will be found in our article Calmucks.

KUR, or Cyrus, is a celebrated river of Asia, which rises a little to the west of the town of Khars, in Armenia, and falls into the Caspian Sea. It has been written Cyrnus, Cyrtus, Kyrus, Kyrros, Koros, and Koro, of old. At present it is called Mtkwari by the Georgians, and Kor, Kur, Kourr, or Kourra; but all these varieties generally subside into Kur, or Cyrus. According to Reineggs, the source of the river is a number of springs situated twelve miles south-west of the Turkish city, Aghalzighe, or Akiske; and, after enlargement by several streams, its course is due north, until passing this city and Borgami, in Upper Kartel, it turns eastward through the plain interposed between the southern Caucasian mountains and the most northern range of Ararat; where, meeting the mountains which divide Georgia from Shirvan, the river takes a southern direction, and twenty miles from the Caspian sea divides itself into numerous branches, by the mouths of which it is disembogued below Sallian.

The Kur, in general, is yellowish and turbid, owing to the quantity of calcareous matter which it holds in solution. Its course, for the most part, is tranquil, but rapid, and flowing between banks so steep in some places, that, it is remarked, a traveller may journey "for hours without the possibility of quenching his thirst in summer, though the river be constantly before his eyes, if not provided with a leathern drinking flask, and a long cord, to draw up the water." It receives numerous tributary streams, as the Aragwi, 25 miles above Teflis, whose intermixture imparts a greenish hue for a certain space, the Ktsai, Alasan, and chiefly the Araxes. After the union of this celebrated stream, about 66 miles from its mouth, the Kur enlarges to the breadth of 140 yards, and is navigable to the Caspian. Higher up it is also navigable for part of its course to Teflis, by means of rafts, whereby various commodities are carried from the fertile domain of Mughran. But this mode of conveyance is dangerous, and productive of frequent accidents. At the mouth a very profitable fishery is carried on by the Russians, but there are comparatively few fish here, and in most of the other rivers in the country, owing to their rapidity. From their scarcity in the Kur at Teflis, where it is rapid, the Georgians are said to to call it *Myuinari*, or the *Blind*.

The banks of the Kur are partly covered with forests, wherein the vine is uncommonly plentiful, together with various other fruits; but towards its mouth there is a great barren plain, whole districts of which are overspread with dwarf marine plants, from which soda is extracted. Here the tortoise is seen, and is supposed to live on snakes. It has been affirmed, that these reptiles are in such abundance on the right bank, both of the Kur and Araxes, as to preclude a passage across the plain of Mogan. But this prejudice, which even enlightened persons entertain, is as ancient as the days of Plutarch, who relates, that Pompey was prevented from marching down by the Kur to the Caspian sea, on account of the number of serpents. The panther repairs to the banks of the river from Ghilan, taking refuge where they are covered with reeds and underwood. The wild boar inhabits the marshes at its mouth; while the lynx and hyæna are sometimes seen in the neighbourhood. Jackals are numerous, and the forests are full of deer. The Caucasian pheasant is frequent among the bushes; and the francolin in low and reedy places.

The Kur, in its course, passes several celebrated towns and fortresses, as Aghalzighe, on which the Russians some time ago made an unsuccessful attempt, and a little below which it traverses a narrow ridge called Bedreh, defended by a castle on each side.—Tsgetta stands at the union of the Aragwi, where the Kur is crossed by a bridge; and it intersects Teflis, the capital of Georgia.—Sallian, near the mouth of the river, is denominated a city, though composed only of several villages. Thus it appears, that the whole course of the Kur, from its source to the efflux, is through the kingdom of Georgia, and the province of Shirvan. But the source not being many miles from the eastern shores of the Black Sea, a plan is said to have been entertained by Seleucus Nicator, of uniting the latter with the Caspian. As canal navigation, of late years, has been carried to a great and beneficial extent, this project was revived some time ago. It was proposed to unite the river Tscharuck, which flows into the Black Sea, with the Kur, as their respective sources are not far asunder, by means of a navigable canal. However, all projectors seem to have overlooked, that the two rivers are separated by a chain of mountains—that the Tscharulk is scarcely navigable in any part—and that the Kur is not nearly so throughout.

Plutarch relates, that Pompey, who forded the Kur in one place, conveyed his army across it at another on 10,000 skins. This plan of crossing rivers is not abandoned in the East. The Arabs, dwelling on the banks of the Tigris and Euphrates, support themselves on inflated skins, in which manner whole families may be seen floating. The celebrated Persian usurper, Nadir Shah, provided a number of inflated skins, on which were laid planks, or other materials, whereby his armies crossed in their march to India. Tamerlane was enabled to pass the Kur along with his army, on a bridge formed of branches and reeds. (*c*)

KURDISTAN. See Curdistan.

KURILE Islands, is a chain of islands extending between Cape Lopatka, the most southern point of Kamtschatka, and Jesso, which several geographers have considered as belonging to them. The total number is unknown. Names are given by the Russians to 25. A Japanese author, who lived about a century ago, says there are 37, and of these he specifies 32. Instead of proper names, however, they are usually distinguished by numbers, as *first*, *second*, *third*, proceeding from the north. These islands are of unequal dimensions, but their exact extent is no where laid down. Sumscku, the first, is said to be about 33 miles in length and 20 in breadth: Porumuschir, the next, double that size, and some still larger; but several are only barren rocks, almost level with the surface of the water. Navigation is exceedingly dangerous, both from prevalent fogs, and the force of currents running among the islands. The channel between Cape Lopatka is specially prohibited to vessels, on account of the hazards attending its passage, and the frequent shipwrecks. Krusenstern affirms, that the widest channel, which he calls the Straits of Nadeshda, between the islands Raukoke and Mataua, is 16 miles across, and free of all danger.

Nothing is known of the mineralogy of this chain, which is supposed to present the summits of so many submarine mountains. Some are volcanic, and violent earthquakes have been witnessed. The islands are, in general, hilly, with steep and precipitous shores; and ranges of naked mountains appear in the interior. Several of them contain small lakes, and rivers stored with fresh water fish.

Wood is in general scarce, or low and stunted; and many of the islands are entirely destitute of it. There seems to be scarcely any cultivation, most probably because the climate is unfavourable. Wild roots, such as the inhabitants of the north are accustomed to subsist upon, are common; and certain islands are visited, chiefly for the purpose of obtaining them, and of catching foxes or bears.

According to information communicated to La Perouse, none were inhabited in 1787, excepting the first, second, thirteenth, and fourteenth; and the natives of the thirteenth always wintered on the last. The total number of inhabitants on the whole did not exceed 1400. They were tributary to the Russians, who had exempted them from tribute since 1777, owing to the scarcity of sea otters. The Russians claim dominion over the northern, and the Japanese over the southern islands.

The natives of the Kurile islands are of low stature, and swarthy complexion: those towards the north are said to resemble the Kamtschadales; but towards the southern limits of the chain, they are distinguished by remarkably thick beards; and all the body is covered by an unusual profusion of hair. Sarytchew remarks, that they are named *hairy Kurilians*, and that it is difficult to ascertain their origin, "as scarcely any people in this quarter, either Chinese or Japanese, or in fact any other northern nation of the Asiatic shores, except the Gilaks, near the mouth of the Amur, have any beard." The men shave part of the head, but the women only cut part of the hair in front. The lips of the former are stained in the middle; those of the latter are entirely blackened, and their arms are stained or tattooed as high as the elbows. They dress in the skins of birds and quadrupeds, which are patched together, regardless of uniformity; and the costume of both sexes is nearly alike. Cloth, serge, or silk, especially if scarlet, is extremely acceptable; and pieces of foreign manufacture are intermixed with what composes their attire. Their language is soft and harmonious. They speak in a mild and agreeable accent, slowly and distinctly.

The Kurilians derive their subsistence chiefly from the capture of wild animals and fish, though less than some neighbouring nations from the latter; and they dig roots from the earth, but are little acquainted with agriculture. Their habitations are excavated in the ground, and the floor and sides are covered with mattings of grass. Owing to the scarcity of wood in the islands, what is drifted ashore from more distant countries is employed; and the wealthier inhabitants build houses, which are supported on four posts, and furnished with articles from Japan. A man marries two or three wives, with each of whom he has had a previous intrigue, and with whom, apparently, he does not reside during the day afterwards. Parturition is said to be uncommonly difficult among the women: and should there be twins, one is destroyed. In case of adultery, the offended husband challenges the paramour to a combat with a club, which is interchanged between them, and three blows alternately dealt out until the one or other falls. If the husband declines to offer this perilous encounter, the price of his honour may be satisfied in clothes, furs, provisions, or other commodities.

The Kurilians are principally Pagans. They worship idols; to which they sometimes sacrifice the skin of the first animal they kill, while they themselves eat its flesh. On changing their huts, the skin and the idol are both left there. But when undertaking dangerous voyages, the idol is carried with them, and, in the event of imminent hazard, is thrown into the sea. They are also accustomed to throw chips among the waves as an offering, when they attempt a passage of the channel which separates the first island from Cape Lopatka.

These people enjoy a favourable character: They are hospitable, honest, and inoffensive, and entertain a high respect for old age. Strangers from other islands are received with great demonstrations of ceremony and affability combined. Their arrival is awaited on the shore, and they are conducted to the huts, where they are entertained after the best manner of the host, who stands listening to the adventures of his guests. The narrative sometimes continues two hours; and, when completed, the eldest among the islanders—as this task, or rather privilege, always belongs to seniority—begins a corresponding relation of what has occurred to himself and his friends. Previous to the fulfilment of the ceremonial, no conversation takes place among the others. Notwithstanding the mildness of their disposition, suicide is not rare.

Trade, or manufactures, can hardly be said to be practised here. Nettles are made into stuffs, which are sold to the Japanese, who, together with the Russians, are the only nations visiting the Kuriles. According to the eastern author, above referred to, a traffic was carried on from Jesso, with one of them which he calls Kitat-Soeb, and entirely by barter, as the inhabitants came down from the mountains to the coast, to exchange skins, stuffs, and cloths, for rice, salt, tobacco, and other commodities. Of later years, however, the Japanese seem to have made permanent establishments on some of the islands. The Russian embassy to Japan having experienced a contumelious reception at that island, resented it, by an attack on the Kuriles. After returning to Kamtschatka, two armed vessels were dispatched from thence in 1807, which soon reached the settlements. The Japanese made a shew of resistance with their bows and arrows, but speedily fled, leaving their habitations and magazines at the mercy of the invaders. Here were found cannon, and arms of different kinds; also beautiful lacquered utensils, books, and maps, together with a large provision of rice, salt, and tobacco. The Russians returned with considerable booty, among which were many interesting objects, that they had fruitlessly endeavoured to gain a knowledge of during their residence in Japan. Although the Russian merchants have resorted to the Kurile islands for a considerable time, little advantage, either commercial or scientific, has resulted from their visits. (*c*)

KUZISTAN, or the ancient *Susiana*, is a province of Persia, bounded on the south by the Persian Gulf; on the south-west, by the Tigris and the Shat-ul-Arab; on the north-west, by the dominions of the pacha of Bagdad; and on the east, by the river Tab, which separates it from Fars. This province is divided into the territories of Chab Sheikh, and those which form the government of Shuster.

The Chab territories extend from the banks of the Tab to the conflux of the Karoon and the Abzal, and from the shore of the Persian Gulf to a range of hills which skirt the valley of Ram Hormuz to the south. The rivers which water this part, are the Karoon, the Tab, and the Jerahi.

[illegible] eater part of it consists of extensive morasses and [illegible] es. The most fertile spots are in the neigh- [illegible] Dorak, the capital, and on the banks of the [illegible] the Shat-ul-Arab, where alone rice and dates are [illegible] d. Wheat and barley are grown in small quantities. The northern and western parts of the country afford [illegible] good pasturage.

The Karoon, supposed by D'Anville to be the ancient Choaspes, is a noble river, in many parts more than three hundred yards in breadth, and navigable for boats of 25 tons burthen as far as Kishtibund, four miles from Shuster. The chief towns of this part of the province, are Dorak, or Felahi, Ahwaz, Endian, Mashoor, Goban, and Jerahi. Felahi stands on low marshy ground, on two of the branches of the Jerahi. Its mud walls, which are about 16 feet thick, are nearly two miles in circumference, and are flanked at regular intervals with round towers. The population, which amounts to about 8000, live in the suburbs, under the shade of the date trees. Its principal trade consists in the manufacture of the *abba*, or Arabian cloak, which is exported in great quantities all over Persia and Arabia.

Ahwaz, once a flourishing city, is now a wretched town of 600 or 700 inhabitants. It stands on the banks of the Karoon. An old bridge, and a palace, are the principal remains of the ancient city. There are some extraordinary excavations in the rocks.

Endian, situated in North Lat. 30° 18′, is divided into two parts by the Tab, and is nearly two miles in circumference. It trades with Bassorah and Bebahan, and has a population of between 4000 and 5000 souls.

Mashoor, situated half way between Endian and Dorak, is about two miles from the sea. It has a population of about 700, who trade with Bassorah and the Arabian coast.

The revenues of the chab are about *L.*50,000 Sterling per annum. He can bring into the field an army of 5000 horse, and 20,000 foot.

The other part of Kuzistan, which is attached to the government of Shuster, is the best part of the province. It is fertilized by four noble rivers, namely, the Karoon, the Abzal, the Kerah, or Haweesa, and the ancient Gyndes. The principal towns, are Shuster, the capital, (see the article SHUSTER,) Dezphoul, Shus, and Haweeza. Shuster contains nearly 15,000 inhabitants. Dezphoul contains nearly the same number. It stands in a spacious plain, on the east bank of the Abzal. The principal building is a handsome bridge of 22 arches, 450 paces long, 40 high, and 20 broad. The ruins of Shus extend over a surface of about twelve miles. They consist of hillocks of earth and rubbish, covered with broken pieces of brick and coloured tile. The largest of these mounds is about 100 feet high, and a mile in circuit. They resemble the pyramids of Babylon. Major Rennel regards these ruins as the remains of the celebrated city of Susa, while Dr. Vincent considers Shuster as occupying the site of Susa.

Kuzistan possesses a healthy climate; and Shuster is the resort of invalids from the surrounding territories. In summer its inhabitants avoid the excessive heats, by taking refuge in subterraneous chambers during the day, and spending the night on the flat roofs of their houses. Periodical rains prevail from December to the end of March. Two crops of grain are obtained in the year. Indigo is cultivated near Dezphoul; and excellent opium is extracted from poppies, which grow near Shuster. See Macdonald Kinneir's *Geographical Memoir of the Persian Empire*, p. 85.

L.

LAALAND is an island of Denmark, remarkable for its fertility. It produces all sorts of grain; and considerable quantities of wheat are exported from it to Copenhagen, and other parts of Denmark. It is, however, low, marshy, and insalubrious. The principal towns are, Naskow, the capital, which is walled, and has a considerable trade, with a rich hospital, and a good harbour; Mariebow, situated on a lake near the middle of the island; Nysted, on the south-east coast; and Saxkioping, on the north-east part of the island. See DENMARK.

LABORATORY is a place furnished with all the various kinds of chemical apparatus. An account of the different instruments and apparatus used in experimental chemistry, will be found in our article CHEMISTRY.

LABDANUM, or LADANUM, is a resinous substance, which oozes from the leaves of the *cistus creticus*, or *ladanifera*. An account of this gum has already been given in our articles CANDIA and CHEMISTRY. See also Milburn's *Oriental Commerce*, vol. i. p. 158.

LABOUR. See MIDWIFERY.

LABRADOR, a large peninsula about 850 miles square, lying between 50° and 60° of North Lat. and 55° and 71½° of West Long. from Greenwich. It is bounded on the south by Canada and the Gulf of St. Lawrence; on the east by the Atlantic Ocean; on the north by Hudson's Straits; and on the west by Hudson's Bay. It was discovered in 1496, by the Portuguese, and named Terra de Labrador, or "ploughman's land," a designation to which it seems to have very little title. It is frequently called also New Britain; and its western coast is generally denominated the East Main, by the Hudson's Bay settlers. The whole of this vast tract of country, as far as it has hitherto been explored, is extremely barren and dreary, the surface every where uneven, and covered with large stones; the mountains devoid of herbage, and producing at best a little moss, or a few blighted shrubs; the vallies, in some places, full of low crooked trees of the pine and birch species. The southern parts present some appearance of soil capable of cultivation; and in some of the deep bays a little timber may be found. The native plants are, wild celery, scurvy-grass, reddocks, and Indian sallad. The prevailing aspect of the whole region is a heap of bare and frightful rocks. The highest mountains extend along the eastern coast, from latitude 54° to latitude 59° or 60°; but their elevation does not appear any where to exceed 3000 feet. There are vast chains of lakes and ponds throughout the country, produced by the rains and melting of the snow; but springs are extremely rare. There are several streams, which empty themselves into the sea; but they are not deserving of the name of rivers, and are nothing more than drains from the lakes and ponds of the interior, running on a bed of solid rock, sometimes broad, but rarely of any depth. The climate is remarkably rigorous; and the winter lasts about nine months, from the middle of September to the middle of July. But, on this point, the following extract from a meteorological journal of the weather at Nain, in 57° of north latitude, will afford the most accurate information, as far as regards the state of the thermometer.

	Months.	Highest.	Lowest.	Mean.
1777.	August	76° 0′	36° 0′	52° 3′
	September	72 0	27 0	43 6
	October	51 0	12 0	30 2
	November	41 0	8 0	15 4
	December	31 0	26 0	10 3
1778.	January	18 0	30 0	12 2
	February	32 0	27 0	10 7
	March	27 0	25 0	4 3
	April	49 0	8 0	27 1
	May	68 0	29 0	39 0
	June	77 0	33 0	45 0
	July	82 0	34 0	51 0
	August	74 0	40 0	52 5
	September	69 0	34 0	43 5
			Mean of all	32 6

Of the mineralogy* of Labrador very little is known; and the only subterranean productions hitherto discovered, are a little iron ore, granite, hornblende, limestone, lapis ollaris, hæmatite, and the beautiful shining spar, called the Labrador stone. This last mentioned substance was discovered by the Moravian missionaries in sailing over the lakes, where its bright hues were reflected from the water; and is supposed to be the same article, which some of the early navigators brought from the coast as a specimen of gold ore. Its native rocks have not been discovered, but it is collected by the Esquimaux on the shores of the sea and lakes.

The animals of this country are neither very numerous nor various. Rein-deer, whose venison is excellent, are tolerably abundant. Black and white bears are frequently seen in considerable numbers, especially where the fish, being retarded in their progress by the cataracts, are found collected in one place. Wolves, foxes, carkashew, mountain cats, martins, beavers, otters, hares, a few ermines, and plenty of porcupines, are the principal quadrupeds met with in this dreary region. The more permanent feathered inhabitants, are eagles, hawks, horned owls, the red game, and a smaller species, called the spruce partridge. Many migratory birds frequent the woods and lakes in summer and autumn, and some of the smaller sort are remarkable for their beautiful plumage; but, after the breeding season is past, they seek a happier climate before the approach of winter. The curlews are extremely abundant, and well grown, and excellent for eating. The sea fowl are remarkably numerous, especially in the little islands which lie along the eastern coast. The most prevailing kinds of fish on the coast, are whales, cod, and salmon, with a very few shell fish. There are no venomous insects or reptiles in the country; but the myriads of small flies in the warmer months are exceedingly tormenting.

Labrador is very thinly inhabited, and the natives are a miserable and diminutive race. They consist of various tribes, who are perpetually at war with each other, and may be divided into two general classes; the mountaineers, who inhabit the inland districts; and the Esquimaux, who occupy the sea coasts. The former resemble greatly the Hudson's Bay Indians; and those of them who frequent the southern parts of Labrador carry on a regular intercourse with the Canadian traders. They are of a low stature, and have very small limbs; but are of a robust constitution, and capable of enduring the greatest fatigues in travelling. They travel chiefly by means of canoes, covered with the rind of birch, which are sufficiently large to contain a whole family, with their articles of traffic, and yet so light as to be easily carried on their shoulders. In consequence of the multitude of large ponds in the country, they contrive to go the greater part of the way by water, and, when these lakes fall out of their course, they place the canoe on their heads, and proceed over land till they meet with another opportunity of embarking. Their chief occupations consist in hunting rein-deer, catching seals, and collecting furs. These last articles they bring to the Canadian traders, and have the character of being just dealers, and good-natured people. They barter their commodities for blanketing, fire arms, ammunition, and spirits, of which last article they are immoderately fond. Some of them have been visited by the Roman Catholic missionaries; and still retain an attachment to the priests of the Canadian church.

The Esquimaux were formerly settled at different places on the coast, almost as far down as the river of St. John's; but, in consequence of their quarrels with the mountaineers, who are their inveterate enemies, or of the encroachments of the Europeans, they have removed their habitations far to the north. They are of small stature, and of a lighter colour than the other natives. They bear a near resemblance to the Greenlanders, in their persons, language, and customs; and are considered as having emigrated from the opposite coast of Davis' Straits. They have flat countenances, short noses, black coarse hair, and remarkably small hands and feet. They differ from the more inland natives, in having beards, whereas these other tribes have no hair on any part of their bodies except the head. Their food consists chiefly in the flesh of seal, rein-deer, and fish, which, till very lately, they used to eat altogether raw, and sometimes in a putrid state. Their dress is made entirely of skins, (except a little blanketing which they may have procured in traffic,) and consists of a hooded close shirt, breeches, stockings, and boots, generally worn, at least in cold weather, with the hairy side inwards. The women are clothed exactly like the men, except that they wear larger boots, and have their upper garment ornamented with a tail, while their heads are loaded with strings of beads, or surrounded with a hoop of glittering brass like a coronet. Their houses in winter resemble caverns sunk in the earth, and consist only of one apartment, which, though not very large, generally contains several brothers, or other relatives, with their wives and children. In summer, they dwell in tents of a circular form, constructed of poles, and covered with skins sewed together; and which they are continually moving from place to place. They have always a great number of dogs about their camp, which serve to guard the habitation, and to draw the sledges; or are occasionally used as food, and their skins made into clothing. These animals are larger than the dogs of the mountaineers, and have a head very like to that of the fox. They are incapable of barking, but utter a hideous kind of howl. The weapons of these Esquimaux, are the javelin, bow and arrow, in the use of which they are said to be by no means expert, though they have no other means of defending themselves, and of procuring their subsistence. They all practise polygamy, but their families are not generally numerous. The wives live together very harmoniously, and have all the labour to perform, except procuring food. They are continually at work, and sew very neatly with the sinews of rein-deer. The husbands are strangers to jealousy, and very readily lend one of their wives to a friend, like any other article of property. They have no government or laws; and no other punishment for the most detestable crimes than general censure. No man is held superior to another, except in as far as he excels in strength or courage, or in the number of his family. They are a harmless people, not apt to steal from one another, or to give way to violent anger; but are sufficiently harsh to the poor women, when they happen to give any offence. They are dexterous in the management of their canoes, which they steer along the coast with wonderful exactness in the thickest fogs, without any aid from a compass. They must be ranked at the same time in the lowest scale of intellect, and are said to have no name for a number beyond twenty-one.

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* See a notice on this subject, by the Rev. Mr. Steinhauer, in the "Transactions of the Geological Society." vol. ii.

The Moravian missionaries, since the year 1764, have been endeavouring, with wonderful perseverance, to bring those rude tribes to the habits of a civilized life, and the duties of the Christian religion. They have at length succeeded in forming three settlements on the coast of Labrador, namely, Nain, Okkak, and Hopedale, which employ 25 missionaries, and contain altogether about 600 inhabitants, of whom above one-half belong to the congregations. The christianized Esquimaux are said to have been taught to sing with great softness and melody in their public devotions; and to read, in their own language, those parts of the scriptures which have been translated for their use. See *Particulars of the Country of Labrador, from the Papers of* Lieutenant Roger Curtis, in the *Philosophical Transactions*, London, vol. lxiv.; Cartwright's *Journal*. (*q*)

LABYRINTH is the name of an ancient edifice, built in such a manner, that any person who had once entered it could not again find his way to the entrance. The few celebrated labyrinths were those of Crete, Egypt, Lemnos, and Italy. See the *Travels of Anacharsis*, vol. iv. p. 441; and Pococke's *History of the East*, vol. i. p. 6.

LAC, or **Lacca**, is a substance prepared by the female of a small insect called the Coccus Lacca, which is found on several trees in the East Indies.

It is found chiefly in the uncultivated mountains on both sides of the Ganges, and it is also produced in Pegu, and in other countries to the east. This substance is divided into four kinds, stick-lac, seed-lac, lump-lac, and shell-lac, which have already been described in our articles Chemistry and Dyeing. The best stick-lac is of a red purplish colour; that which is yellow or brown is bad. In the years 1805—1808, the following quantities of seed-lac were sold at the East India-house.

1803	586 cwt.	sold for *L.*	1,181
1807	526	. .	1,221
1808	87	. .	881

Seed-lac is seldom imported. In 1808, 19 cwt. sold for *L.* 22

Lump-lac is principally used in India.

The best shell-lac is transparent or amber-coloured. The thick, dark, and speckled kind is bad. The following are the quantities of shell-lac imported and sold in the years, from 1803 to 1808 inclusive:

1803	1640 cwt.	*L.* 9,800	1806	743 cwt.	*L.* 3,739
1804	2626	14.613	1807	823	4,121
1805	2377	12,978	1808	239	1,243

An account of the chemical properties of lac will be found under our article Chemistry, and its use in dyeing, is explained under Dyeing, See *Philosophical Transactions*, vol. lxxi. lxxvii. and lxxxi.; *Id.* for 1804, Part ii.; *Mem. Acad. Par.* 1719; and Milburn's *Oriental Commerce*, vol. ii. p. 216

LACCADIVE Islands, are a group of about 32 low shoally islands in the Indian Sea, belonging to the Biby The nearest of them is 75 miles from the coast of Malabar; and they stretch from the 10th to the 12th degree of North Latitude, being separated by a very wide and deep channel. The largest of these islands does not contain more than six square miles.

The only produce of the Laccadive Islands is cocoa nuts, betel nuts, and plantains.

They export coir, which is made from the husk of the cocoa nut, jagery, cocoa nuts, and betel nuts. Coral from the surrounding reefs is also carried to India. The best coir cables on the Malabar coast, are made from the fibres of the Laccadive cocoa nut. Their boats are made of the stem, and their houses are constructed wholly from the materials yielded by this valuable palm.

Minicoy, the southernmost island, is 7½ miles long, and ½ a mile broad. It extends in the form of a crescent to the north-west, having a coral reef across it. The town is situated within the reef; and the channel through this reef is very intricate and narrow.

Kalpeni is about 37 miles north east from Minicoy, and is about 4 miles long, and 1 broad. It is surrounded with reefs, and the town is in the midst of cocoa nut trees.

Underoot, the nearest to the Malabar coast, is about 8 miles long from east to west. It is well planted with cocoa nut trees: and the town is on the north side of the island.

Ambergris is somewhere to be met with among these islands. Vasco de Gama visited the Laccadive islands in 1499, on his return from Calicut, but they have never been carefully examined. See Dr. Francis Buchanan's *Journey from Madras through the Mysore, &c.* vol. ii. p. 554; and Milburn's *Oriental Commerce*, vol. i. p. 320.

LACCIC Acid is the name of a new acid, lately obtained by Dr. John from stick-lac. This substance, having been reduced to powder, was digested in water, till it ceased to communicate any colour. The aqueous solution was evaporated to dryness, and the residue digested in alcohol. The alcoholic solution was similarly evaporated, and the dry residue digested in ether. The evaporation of the ether solution, left a syrup mass of a light yellow colour, which being again dissolved in alcohol, and the solution mixed with water, lets fall a little resin. This liquid contains the *Laccic Acid*, united with a little potash and lime, from which it may be separated by precipitating it with lead, and decomposing the laccate with sulphuric acid, just sufficient to saturate the oxide of lead. The following are the properties of this acid:

1. The taste is acid. Its colour is wine yellow. It is soluble in water, alcohol, and ether; and it is capable of crystallising.

2. It throws down lead and mercury from their solutions in acids white; but it neither precipitates lime water, nor the nitrates of silver and barytes.

3. It throws down the salts of iron white.

4. Its combinations with lime, soda, and potash, are deliquescent, and soluble in alcohol. See Thomson's *Chemistry*, 5th edit. vol. ii. p. 177; and Schweigger's *Journal*, xv. 110, quoted by Dr. Thomson.

LACE is a delicate kind of net work, which is much used for ornament in female dress. The meshes of this kind of net are of a hexagonal figure, and are formed by twisting or plaiting together very fine threads of silk, flax, or cotton. Thick threads are also woven into the net to form the figures or pattern, according to some design; and these thick threads, which are called gimp, form the ornament of the lace.

There are several different kinds of lace, which are more or less esteemed, according to the fashion of the day; and, like jewels, and precious stones, they are valued in proportion to the difficulty of procuring them, rather than from any real difference in their appearance or qualities.

The lace manufactured in England is generally called Buckinghamshire, or Bedfordshire lace, after those districts wherein it is made; it is also called pillow lace, or bobbin lace, because it is woven upon a pillow or cushion by means of bobbins. The latter terms are chiefly used to distinguish it from an imitation which is made by machinery at Nottingham; but by a recent invention, this lace is made in the greatest perfection by machinery, and is called bobbin-net. The bobbin lace consists of hexagonal meshes; four of the sides of each hexagon are formed by twisting two threads round each other, and the other two sides are formed by the simple crossing of two threads over each other. This is the same kind of lace which is known in France by the name of Lisle lace, being manufactured in that town.

Another kind of lace is made at Honiton in Devonshire, and is called Honiton lace. It is of the same kind as that made at Brussels, and it is also called Brussels lace; two sides of each mesh of this lace are plaited of four threads, and the four other sides by threads twisted together. The plaiting renders it much more durable than the twist lace, and it therefore bears a much greater price.

The lace made at Valenciennes is very highly esteemed, but is not manufactured in England. All the six sides of the hexagon are plaited; but two of the sides of each mesh are so small, that they appear like lozenges.

The Nottingham imitations of lace are of two kinds, point-net and warp-net. From the names of the machines in which they are made, they are both a species of chain-work, and the machines are varieties of the stocking frame. The warp frame makes a very close imitation of the Brussels lace, but has very little durability.

The Buckinghamshire lace is woven on a pillow, or cushion, which the woman or child who makes the lace places on her knees. The threads are wound upon bobbins, which are small round pieces of wood, each about the size of a pencil; round the upper end of each, a deep groove is formed, so as to reduce the bobbin to a thin neck, and on this part the thread is wound: a separate bobbin is used for each thread. To give form to the meshes, pins are stuck into the cushion, and the threads are woven and twisted together around the pins; a piece of parchment is first fixed down upon the cushion, which has been previously pierced with small pin-holes, to shew the proper places for the pins, and on this parchment the design for the gimp, or thick thread, is also traced, to guide the woman in placing the gimp, so that it will be woven in between the fine threads which form the net-work. The work is begun at the upper part of the cushion, by tying the threads together in pairs, and each pair is attached to a pin, which is stuck through the parchment into the cushion. The round form of the cushion allows the bobbins to hang down by their threads, on different sides of the cushion; and on whatever side the bobbins are placed they will continue. At the commencement of the work, all the bobbins are put on one side of the cushion, and are brought to the front side, four bobbins, or two pairs at a time, to be twisted together. The woman takes one pair in each hand, and, with the finger and thumb, twists the bobbins over each other three times; the effect of this is to twist the threads of each pair together, or round each other, and this is done by both hands at the same time. When the twisting, which forms the sides of the mesh, is thus completed, the adjacent bobbins of each pair are interchanged, in order to cross the threads of those bobbins over each other, and make the bottom of the mesh. To render this clear, suppose the four bobbins numbered: No. 1 is twisted round, 2 and 3 is twisted round 4. Then, in order to cross, 2 and 3 are interchanged, so that 1 and 3 come together, and 2 and 4; and the next time that the twisting operation is performed, these pairs of threads will be combined together.

When a mesh, or half mesh is made, it must be secured by putting a pin into the cushion; and, in order to draw the twist work close, the pin is introduced between the recently crossed threads, and carried up towards the top of the pillow, so as to drive the twists and cross before it, and concentrate or draw the twists into a small compass; the pin is then inserted into its proper hole in the parchment, and will prevent the threads from returning. These four bobbins are now done with for the present, and are put to one side of the cushion; then two other pairs are brought forward into the front of the cushion, and are twisted and crossed in the same way; and, in this manner, the work proceeds, till a row of meshes is formed all across the breadth of the intended piece of lace, and then the same bobbins are worked over again to make another row. In general, the number of bobbins and of threads is equal to 48 or 60 to every inch of breadth.

The work-people perform these operations with great dexterity; but the work, nevertheless, proceeds very slowly, as it requires so many meshes to make a small piece of lace, and only one mesh is made at a time. Taking the threads at 50 per inch, if the piece of lace is one inch wide, it will have 25 meshes in the breadth, or 625 meshes in each square inch of length, or 22,000 meshes in a yard. The price of a yard of lace of this descriptiom is seldom more than 18 pence.

The point net frame is, as before stated, a variety of the stocking frame, which was invented by Mr. John Morris of Nottingham, in 1764; but it was not used to make lace in the first instance, being intended to make oilet holes for the clocks, or ancle part, of stockings. The machine is an addition to a stocking frame, and operates on the thread in the same way as in stocking weaving, for a great part of the process. An additional row of needles is placed in front of the frame, which are called points; these are fixed in a row upon a moveable bar, which is mounted in a frame, so as to be capable of being applied to the row of needles of the frame, or removed from them at pleasure; but it will always preserve its parallelism to the row of needles. The lace in this machine is formed of one continued thread, which is laid across the row of needles, and, by the action of the jacks and sinkers, is formed into loops, in the same manner as the stocking frame; (see the article CHAIN-WORK,) but previous to finishing the operation of the chain-work, the row of points is plied between the needles of the frame, and the points being only half the number of the needles, they take every other loop, and, by a particular motion, pick up those loops, and cast them over the neighbouring needles, so as to gather the loops two together, into pairs, and leave intervals between each pair; consequently, when the usual operations of the stocking-frame are resumed, the stitches will be found worked two into one. At the succeeding course, the row of points is again applied; but the points are made to enter between those pairs of loops, which were combined together in the last course, and separate them, but at the same time to combine together those loops which were separated the last time. These operations continued, form a net work of hexagonal meshes, which resembles lace, and when stiffened with starch, to make the meshes preserve their figure, has a very beautiful appearance. The objection to this imitation of lace is, that it becomes loose and irregular, after being washed; and if the thread breaks, the work will unravel in the same manner as stockings.

The warp-frame is also a variety of the stocking-frame;

but the parts are very differently arranged, because all the movements are adapted to be produced by treadles, leaving the hands of the workman to manage the machine, which is a piece of mechanism applied in front of the row of needles of the frame. It is to be understood that the needles, and sinkers, and presser of the warp-frame, operate nearly in the same manner as the stocking-frame, except that there are no jack sinkers, because the thread is supplied to the needles in a different manner from the common stocking-frame; and the operation of the sinkers is not to form the thread into loops between the needles, but only to move the stitches of the work backwards or forwards upon the needles; and hence the nibs of the sinkers have no catches upon them, that is, the name given to the small projecting pieces which bear upon the thread, when the sinkers drop down, and carry the thread down into loops between the needles.

In the warp-frame, the piece of lace is not formed of one continued thread, as in the point-net frame; but there are as many different threads as there are needles in the frame. These threads are warped, or wound upon a roller or beam, the same as a loom; and it is from this circumstance that the machine is called warp-frame. The roller is placed horizontally beneath the rows of needles, and the threads are carried up from it, and conducted through the guides, and to the needles. These guides are rows of small wires, with eyes through the ends like sewing needles, and the threads pass through the eyes. Two rows of guides are used; each row containing one half as many as the number of needles in the frame; and as each guide has a thread, the two rows of guides together contain as many threads as there are needles. The machine, which is the frame containing the two bars on which the rows of guides are fixed, is so poised upon centres, that the guides are capable of advancing to the needles when they are required, to lap the threads upon the needles; or, when the thread is supplied, the guides can be drawn away from the needles, to leave them free for the operations of the sinkers and presser. When the guides are first applied to the needles, they lie beneath the row of needles; but the guides can be raised up, so as to ascend in the spaces between the needles; and when the guides are thus raised clear above the row of needles, they are moved so much sideways, that when they are depressed again, they will not return between the same needles, but between the adjacent needles. It is plain that this action will loop the thread, which each guide contains, round the needle, and that this is done in the whole row of needles at the same time. The treatment of the loops thus formed is the same as in the former machine; the guides are so arranged, that those of the upper row fall immediately over those of the lower, and therefore two guides will pass between the same needles. By this means the working of the frame combines two adjacent threads together, in a series of looping, or chain-work; but at the next course, the guides are interchanged by moving them sideways, so that those guides which were over each other in the former instance, and therefore passed between the same needles, will be separated from each other, and those which were separated in the former instance will be brought together.

The warp-lace is more permanent than the point-net, because the sides of the meshes are made of two or three loops of chain-work drawn through each other, which is not so liable to unravel as the point-net when a thread breaks. These loops resemble the plaited sides of the Brussels lace; but the warp-machine is capable of making several different patterns. In both the point and warp frames, the net is woven in very considerable breadths, even as great as a yard and a half; but it is afterwards divided into pieces of the breadth required, a row of wide meshes being formed at the intended line of division; but before the piece is divided, it is extended in a frame like that used for tambour work, and the gimp, or thick thread, which represents flowers and ornaments, is worked in by the needle; for, it must be observed, that the machine only weaves the plain net-work. The ornamenting of the lace in this manner, takes more time than the weaving: It is performed by women and children. They have an enlarged drawing of the flower, or figure, they are to work; and this they are enabled to copy with great exactness, by observing the course the thread is to take amongst the meshes of the net-work.

The Nottingham lace trade was very considerable some years ago, but is at present in a state of stagnation. The lace, when well made, is exceedingly beautiful and regular; and hence it was much esteemed at first, particularly the large pieces for making veils and dresses; but, when the want of durability was detected, it lost its value: Still, as the manufacturers were able to make it at a very cheap rate, they sold immense quantities for some years.

It has long been an object of research with mechanics, to produce a machine capable of weaving the real twisted lace, like that which is made on the pillow: and no less than *sixteen patents* were obtained for this object before it was effected. The nearest approach to it was by John Morris, who invented the point frame in 1781.

The difficulties attending this species of machinery, are principally owing to the fineness of the meshes of lace; and it is essential to any machine for making lace, in which the threads are twisted together, that the ends of the threads, or the bobbins on which they are wound, should be capable of passing one over the other, as before described in making lace on the pillow: Hence the bobbins must be detached; and it is very difficult to make and also to operate upon so many small bobbins as a moderate breadth of lace requires.

Mr. Morris attempted to avoid this difficulty, by stretching all the threads in a parallel direction in a horizontal frame, and operating by machinery upon the middle part of the threads, to pass each one over its neighbour; which, being repeated several times, produced a twisting of the threads round each other, at each end of the frame, so as to make two pieces of lace at the same time. The crossing, which completes the meshes, was effected by interchanging the pairs of threads which were to be twisted together. But this process could not produce the real lace; because, though the threads actually twisted round each other, yet all the threads employed in the fabric proceeded in the direction of the length of the piece, and the meshes had a tendency to flatten themselves, or close up laterally.

A piece of bobbin lace is composed of two systems of threads, like the warp and weft used in weaving cloth. The warp threads proceed, in a zig-zag direction, longitudinally through the piece; and the others, which are called diagonal threads, traverse across the breadth, not at right angles to the warp threads, as the weft in cloth, but they proceed in an oblique or diagonal direction, from one edge or selvage of the piece to the other, and then return in an opposite direction. It is the intersections, or crossings of these diagonal threads over each other, which form the upper and lower sides of the hexagonal meshes, as before mentioned; whilst the twisted sides are formed by the union of the longitudinal and diagonal threads.

Mr. John Heathcoat, in 1808, invented a machine for making this kind of lace, which answered the purpose very effectually. The ground-work of the invention, is to extend those threads which form the warp of the lace in parallel lines, and dispose the diagonal threads upon small bobbins, which are detached, and are capable of passing round the extended warp threads, so as to twist with them. By this means, the number of bobbins is reduced to one-half. In this machine there are two horizontal beams, or rollers; one to contain the thread, and another to receive the lace; also a number of small bobbins to contain the thread.

One roller is placed in the under part of the machine, and the other in the upper part, but both in the same perpendicular plane. The threads intended to form the warp, or longitudinal threads, in the piece of lace, are wound upon the lower roller, and ascend to the upper rollers, to which they are separately attached.

Those threads which are intended to traverse the piece of lace, (and are thence denominated diagonal threads,) are wound each upon a small separate bobbin. The bobbins resemble the pirns used in a weaver's shuttle, but they are made very small. Each bobbin is a wire pin, round which the thread is lapped, in the form of a small cone; and a slender spring is provided, to cause such a friction as will make the threads draw tight, when pulled off from the bobbin.

These bobbins are so arranged, between the two rollers above mentioned, that the threads proceeding from them accompany the longitudinal threads to the upper roller, and are attached thereto. Each of the longitudinal threads, in its way to the upper roller, passes through a conical tube, or spindle, at the lower end of which is a small pinion; and the spindle is so supported as to be capable of turning round. On the upper end of the spindle is a taper tube, composed of two parts, which, when put together, form a tube; but the two parts will separate in the direction of the length of the tube. One of the parts of the tube, so divided, remains attached to the spindle, and is thereby sustained, so that it will partake of the revolving motion of the spindle.

The longitudinal thread which passes through the spindle, is conducted through the hollow part of this half tube, and through a small eye at the extreme point of it.

The other section, or portion of the tube, can be separated from the spindle, and contains within its hollow part the small bobbin on which the diagonal thread is wound.

When the latter section, with the bobbin, is applied upon the other portion which is attached to the spindle, the two form a long taper tube, or spindle, containing a pair of threads, viz. a longitudinal thread, which comes up from the lower roller, and passes through the hollow spindle and the half tube attached to it; also a diagonal thread, which comes from the bobbin contained in the hollow between the two sections.

These spindles are mounted in collars, so as to be capable of turning round by means of the pinion at the lower extremities, and when so turned will twist the bobbin and longitudinal threads together.

The number of these tubes or spindles is just equal to the number of pairs of each kind of threads; and their arrangement is such, that all the pinions lie in the circumference of a circle, and the spindles and tubes converge to the centre of the same circle in the manner of radii. All the pinions can be moved round at the same time by rack-work, the teeth of which correspond with the pinions. This motion is to cause the pairs of threads contained in each tube to twist together; and this twisting takes place in all the tubes at the same time.

The crossing of the diagonal threads over each other is performed in the whole breadth at once, as follows:

That moveable part of each divided tube, which contains the bobbin of diagonal thread, can be removed from the other portion, and the bobbin will come away with it; also any of the separated portions, with the bobbins, will fit and attach to any of the parts attached to the spindles. By a very ingenious piece of mechanism, the whole number of these moveable parts can be detached from the spindles, and brought forward altogether until they are clear of the spindles.

During the time they are so detached from the spindles, one half of them are caused to move one space to the right, and the other half one space to the left.

The lifted parts are then put back again, and attached to the spindle; but, by this operation, each spindle will have changed its diagonal thread, without having changed its longitudinal thread. This effects the crossing of the threads throughout the whole breadth of the machine at the same time.

The pins by which the uniformity of the meshes is preserved, are all placed upon a moveable bar, and are all inserted at once into the meshes formed by the two operations of twisting and crossing. The working of the machine is a regular succession of the three operations of twisting, crossing, and taking up the meshes.

Thus the twisting is performed by the revolution of the spindles and tubes containing the two threads to be twisted.

The crossings are then made by one motion, which interchanges the bobbins containing the diagonal threads.

The pins are then all introduced at once, to regulate the new meshes formed by the crossing and twisting.

This machine can be worked with great rapidity, by means of handles and treadles disposed in nearly the same manner as in a stocking-frame. It is calculated to make lace of such breadths as are usually made by the cushion, which seldom exceeds three inches; but it is not capable of any great width, from the circumstance of the convergence of the spindles and tubes to a centre.

The object of this convergence is to obtain a sufficient space between the spindles for the pinions and bobbins; whilst the extreme points of the tubes, where the pairs of threads issue, are necessarily very close together: and at these points the lace is formed.

Mr. Heathcoat, in 1809, invented another machine, which is adapted to make lace of any required breadth; and as the mechanism is much less complicated, it has superseded the use of the former machine.

In this, like the first machine, the warp threads are wound upon a roller at the bottom of the machine, and are carried up to a work beam or roller situated at the bottom of the machine; also the diagonal threads are wound upon small detached bobbins, and regularly interspersed between the warp threads; but there is no farther similarity between the two machines. The bobbins are small flat wheels about the size and thickness of a shilling, with a deep groove in the edge to wind the thread upon. These bobbins are fitted into a small carriage or frame, in which it is at liberty to turn round when the thread is drawn off; but there is a slight spring which makes as much resistance as is necessary to draw the thread tight. The bobbins and their carriages are so thin, that, when placed side by side in rows, they will not occupy more room than the breadth of lace they are intended to make.

The longitudinal threads are stretched in a perpendicular direction from the thread roller to the lace roller, so as to form a row of parallel threads arranged at equal distances from each other; and, to guide them, each thread is conducted through a small eye in a wire resembling a needle. Two rows of such guides are fixed on two bars, which are placed horizontally, and each bar is capable of moving a small space endways, and will then carry the threads sideways with them, which indeed is the object of these rows of guides.

On each side of the row of perpendicular threads is fixed an horizontal bar, called a comb-bar, the upper surface of which is cut into notches or grooves for the reception of the small carriages which contain the bobbins. The grooves are in the upper sides of the bars, and crossways or perpendicular the length of the bar. The comb-bar at the back of the row of threads is exactly correspondent with that in front, and the intervals of the grooves in both are the same as the spaces between the rows of guides and threads. The carriages of the bobbins are placed in the grooves of the comb-bars, and slide freely therein, so as to be capable of passing out of the groove of one bar between the threads, and into the grooves of the opposite bar; but the distance between the two comb-bars is such, that the bobbins will enter into the grooves of one bar before they quit the grooves of the other.

In working the machine, all the bobbins of the whole row are connected together by means of a thin bar or ruler, the edge of which is inserted in a notch made in the carriage of each bobbin, so that all the bobbins can be moved in the grooves of the comb-bar at the same time, and can be passed from one bar between the perpendicular threads, and be received into the other bar. At the opposite end of each carriage is a similar notch, for the reception of another such ruler; but only one is used at a time. By means of these two rulers, the bobbins can be transferred from one comb-bar to the other, and will be passed between the row of threads. Suppose, for instance, that all the bobbins are situated in the front comb-bar, the ruler, which is in its notches, being pushed backwards, will move all the bobbins at the same time through between the threads, and enters them into the grooves of the back comb-bar; the other ruler is then applied, and when its edge is put into the notches at the back of the bobbins, the ruler in front is lifted up to take its edge out of the notches in front; this being done, the bobbins are drawn completely through between the threads in the grooves into the back comb-bar.

The result, therefore, of this train of manipulations, is to transfer the bobbins from the front comb-bar to the back, and in so doing they are made to pass between the threads. This being done, the bar sustaining the guides is moved sideways through a distance equal to the interval between two adjacent grooves of the combs, and then the row of bobbins is returned from the back comb-bar between the perpendicular threads, and brought into the front comb-bar by the same movements which have already been described. Now it is evident that in the bobbins passing between the perpendicular threads the first time, those perpendicular threads which were on the right side of each bobbin would be on the left side of the same bobbins when they return; by which means each of the threads of the bobbins makes a turn round its corresponding perpendicular thread.

The action being repeated, each bobbin makes a complete twist round its corresponding bobbin thread, and the sides of the meshes are thus formed; but it is to be understood, that every time after the bobbins have been passed between the perpendicular threads, before they are passed again in an opposite direction, the row of guides is to be moved a space, as before mentioned.

But before we can clearly explain the manner of crossing the bobbin threads, we must point out a circumstance which we omitted before, in order to render the description less complicated, viz. that in order to obtain more room for the bobbins, they are arranged in two rows, one before the other, in the same grooves of the comb-bars; and that one row is first passed between the perpendicular threads, and then the other. Also the rows of guides before mentioned, are two in number, and one half of the number of perpendicular threads, that is, every alternate thread, is conducted through the guides of one row, whilst the intermediate threads are conducted through the guides of the other row. In order to make room for the passage of the bobbins, the two rows of guides are so placed during the time that the bobbins pass, that they collect the perpendicular threads one before the other, each alternate thread falling behind its neighbour, by which means only one half of the number of threads appear in front, and of course the spaces between them are rendered double to what they would be, if the whole number of perpendicular threads were placed at regular distances. After one half of the number of bobbins, that is, one of the rows of bobbins, has passed between the threads, then, before the other row is passed, the rows of guides are so moved as to separate those threads which were placed behind each other in the former instance, and arrange those threads behind each other which were separated in the former instance; consequently, when the remaining row of bobbins is passed, the whole number of bobbins will have passed between threads, as we have described; but as this is effected at two operations, bobbins of a double thickness can be employed.

This separation of the bobbins into two rows is also requisite for making the crosses, which is done by moving one of the rows of bobbins one space to the right or left without moving the other, and, when this is done, the threads proceeding from one row of bobbins will be found crossed over the other row of bobbins, instead of being parallel to them. That comb-bar, which is in front of the perpendicular threads, is moveable a small space to the right or left; and, when only one of the rows of bobbins is in this comb-bar, it is moved a space. The other row of bobbins being at the same time in the back comb-bar, will receive no motion. Consequently, when one of the rows is passed between the threads, so as to bring the two rows together into the same comb-bar, one row of bobbins will be found to be moved sideways with respect to the other, and this produces the crosses.

The last operation to be noticed, is, that of drawing the twist close, and giving form to the meshes. This is done by a row of sharp pins, called points, which are suspended in a frame, so that they can be brought down low enough to be introduced between the threads beneath the crosses just made, and being then moved upwards, these points will carry both the twists and crosses upwards before them, and draw them close, and also give form to the meshes. There are two rows of points; one which is used as above, to give form to the recently formed meshes; and another row, which relieve the former, and hold fast the last made meshes, whilst the first mentioned points repeat their action.

The whole of Mr. Heathcoat's machine is very ingeniously contrived, and it works with great rapidity. The workman is seated before the machine, and employs both his hands and feet to give the different motions. The machines are made of different widths, from 1 to 2½ yards, and the bobbins are from 10 to 12 per inch in each row, that is, equal to 20 to 24 per inch. If the machine is 2 yards wide, the number of bobbins will be from 1440 to 1728; but all these are passed between the perpendicular threads in an instant, and it is rarely that any derangement happens.

The manufacturers of Nottingham have exercised much ingenuity in making lace-machines, since Mr. Heathcoat produced his; but though their machines differ in the mechanism which produces the movements, they are all on the principle of Mr. Heathcoat's second machine, and work by license under his patent.

This invention has been carried into France by some of Mr. Heathcoat's workmen, who have established a manufactory at Douay.

Mr. Heathcoat has recently invented machinery, by which his second machine is made to interweave the gimp in figures or flowers at the same time that the lace is made. Hitherto the machines have only made the plain net, and the figures have been worked by hand after the net was finished. (J. F.)

LACEDÆMON, or SPARTA, now MISITRA, the capital of Laconia, was situated at the foot of Mount Taygetus, and watered by the river Urotas. It is said by Polybius to have, at one time, occupied so great an extent of ground, as to include a circuit of forty-eight Greek stadia, or about six British miles. There are no certain records of its origin; but it is generally said to have been founded about 1516, B. C. by Lelex, from whom it was first called Lelegia; and it appears, from Homer's description, to have been among the most considerable of the Grecian states in those early times. Its history is not distinguished by any remarkable personages or events, till the reign of Tyndareus, whose wife (the poetical Leda), was mother of the celebrated brothers, Castor and Pollux, and of two sisters not less celebrated, Clytemnestra and Helen. The two sons having died in early manhood, the daughters were married to Agamemnon and Menelaus, princes of Argos and Mycenæ. About 80 years after the fall of Troy, Lacedæmon was wrested from Tisamenus, grandson of Agamemnon, by the decendants of Hercules. Aristodemus, to whose lot Laconia fell, in the division of the subjugated countries of Peloponnesus, left two sons, Eurysthenes and Procles. The mother refusing to declare which of the princes (who were twins) was the first born, it was determined that they should succeed to the throne of their father with equal authority, and that the posterity of each should inherit the rights of their respective ancestors. The jealousy naturally consequent upon such a divided sovereignty led the succeeding kings of Lacedæmon to court the support of the people; and thus produced so many concessions of authority, as at last to render the government of Sparta little better than a state of anarchy. In this situation of affairs, the celebrated Lycurgus, generally reckoned the fifth in descent from Procles, succeeded his brother Polydectes; but contented himself with acting as guardian of his nephew Charilaus, who was born after the death of his father, and whom he immediately presented to the Spartans as their king. Either from a thirst for knowledge, or from the calumnies by which, notwithstanding his disinterested conduct, his character was assailed among the lawless Lacedæmonians, he resigned the reins of government, and resolved to spend the period of his nephew's minority in foreign travel. The insubordination of Sparta, and the miseries which it produced, became, in a short time, so intolerable, that both the kings and the people united in requesting him to return, and take upon himself, in quality of legislator, the reformation of the state. Aware of the influence of religious sanctions on the human mind, he took care, on his way, to procure from the Oracle at Delphos a high testimony to his claims as a legislator. Having farther secured a strong party of friends to favour his extraordinary scheme of polity, he proceeded to renovate the Spartan citizens. He committed the executive power of the state to a senate of twenty-eight, selected from the nobles, with the two kings as presidents; and, to this assembly was assigned the entire privilege of originating laws. The assembly of the people, on the other hand, was intrusted with the election of the future senators, and with the prerogative of annulling or confirming (by simple votes, without the liberty of debate,) the laws which the senate proposed. The kings were nothing more than hereditary senators, commanders-in-chief of the armies, and high-priests of the nation. He next effected the most daring innovation ever attempted by a legislator, namely, an equal division of the lands, and levelling of conditions. The whole territory of Laconia was divided into 39,000 shares, 9000 of which were allotted to the city of Sparta, and the rest to the other townships. His next step was to prohibit all use of gold and silver, even as a circulating medium, and to substitute a cumbersome coinage of iron money, which rendered the accumulation of wealth inconvenient and almost useless, as well as abolished all foreign commerce and trades of luxury. Resolved to destroy every temptation to avarice, as well as to preclude every display of its gains, he ordained that all the citizens, even the kings, should eat only at public tables, where the strictest temperance should be observed. He went so far as almost to annihilate private property, by enacting, that every individual must lend what he was not immediately using; and even that any one might take, without asking, whatever he wanted of his neighbour's goods, with the obligation of replacing it undamaged. By all these regulations it was his aim to exalt every individual; and hence his laws farther required, that every citizen should, in the strictest sense of the modern term, be a gentleman. Every free Lacedæmonian was prohibited from exercising any of the mechanical or even agricultural arts. He was permitted to have no business, except that of the state; and for this, whether in peace or war, it was the purpose of education to qualify every man. Having attempted to provide against internal evils, by rendering his countrymen a nation of philosophers, he next secured protection against external violence, by making them also a nation of soldiers, superior to the rest of mankind. In this view, he began with measures to provide a strong and active race of subjects for the state. He directed that the young women should be trained, like the young men, to athletic exercises; and that both sexes should appear naked in the public places. He enacted that it should be disgraceful to be unmarried, and unproductive of children to the commonwealth; but, at the same time, disregarding the sanctity of wedlock, he held it a matter of indifference, who might be the father of the child, provided only it was healthy and well formed. To prevent, however, the natural evils of promiscuous concubinage, (which would have defeated the end in view,) he decreed, that it should be a reproach, and a species of crime, for young men to be seen in company with young women, and that even their own wives should be visited only by stealth. The Spartan legislator sacrificed to his political system, not only the moral feelings, but also the natural instincts of his fellow creatures. He appointed that all children, as soon as born, should be examined by persons set apart for the office, and that only the vigorous and well-formed infants should be preserved, while all that were defective in shape or constitution, should be instantly exposed in the wilds of Mount Taygetus. Those, who were found fit for being reared, were delivered to the care of public nurses, to be brought up according to the mode prescribed by law; and were, after the age of seven years, introduced into the public schools, where all were educated on the same plan. There, both in body and mind, they were moulded to such a temperament, as was thought most suitable for rendering them serviceable to the state. Letters were taught only for use, not for ornament; and the Spartans, while famed for wisdom, were never eminent for learning. Great attention was paid to conversation; and, while loquaciousness was reprobated, the boys were exercised to quickness of reply, conciseness of expression, and satirical strokes of humour. They were principally taught to cherish an ardent and paramount love of their country; and formed to a high principle of honour, especially of sensibility to applause and shame. They were allowed only one garment, which was to serve equally for winter and summer; were accustomed to sleep on rushes, which they were obliged to gather for themselves; and were supplied with very plain and scanty food; but encouraged to steal whatever they could, provided they accomplished the theft without detection. As they approached the years of puberty, their discipline became more strict, and their labour more severe. No kind of remission or indulgence was permitted, except during military service; and, while the city was the scene of toil, study, spare diet, and rigid discipline, the camp was a place of rest, relaxation, and luxury. Till the age of thirty, no one was permitted to intermeddle with political or judicial affairs; nor was either private study, or domestic business, considered as reputable; but it was every man's duty to attend the places of instruction, and to bestow a portion of his time on military and athletic exercise. Poetry and music were allowed, under the direction of the magistrate, but rather on public festivals than for private recreation; and the amusements most encouraged, were hunting, and conversational meetings. In these conversations, mirth of a peculiar species, the mirth of wit and wisdom united, was prescribed; and, while all were trained from their youth to a ready and determined style of reply, great care was taken to preserve, at the same time, a graceful, respectful, and even modest demeanour. The young were constantly under the inspection of the old, to whom the greatest reverence was recommended, and under whose eye a talent of circumspection and attention to rules was acquired. To prevent the corruption of Spartan manners, all travelling into foreign countries was prohibited, and strangers admitted under great limitations. To preserve the state from the insurrection of the slaves, or Helots, to whom all agricultural operations and mechanical arts were allotted, the most oppressive and inhuman treatment of these miserable bondmen was enjoined by law. Every thing that could humiliate their minds, and remove them to a distance from the condition of their haughty masters, was imposed upon them. Even vice was prescribed to them; and they were compelled to drunkenness, in order to render it contemptible in the eyes of the Lacedæmonian youth. Nay, to prevent the increase of their numbers beyond what the safety of the commonwealth allowed, the young Spartans were occasionally dispersed through the country, with a commission to murder the stoutest and most enterprising Helots, whom they might meet, or be able to surprise.

The military as well as the civil code of Sparta is considered as the invention of Lycurgus. Its fundamental principle was this, that the Lacedæmonians should place their security in the discipline and courage of their troops, not in the strength of their fortifications; and, hence, the city was never provided with walls. The peculiar composition of the Lacedæmonian army, so highly extolled by the military characters of ancient Greece, is not easily explained, in consequence of the contradictory descriptions given of the system by Xenophon and Thucydides. It appears, however, to have a near analogy to the arrangement of the modern European armies; and to have performed all its evolutions on the company, as the principle of motion. According to Thucydides, the enomoty, or lowest subdivision, consisted of 32 men, 4 of which formed a pentecosty composed of 128; four of these again making a lochus or battalion of 512; and four of these last completing a mora or division of the army. These divisions were commanded by general officers, named polemarchs, subordinate only to the kings, who were commanders-in-chief of the forces, invested with fuller authority in the field than in the city, but amenable to the civil power for the exercise of their supremacy. Every Lacedæmonian was a soldier; and the infantry is calculated to have seldom been much fewer than 40,000; but those only who had attained the age of 30 years were admitted to the honour of serving beyond the boundaries of Laconia. The soldiers wore a scarlet uniform; and the troops were abundantly provided with all kinds of useful baggage, camp necessaries, waggons, and beasts of burden, with numerous artisans, labourers, and servants from the Helots, that every warrior might have no other business but that of fighting, and be as much as possible at his ease when not engaged on duty. An advanced guard of horse always preceded the march of the army; and the form of encampment was directed to be as nearly as possible of a circular figure. The cavalry do not appear to have ever excelled, and the infantry were always heavily armed, even when circumstances seemed to require some other mode. In order to restrain the love of war and thirst of conquest, which could not fail to actuate a nation of soldiers, Lycurgus expressly prohibited his countrymen from engaging in frequent wars with the same people, and from pursuing a flying enemy when once decisively beaten. Thus also he provided against the chance of foreigners acquiring the Spartan discipline; and, by lessening to the enemy the danger of flight, secured to his countrymen the probability of a cheaper victory.

Lycurgus, having completed his plans, and seen them fully reduced to practice, next proceeded to secure the continuance of the system. He would not consent that his laws should be committed to writing; but wished them, like oracles, which were only uttered by the voice, to remain engraved on the hearts of his people with all the authority of divine institutions. With the view of farther providing for their perpetuity, he assembled the kings, senate, and people; and bound them by a solemn oath, that they would make no alteration in the laws which he had instituted till he should return from Delphos, to which he was going for the purpose of consulting the oracle on some matter of public importance. Having obtained from the god a farther sanction of his institutions, which he transmitted in writing to Sparta, he put an end to his life by abstaining from food; that, by never returning, his countrymen might never be released from their oath.* His institutions continued in force for the space of 500 years, and their influence soon became manifest in the martial spirit of the Lacedæmonians. They became impatient for war, and eagerly sought an opportunity of exerting their newly acquired strength.

One of the most important of their early struggles was carried on against the Messenians, which originated in a tumult at Linnæ, where the Messenians and Lacedæmonians, (being both of the Dorian tribe,) were engaged in celebrating the worship of Diana; and where Teleclus king of Sparta, son of Archelaus, the contemporary of Lycurgus, was slain. The Lacedæmonians complained, that the

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* Other accounts relate that he retired to Crete, where he died at a great age, and commanded his ashes to be scattered on the sea, that the Lacedæmonians might not be able to bring back his remains, and thus to seek a release from their obligation

Messenians, having attempted to carry off some Spartan virgins, Teleclus received his death in their defence; when the Messenians averred that the pretended virgins were armed youths in disguise, for the purpose of assassinating the Messenian chiefs who attended the solemnity. New causes of dispute arose; and the Lacedæmonians, resolved against all measures of reconciliation, solemnly bound themselves to persevere in the contest, and, according to some writers, to remain absent from their homes till Messenia should be subdued. But the Messenians maintained the conflict with equal advantage for many years, under their kings Euphaes and Aristodemus; and it was not till after the death of the latter, that Spartan discipline and perseverance at length prevailed. The Messenians were completely subdued, and half the produce of their lands was exacted as tribute to the conquerors. Among the events of this war, an instance occurred of the singular spirit which prevailed in Sparta, and which is so generally accredited by ancient writers, as to authorise the belief that their accounts, though not altogether so consistent with each other, must have rested on some foundation. The absence of the Lacedæmonians from their homes was at length felt in the city, as not only a domestic grievance, but also a public evil; and in order to remove the check thus imposed upon the population of the state, all the young men, who had joined the army without having taken the oath of absence, were sent home, to supply the place of temporary husbands to the women. After the termination of the war, the innocent offspring of this irregular connection, being slighted by the other citizens, and not submitting very patiently to the disgrace attached to their class, were persuaded to emigrate to Italy, where they founded the city of Tarentum. After a period of nearly forty years, the new generation of Messenians made a resolute attempt to regain their independence; and, under the auspices of Aristomenes, a descendant of Hercules, through a long race of Messenian princes, sustained a desperate struggle with the power of Lacedæmon; but were again compelled to receive the yoke of the victorious Spartans, who re-peopled the desolated tract, which they had thus acquired, by colonies of Asinidans and Nauplians, who had been expelled from their natural seats by the Argians. With these last mentioned people the Lacedæmonians had previously been engaged in a severe struggle for the district of Thyrea, which was situated within their mutual limits; and which was finally annexed to the Laconian territory, a circumstance which gave rise to a long and deadly animosity between the two contending parties. A similar contention took place between the Arcadians, who enabled the city of Tegea to resist, with more than usual valour and success, the Spartan encroachments; till at length the politic citizens of Lycurgus succeeded in forming a close alliance with these brave mountaineers, whom they were unable to subdue, who afterwards proved the most serviceable auxiliaries in the ambitious schemes of Lacedæmon.

As the Lacedæmonian institutions were so unfavourable to literature, adverse to all foreign intercourse, and productive of strict secrecy in their own politics, there is little accurate information to be found in ancient writers with regard to the more early internal transactions of their state. There appears, however, to have been a constant and violent struggle among the nicely balanced powers of the government; and, in order to restrain the overbearing spirit of the senate, king Theopompus, who completed the first conquest of Messenia, seems to have either originally instituted the order, or at least to have greatly enlarged the authority, of the popular magistrates, named Ephori. These were five in number, elected annually by the people from their own body; and bearing a near resemblance to the tribunes of Rome. The primitive design of their office was merely to serve as vindicators of the constitutional rights of the people against any encroachments of the kings or the senate; but, by degrees, they acquired a more extensive authority, deciding on measures of peace or war, determining the number of forces to be raised, and providing funds for their maintenance; holding courts of inquiry into the conduct of all magistrates, supreme and subordinate; engrossing, in short, the whole administration of civil affairs; and reducing the kings always to the situation of mere hereditary generals of the army.

The Lacedæmonians were by this time by far the most powerful people of Greece. Masters of Messenia, and ancient allies of Corinth, they in a great measure commanded in Peloponnesus. Their ambition was unbounded; and they watched every opportunity of extending their power. Whenever the Grecian states were involved in mutual wars, or agitated by internal seditions, they were ready to interfere as mediators; and while, in this capacity, they usually conducted matters with much apparent moderation, they seldom failed to strengthen the influence of their own state. They uniformly favoured the aristocratical or oligarchical parties in the different Grecian cities; and having always, by this plan, a few chiefs in every place indebted to their support, they easily rendered these dependent leaders effectual instruments of securing to them the aid, and almost the submission of their respective countries. This policy they began about this time to pursue among the Athenians, whom they had assisted to liberate from the yoke of the tyrant Hippias. But, for an account of their proceedings in this affair, and also of their transactions in the Persian, Peloponnesian, and Theban wars, we must refer our readers to the articles ATHENS, EPAMINONDAS, and GREECE.

A few of the more important of the intermediate and insulated events, however, which belong to the history of Lacedæmon, and which affected its internal interests more directly and permanently, require to be noticed, as far as our limits will permit. A short time after the conclusion of the Persian war, the Spartan commonwealth was thrown into the utmost confusion, and reduced to the brink of ruin, by a destructive earthquake in its capital, and a formidable insurrection of the Helots. By the former of these calamities, 20,000 lives were lost, and only five houses left standing in the city. The wretched slaves throughout the country, profiting by the disorder and distress which ensued, rose in a body to avenge their sufferings, and secure their freedom; but, by the exertion of king Archidamus, a sufficient number of Spartans were assembled to protect the metropolis; and the insurgents, many of whom were descendants of the Messenians, betook themselves in a body to the strong hold of Ithomë. The Lacedæmonians, though singularly expert in the use of arms, were utterly helpless in almost every other occupation; and by the simple desertion of their slaves, exclusive of their formidable opposition as an enemy, were reduced to the greatest straits. The operations of agriculture, and the exercise of the mechanic arts, were suspended; and application was made for succour to all the neighbouring states. By the reinforcements thus procured, the rebellion was so far reduced, that the remaining insurgents were blocked up in Ithomë; but the extraordinary strength of the place, and the desperate resistance of its possessors, rendered every assault unavailing; and it was found necessary to solicit the aid of the Athenians, who were esteemed the most skilful of the Greeks in the conduct of sieges. Their united attacks still proving unsuccessful, recourse was again had to the old method of blockade; and it was during the leisure, of this tedious plan of proceeding, that the assuming vivacity of the Athenians on the one hand, and the unyielding pride of the Lacedæmonians on the other, occasioned those mutual animosities, which led directly, though not immediately, to the fatal Peloponnesian war. So far did the suspicions of the Lacedæmonians arise, that they declined a continuance of the Athenian assistance; and these last, on their part, were so exasperated by their dismissal, that they forthwith renounced the confederacy with the Lacedæmonians, and formed an alliance with Argos, the inveterate enemy of Sparta. The reduction of the Helots was at length effected; but nothing that they had ever suffered from their relentless oppressors can be compared with a measure which was subsequently adopted, while the Lacedæmonians were hard pressed during the first period of the Peloponnesian war, and which is perhaps the most disgraceful that has been recorded in the annals of any nation. Desirous to carry the war to a distance, but dreading the renewal of insurrection among the slaves, should the troops be removed from home, they invited, by proclamation, such of the Helots as were willing to merit the gift of freedom, and the dignity of citizens, by deeds in arms, to present themselves to the magistrates for the honourable trial. Having thus discovered the more enterprising individuals, who might have been most ready for insurrection, about 2000 were selected, marched in solemn procession around the temple, under pretence of being admitted as freemen to the participation of religious rites, and then privately massacred by their unfeeling tyrants.

Towards the conclusion of the Peloponnesian war, considerable changes took place in the spirit and administration of the Spartan government. Its kings, always more exalted in war than in peace, became interested in holding commands on distant stations, but found a constant check upon their schemes in the poverty of the state. Agis, while commanding at Derceleia, a port which the Lacedæmonians had occupied in Attica, availed himself of a concurrence of favourable circumstances, to accomplish the establishment of a public revenue in Sparta; and, for the better support of this powerful arm of war, the Lacedæmonians, departing still farther from the system of Lycurgus, were persuaded, first by Alcibiades, and finally by Lysander, to solicit pecuniary aid from Persia, and to allow the introduction of gold and silver coin into the republic. This stream of foreign wealth speedily sapped the rigid integrity which had hitherto distinguished the Spartan character, and smoothed the way for those alliances with the Persian court, which were too often constructed on principles hostile to the general liberties of Greece.

After the conclusion of the Peloponnesian war, the power of Sparta reigned paramount in Greece; and its leaders acted a distinguished part in the assistance rendered to Cyrus in the expedition against his brother Artaxerxes. By the exploits of the ten thousand on that occasion, they had both learned to despise the Persian armies, and had exposed themselves to the vengeance of the Persian monarch. The Asiatic Greeks, who were more immediately obnoxious to the apprehended retaliation, and who had formerly paid allegiance to the Athenian state, now solicited the more powerful protection of Lacedæmon; and a war with Persia, famed for wealth more than for warlike spirit, found a ready support among the needy states of Peloponnesus. The allied forces were conducted by the Spartan general Dereyllidas, who, without the splendour of any memorable victory, and therefore with less renown than his talents appear to have merited, accomplished the emancipation of the Ionian Greeks from the Persian dominion.

That modesty in command, united with dignity of manners, that contempt for wealth, and superiority in military and political knowledge, to which the institutions of Lycurgus had formed his countrymen, had, in former times, raised so high the character of the Spartans, that the Grecian republics readily acknowledged them as their head; yielded a willing obedience to their generals in united warfare; regarded an individual of their nation at the public games with more curiosity and admiration than even the victors in the contests; and manifested a respect for their character, as was never perhaps paid to that of any other people. But in the long course of the Peloponnesian wars, and the extensive communication with strangers to which it led, and the necessity of raising a larger public revenue which it imposed, the Spartan man was become altered and corrupted, and their high fortune gave rise to a haughty tyranny in their conduct, which gradually alienated the most ancient and attached of their Peloponnesian allies. Their implacable punishment of Elis (to whom a kind of religious supremacy was admitted among the Grecian states, but whose decrees against Sparta were avenged by the terror of the sword,) produced a strong sensation against them among the Grecian people. A very considerable alteration had taken place also in their own civil arrangements; though little information exists of the particular steps, and regular progress, by which these encroachments were produced. But, contrary to the system of Lycurgus, (which allowed no distinction of rank or privileges except what arose from age and merit,) the families in the capital, peculiarly named Spartans, had engrossed the whole power of the commonwealth; and the rest of the people, under the general designation of Lacedæmonians or Lacenians, was excluded from the higher offices. Those Spartan families, who appropriated to themselves the superior dignities of the state, were distinguished by the name of Peers, though now greatly reduced in number, began to widen the distinction between themselves and other classes, and to exercise their authority with less reserve and discretion. This overbearing conduct produced a dangerous plot, a short time after the accession of Agesilaus to the throne, for effecting a complete change of government, by assassinating kings, ephori, and senate; but its leader Cinadon and his accomplices being discovered and executed, the spirit of sedition was checked, and the exclusive privileges of the peers preserved. The unanimity and stability of the state were at the same time more confirmed, than had been the case for a long period, by the talents and manners of king Agesilaus, who possessed much of the genuine Spartan character, and paid equal respect to the ephori, senate, and people; but an event, which at first extended the power and fame of the Lacedæmonian king and commonwealth, prepared the way for the final downfal of Spartan pre-eminence.

Agesilaus, commissioned with a powerful army to protect the Greeks of Asia against the designs of the Persian monarch, entered upon a brilliant career of victory, equally productive of honour and spoil. He scattered, with little difficulty, the Persian forces that were brought against him; passed from province to province, as if on an uninterrupted march; excited the remoter parts of the empire to throw off the yoke, and made the great monarch tremble for his personal safety in the midst of his dominions. (See AGESILAUS.)

This extraordinary success, however, urged the Persian court to employ a different weapon of defence. By the distribution of gold, the promise of subsidies, and the disposal of the Persian fleet, a powerful confederacy of the Athenians, Corinthians, Argives, and Thebans, was arrayed against the domineering commonwealth of Sparta. The defeat and destruction of their naval force by that of the Persians and Athenians under the command of Conon, was the first fatal blow to their power; from the effects of which they never recovered, and which was followed by a general revolt of their colonies and tributary allies. The subsequent victory gained by Agesilaus at Coroneia over the confederate Greeks, (the most sanguinary, according to Xenophon, that he had ever witnessed,) and the advantages obtained by Praxitas at Corinth, still upheld the renown of the Spartan name; and the peace procured by the Persian mediation, through the able policy of Antaleidas, secured the supremacy, and served the interests of the Lacedæmonians nearly as effectually as the successful termination of the Peloponnesian war had done. But the fatal issue of the Theban war which followed, and which their own overbearing interference had excited, together with the loss of half their territory by the restoration of the Messenian state, (which was a consequence of that war,) completely broke their long established influence as leaders in Greece, and left the nation in a state of indecision and disorder from which it never recovered. (See GREECE and EPAMINONDAS.)

Before the power of Philip of Macedon had made much progress in Greece, the Lacedæmonians had so far recovered their strength as to renew their oppressions on the adjoining states, particularly of Argos and Messenia; but, though aware of the danger to be apprehended from the measures of the politic Macedonian, were either too degenerate, or still too feeble, to make any decisive effort in behalf of the falling liberties of Greece. At the assembly of the different states, summoned by Alexander the Great to concert the expedition against Persia, they were the only people who ventured to remonstrate against the measure, (apparently, however, from a spirit of pride rather than from any settled principle of policy on the subject,) and openly asserted, in the strain of their ancient independence, that "they had been accustomed to point out the way to such glorious deeds, and not to be directed by others." But they were obliged to submit to the prevailing sentence of the assembly, and to concur in the appointment of the Macedonian prince to the office of generalissimo in the war. Unawed, nevertheless, by the power of Alexander, or by the terrible example of his vengeance inflicted on the city of Thebes, the Lacedæmonians, under their intrepid king Agis, the grandson of Agesilaus, embraced every opportunity to thwart the measures of the great conqueror, and to vindicate the independence of their country.

When the news of the victory at Arbela had alarmed the other states, by a dread of the growing Macedonian power, more than it gratified them by the humiliation of their old but despised enemy, Agis, more daring than prudent, and more ambitious of restoring Spartan supremacy than Grecian liberty, took the field with a powerful army, and marched against Megalopolis, the only Peloponnesian city which had acknowledged Alexander for its sovereign. But Antipater, who commanded in Macedonia, arriving speedily with a superior force, the Spartans and their allies were defeated, and their enterprising leader slain in the battle. Eudemidas, the son of Agis, a wise and virtuous prince, and a decided advocate of peace, restrained the ardent but ill-judged zeal of his countrymen, to prosecute the unequal contest; and, when one of his subjects was magnifying the victories which their ancestors had gained over the Persians, as an argument in favour of hostilities against Macedon, "Do you think," said the king, "that it is the same thing to make war against a thousand sheep, as against fifty wolves?" Of the subsequent reigns, little more is known than the names of the kings, and of a few leading men; but amidst all the revolutions of Greece, the shadow of independence was still retained at Lacedæmon. It was still governed by its own princes and senate, and had never submitted to the humiliation of receiving within its walls a Macedonian garrison. A striking instance of its ancient spirit was displayed against Pyrrhus, when in his attempt to annex the Peloponnesus to his kingdom, and who had reached the capital of Laconia at a time when the army was absent on an expedition to Crete. The women vied with the men in fortifying the city, and repelling the enemy; and, after repeated attempts to carry the place by assault, the king of Epire was compelled to retreat. This was nearly the last expiring blaze of Spartan valour; opulence and voluptuousness had long prevailed, in place of the poverty and discipline inculcated by the laws of Lycurgus. The most remarkable corruption of those laws had been introduced during the administration of Lysander and Agesilaus, whose conquests had filled their country with wealth, and opened the sources of luxury and avarice. The most flagrant abuses succeeded in every department of the state, and threatened its total subversion. The ephori, instead of answering the end of their institution as a check upon the despotism of the kings and the turbulence of the people, had become an arbitrary and corrupted body, tyrannizing over all parties. The public meals, the last pledge of Spartan temperance, had been discountenanced; and the lands had accumulated in the possession of a few families, who lived in the greatest splendour, while the rest of the population was doomed to extreme penury. In this state of affairs, Agis, the son of Euda, ascended the throne; and, though his family was the most opulent in the state, and himself brought up in all the ease of luxury, he nobly planned the restoration of the ancient discipline, and the re-establishment of the neglected laws of Lycurgus. (See AGIS.) His failure and death left the whole constitution of Sparta in the utmost confusion, and the country itself in a state of rapid depopulation. His successor Cleomenes, animated with the same spirit of reformation, but less averse from sanguinary measures, determined to pursue a more vigorous course. Considering the ephori as the source of the evil, he caused them to be put to death in a secret and summary manner; and having called an assembly of the people, restored the ancient constitution in all its simplicity and rigour. But the habits of his countrymen were too depraved to be so instantaneously renovated; and, as soon as he had quitted the capital to take the command of the army against the Achæans, with whom a quarrel had arisen, the new discipline was again relaxed. His efforts to break the domination of the Achæan league over the other states of Peloponnesus were at first successful; but, by the aid of Antigonus of Macedonia, his army was almost annihilated in a general engagement at Sellasia; and, afraid to encounter his disaffected subjects, he sought an asylum in the Egyptian court. The Spartans, no longer worthy of the name, after suffering the most unparalleled cruelties from the sanguinary tyrant Nabis, were reduced by Philopœmen to a state of complete subjection to Achaia; and finally surrendered their own liberties, as well as the general independence of Greece, by committing themselves to the protection of the Romans. See the references under the article GREECE. (*q*)

LACQUER is a varnish applied to brass and other metals, in order to improve their colour, and preserve them from tarnishing. The different lacquers are formed by shell lac dissolved in alcohol. See GILDING and VARNISH.

LACTANTIUS. **Firmianus**, sometimes called also Lucius Cælius, or Cæcilius, one of the Christian fathers, is supposed to have been born at Firmum, in Italy, and to have thence derived his surname of Firmianus. But he is more generally considered as a native of Africa, where it is, at least, ascertained, that he received a part of his education under Arnobius at Sicca, and where he was probably born about the end of the third century. There is nothing known with certainty of his origin; but he soon became distinguished as a rhetorician, and was selected by Dioclesian as a teacher of the art in Nicomedia. It is not known how he escaped the cruel persecution which that emperor soon after directed against the Christians; but he appears to have remained in Nicomedia for some time after its commencement. He is said to have found little employment as a teacher of rhetoric, and is understood to have betaken himself on that account to writing. During the greater part of his life he lived in a state of poverty; but historians are not agreed, whether this was in consequence of his labours failing of their just reward, or of a voluntary renunciation of wealth on his own part. He was at one time, however, honourably, and not unprofitably employed, when, in his old age, he was appointed by Constantine to instruct his son Crispus Cæsar in the Latin language. On this service he removed to Gaul, and resided at court; but it is not known what became of him after the death of his pupil, except that he attained to a great age, and died, as he had lived, in poor circumstances. He wrote a number of treatises, of which the most valuable are his work *De operibus Dei*, in which he discusses the subjects of creation and providence; his *Institutiones Divinæ*, a general and able defence of Christianity against all the objections of the heathens, of which he afterwards drew up an abridgment, (long supposed to have been lost, till it was discovered by Pfaff, in the library of the king of Sardinia, at Turin, and first published at Paris, in 1712,) and, lastly, his book *De ira Divina*, a learned and elegant, as well as complete treatise on the subject. There are numerous editions of the works of Lactantius, the first of which was published at Rome in 1468, folio; and one of the most ample at Paris in 1748, in 2 vols. 4to.

Lactantius, as a writer, is one of the most elegant and pleasing of the fathers. He was possessed of eminent talents, which he employed in the service of religion with the most disinterested views. His works discover a considerable portion of learning, and are peculiarly distinguished by the beauty and eloquence of the style. He studiously imitated, in this respect, the great Roman orator; and is generally denominated "the Christian Cicero." He was an ardent investigator of truth in general, and earnestly zealous for the vindication of the Christian faith. He is said to have had a natural impetuosity of temper, which is supposed to have biassed his conclusions on some occasions. But he was distinguished altogether by uncommon uprightness and simplicity of character; and though more successful in refuting heathen errors than unfolding sacred truth, he may be ranked among the ornaments of the Christian name in the age in which he lived. See *Histoire Literaire de la France*, tom. i.; Tillemont, *Mem. Eccl.* t. vi.; Lardner's *Credibility of the Gospel History*, part ii.; and *A Concise View of the Succession of Sacred Literature*, by Dr. Adam Clarke. (*y*)

LACTOMETER, is the name of an instrument, invented by Mr. Dicas, mathematical instrument maker in Liverpool, for ascertaining the different qualities of milk, or the richness of milk, from its specific gravity, compared with water, by its degree of warmth taken with a standard thermometer. As we have never seen the instrument, we have taken the following description of it from the Agricultural Survey of Lancashire.

It is constructed with ten divisions upon the stem, similar to the patent brewing hydrometer, and with eight weights, which are to be applied only one at a time upon the top, to obtain the weight of milk; an ivory sliding-rule accompanies the instrument, upon the middle or sliding part of which is laid down the lactometer weight of the milk, going from 0 to 80; and opposite thereto are placed the various strengths of the milk, from water to 160; 100 having previously been fixed upon, from a number of experiments, as the standard of good new milk, and each of the other numbers bearing a proportionate reference thereto. At one end of the sliding rule, the degrees of heat, from 40 to 100, are placed, with a star opposite, as an index to fix the slide to the temperature of the milk; the whole being graduated to shew the exact strength of the milk, as it would appear in the temperature of 55° of heat, although tried in any inferior or superior temperature between 40° and 100°: thus the great inconvenience which would attend bringing the milk at all times to one temperature is avoided, and a simple mechanical method of allowing for the contraction and expansion substituted. And as skimmed milk, being divested of the particles of butter which existed before skimming, appears to have a less degree of affinity with that than the new milk has, one side of the ivory sliding-rule is adapted to skimmed, and the other to new milk.

General Rule.—First, find the temperature of the milk with the thermometer, and fix the sliding-rule so that the star shall be facing the degree of heat the mercury rises or falls to; then put in the lactometer, and try which of the weights, applied to the top, will sink it to some one division upon the stem; add the number of the weight upon the top, and that of the division together, and opposite the same, formed upon the side, will be shewn the strength of the milk.

Examples of New Milk.—If, in the temperature of 72°, the lactometer with the weight 40 sinks to nine upon the stem, fix the slide so that the star shall be facing 72°; then opposite 49 will be found 100, the strength of the milk. Again, if in 60° the lactometer with 50 on the top sinks to 6 upon the stem, the slide being fixed for new milk, so that the star shall be at 60 degrees of heat, then facing 56 will be found 110, the strength of this milk in proportion towards the other, provided it is equally replete with cream. To discover which, it becomes requisite these two samples should stand a certain time, that the cream may rise, which, being taken off, they are to be tried with the lactometer again: and as the cream is evidently the lighter part, the milk will appear by the lactometer denser or better in quality than before. Suppose the milk in the first example to be 57 by the lactometer in 60° of heat, then the strength by the skimmed-milk side of the rule will be 112. And admit the second example of new milk to be 58 in 64° when skimmed, the strength would be 116.

As a comparison, say—

No. 1.	New milk - - -	100
	Ditto skimmed - -	112
	Difference	12
No. 2.	New-milk - - -	110
	When skimmed -	116
	Difference	6

From which it appears, that No. 1. has produced a larger quantity of cream than No. 2. and consequently may be deemed the better milk. Some instances have occurred where the strength of new milk has only been about 80, and when skimmed near 100. Thus it may, without the least impropriety, be called a milk much better adapted for making butter than cheese; the serum or whey in general being near the same density.

The instances in which the lactometer may be useful are, according to the same writer, in discovering what breeds of cattle are most advantageous; what food in the winter season, whether carrots, turnips, potatoes, &c. are best; what the effects of different pastures may be; how far particular farms are best adapted to making butter and cheese; how far the inconvenience of large cheeses in some dairies being too rich to stand may be prevented, by discovering when this redundancy of richness exists in the milk; and in fixing a standard for the sale of this useful article of life.

A standard for skimmed milk may readily be fixed, by saying what strength the common saleable skimmed milk shall be by the lactometer, or what its specific gravity shall be in relation to that of water in the temperate degree of heat, and that an easy comparison may be made between the specific gravity of any milk, and its lactometer strength; this instrument is so constructed, that one of specific gravity shall exactly correspond with three of strength; that is, the strength of 90 by the lactometer is a milk whose specific gravity is 1030, to common pump water 1000. From a number of experiments and observations, it is observed, that the common saleable skimmed milk in Liverpool is from 52 to 64 of strength, that of new milk from 70 to 80; but it would be difficult to fix any standard for the latter, unless some mode could be devised to discover whether it was mixed with old milk or not. The only method would be, after fixing the strength of it, to try, by letting it stand, to discover if it produced that quantity of cream, which as new milk it might reasonably be expected to do.

Another lactometer, upon a different principle, has been recently constructed, at the desire of Sir Joseph Banks, by Mr. Thomas Jones, mathematical instrument maker, Charing Cross. Sir Joseph has described it in the Farmer's Journal, and it promises to answer the intended purpose.

It consists of any number of glass tubes, of the same internal diameter, which is generally about one-third of an inch, and about 11 inches long. They are closed at one end, and open and a little flanched at the other, like the test tubes used by chemists, and are mounted on stands in the same manner. At the distance of 10 inches from the bottom of each tube there is a mark, with 0, or zero, placed opposite it; and from this point the tube is graduated into tenths of an inch, and numbered downwards for three inches, so that each division is $\frac{1}{100}$th of the tube. If several of the tubes are filled with new milk at the same time, and placed at the same temperature, the cake of cream will form at the top, and its thickness or quantity will be indicated by the divisions. In this way experiments may be made on the relative quantities of cream produced by different systems of feeding, or by different animals fed and placed under different circumstances. The per centage of cream is thus obtained by simple inspection. See Brande's *Journal*. vol. iii. p. 393, 394.

LADANUM. See Labdanum.

LADOGA, or Ladozskoi, is a large lake of Russia, in the government of Viborg, lying between the Gulf of Finland and the Lake of Onega. It is about 175 versts long, and 105 broad, and is deemed one of the largest lakes in Europe. The shores of the lake have a flat coast, and a sandy beach. It produces a great number of seals. On account of the numerous shifting sand-banks, and the dreadful storms which prevailed, Peter the Great, in 1718, projected the famous Ladoga canal, cut along the southern shore, from the Volkhof to the Neva. It was finished during the reign of the Empress Anne, and was at first carried only as far as the Kabona, a rivulet which enters the lake to the east of Schlusselburgh; but it now stretches without interruption from the Volkhof to the Neva. It is 67½ miles long, 70 feet broad, and the mean depth of water is 7 feet in summer, and 10 in spring. It is supplied by the Volkhof and 8 rivulets, and has 25 sluices. The barks enter through the sluices of the Volkhof, and go out through those of Schlusselburgh. In 1778 4927 vessels passed though this canal. The lake of Ladoga is connected with the Baltic by the Neva, with Lake Onega by the river Svir, and with Lake Ilmen by the Volkhof. See Navigation, Inland; Tooke's *Russian Empire*, vol. i.; and Coxe's *Travels in Russia*, vol. iii. p. 374, where the reader will find a plan of the Ladoga canal.

LADRONES, or Marian Islands, a large archipelago on the verge of the Pacific ocean, stretching from north to south about 200 miles, are situated between the 11° and 21° of North Lat. and nearly under the 145th parallel of East Long. They were originally discovered by Magellan in 1521, who first gave them the name of Las islas de las Velas, from the peculiar sails of their prows; but afterwards denominated them Las islas de los Ladrones, from the thievish disposition and dexterity of the inhabitants. Nearly a century and a half elapsed before the Spaniards proceeded to take formal possession of these islands, or to make any kind of settlement upon them; but, about the year 1668, Mary-Anne of Austria, widow of Philip IV. sent out a body of missionaries for the instruction of the natives; and it was owing to this circumstance that they received the name of the Marian, or more properly Mary-Anne islands. About ten years afterwards, a small military force was dispatched to support the missionary establishment; but disputes between the soldiery and the inhabitants were the consequence of this measure; and it was not till the year 1695, that the whole of the islands were completely subjected to the Spanish dominion. These indolent conquerors, however, have done nothing either to improve the condition of the natives, or to render the islands beneficial to their empire; but have merely held them as a post of communication between their possessions in the East and West Indies: Their measures have rather tended to desolate the most fertile of these distant possessions. About the end of the 17th century, an epidemical disorder having thinned the population, the remaining inhabitants of Tinian were cruelly torn from their native shores, to recruit the settlements at Guam, where the unhappy exiles drooped, and died in despair.

The Ladrones are fourteen in number; but only three or four of them are inhabited. The principal are, Guam, or St. John, the largest and most southerly, which is about 35 leagues in circumference, and is situated in 13° 25′ North Lat. (see Guam); Zarpane, or Rota, about seven leagues farther north, and 15 in circumference; Aguignan, or St. Ann, a high island, of difficult access, three leagues round, and 13 north of Zarpane; Tinian, about 12 miles long and six broad, separated from the last mentioned by a narrow strait; Saypan, or St. Joseph, three leagues north of Tinian, and 25 in circuit; Anatachan, or St. Joachim, 10 leagues round, and 36 north of Saypan; Sarigan, or St. Charles, four leagues in circumference, and separated from the last mentioned by a channel eight or nine miles in breadth; Guguam, or St. Philip, still smaller, and six miles farther north; Amalagan, or Conception isle, 12 leagues northward, and five in circumference; Pagon, or St. Ignatius, 10 leagues from the last mentioned, and 14 in circuit; Agrigan, or St. Xavier, at 10 leagues distance from the last mentioned, and nearly of the same size; Assonsong, or Assumption island, nearly 12 leagues northwards, a black, rugged, uninhabited cone, about 40 toises above the level of the sea, with the crater of a volcano on its summit; Urac, a desert isle, three leagues in circumference, and the most northerly of the chain, is situated in 20° 45′ North Lat.

Among these islands are numerous rocks, shoals, and currents, which render navigation extremely dangerous; and there are few safe harbours or roads in the whole group, except on that of Guam, particularly at the town of Agana, the residence of the Spanish governor. The climate of the Ladrones, in general, though they lie under the torrid zone, is serene and temperate, except in the months of July and August, when the weather is intolerably hot; and during the season of the western monsoons, between June and October, when tremendous hurricanes are experienced at the full and change of the moon. Their general aspect is beautiful and picturesque, their mountains and forests covered with perpetual verdure, and their soil naturally fertile and productive. The decreasing numbers and depressed state of the inhabitants, however, have occasioned a deplorable change in those respects; and the most delightful among them have been suffered to relapse, from a state of cultivated beauty, into the rudest forms of an impenetrable wilderness. In the year 1742, the island of Tinian, according to the description given in Lord Anson's voyage, was one of the most interesting and healthy spots in the world. The land rose in gentle slopes from the beach to the middle of the island, occasionally interrupted by vallies of easy descent; and woods of lofty spreading trees, many of them loaded with salutary fruits, covered the rising grounds. The lawns, which skirted the forests in various directions, and of considerable extent, were clothed with a clean and uniform turf, composed of the finest trefoil, intermixed with flowers. This beautiful herbage frequently extended a considerable space under the shade of the adjoining forests, which in many places were entirely free from all bushes and underwood. In these woods were found inconceivable quantities of cocoa-nuts and cabbages on the same tree, guanas, limes, sweet and sour oranges, and the celebrated bread-fruit, besides a variety of wholesome vegetables, such as water-melons, creeping purslain, mint, scurvy-grass, and sorrel. Cattle of a milk-white colour, with black or brown ears, and whose flesh was extremely well tasted, were seen in herds of some thousands, grazing in the meadows; and wild fowl of various kinds, particularly duck, teal, curlew, and the whistling plover, abounded on the fresh water lakes in the centre of the island. Even domestic poultry ranged the woods in great numbers, and could be run down with little trouble. Every circumstance, in short, in the aspect of the country, and the habits of the animals, conveyed the idea of a place recently inhabited, and carefully cultivated. The climate also was peculiarly salubrious and agreeable, cooled by constant breezes, and short refreshing showers; and produced the most astonishing effects upon the diseased and debilitated frames of the seamen. But, in little more than 20 years afterwards, the same spot, when visited by Byron and Wallis, presented a picture, almost in every feature, completely opposite to that which Anson beheld. The woods were overgrown with underwood, and parasitical plants, which obstructed every path. The lawns were covered with rank grass and reeds, furnishing a secure asylum to swarms of centipedes, scorpions, and other venomous insects. The cattle were few in number, and so extremely shy, as to render the pursuit of them a most laborious service. The air was so hot and oppressive, that the seamen could scarcely make the necessary exertion to procure the requisite supplies of provisions; and had so powerful an effect upon the animals which they were able to kill, as to render their flesh almost instantaneously putrid. The water was brackish, and full of worms. The rains were incessant, while a suffocating heat continued to prevail; and the climate proved so unpropitious, that many of the crew were seized with fevers. The fruits were much the same as at the period of Anson's visit; but none of the vegetables, so salutary in the cure of scurvy, were to be found. If the picture drawn by the first voyagers may be supposed to have been overcharged, in the delightful sensations which a sickly crew would experience on reaching a verdant shore, the same reasons should equally have influenced the subsequent navigators, whose description presents so striking a contrast; and, after making every allowance for different seasons and different feelings in the writers, the change must obviously have been great in the state of the island, and furnishes a remarkable instance of the effects produced by human culture on the soil and climate of a country, and of the rapid relapse into all their original wildness, when that influence is withdrawn.

With regard to the productions of these islands, in general, it may be farther stated, that sulphur, and some signs of metals, have been discovered on Guam, and a pearl fishery near the coast of Saypan; that the cotton and indigo trees are very abundant on many of them, and that the most valuable productions of both the Indies might be easily introduced; that, besides the animals already mentioned, there are numbers of wild hogs of a large size, (some of which weighed 200 pounds) guanacoes, particularly on Saypan, which are supposed to have been introduced by the Spaniards; immense swarms of musquitoes, large black ants, a variety of venomous insects, and a species of tick, commonly attached to the cattle, but which was apt to settle on the hands and limbs of the European visitors, and burying its head under the skin, caused a painful inflammation; and that the fish on the coast have been uniformly found to be unwholesome.

The inhabitants of these islands regarded themselves, before the arrival of the Spaniards, as the only human beings in the world, and had a tradition that the first man was formed of earth from the island of Guam. In colour, speech, manners, and government, they bore a great resemblance to the Tagals, the original inhabitants of the Philippines. They appeared even to Magellan to have made some advances in civilization; and several monuments were observed by Anson and other navigators, particularly on the islands of Tinean and Saypan, which indicated the arts and antiquity of the population. Square pyramidal pillars, measuring about five feet at the base, and thirteen feet in height, each surmounted by a semi-globe with the flat surface uppermost, so as to have the appearance of a large bowl, were observed in various parts of the islands, arranged in double rows. These pillars were formed of a composition of stone and sand, with a coating of plaister; and seem to have fallen rapidly into decay, after the depopulation of the island took place. The natives are tall, robust, and well proportioned; of an olive complexion, darkened by the use of cocoa-nut oil, with well grown beards, and long black hair; sometimes tied up on the top of the head. The men wear very little covering, commonly nothing more than a cap of palm leaves; but the women have a kind of petticoat made of mat. Both sexes stain their teeth black, and many paint their bodies with a red colour. They are naturally acute, lively, and ingenious; and the females are described as peculiarly cheerful in their dispositions, and graceful in their deportment. They are said also to be treated with greater respect than is usual among uncivilized tribes; and in the married state, to hold rather a superiority in point of privileges over the men. Their houses, or rather huts, were formed by the palm tree, and divided by mats into different apartments, appropriated to distinct uses, as places for sleeping, eating, working, and holding provisions. Their utensils, though few, were neatly made; and their weapons, consisting only of lances or javelins, were formed of a tough strong wood, and pointed with human bones. But the most striking ingenuity is to be seen in their canoes, called by the Europeans flying prows, or prows which are considered as peculiarly adapted to the nature of the seas and winds around these islands, and as altogether unequalled for simplicity of structure, swiftness of sailing, and ease of management. They are usually about 40 feet in length, 4 in depth, and little more than two in breadth, formed sometimes of a single stern, but commonly of two pieces sewed together with bark, and caulked with bitumen. The mast is above 20 feet high, the sail of a square or rather triangular shape, and capable of being accommodated in such a manner, as to enable the vessel to steer indifferently with either end foremost. The lee-side is perfectly flat, but the windward side is curved like other boats, and is also provided with an outrigger or frame of bamboo, about 12 feet in length, resting on a log 13 feet long, hollowed out like a little boat, the whole being kept steady by braces from the head and stern of the main vessel, and serving to prevent its being overset. These prows will sail, with a brisk wind, at the rate of 20 miles an hour; and nothing can exceed the dexterity of the natives in steering, trimming, and righting them when overset. When such an accident happens, they discover great expertness and presence of mind in the water, to which they are inured from their infancy, and are surpassed by few savage nations in the arts of swimming and diving. They were without any regular government before their subjection to the Spaniards; but have a class of nobles among them, who preserve a high degree of dignity and distance in their intercourse with the other ranks, and are treated with great respect; but possess no farther authority than what their persuasion can secure. These islanders, in short, carry the practice of liberty to the utmost possible extent, and pursue their own pleasure without any controul. Every man avenges his own quarrel; and hostilities frequently occur between the inhabitants of different districts; but their wars, which are conducted with more acrimony than courage, are never sanguinary; and the loss of one or two combatants decides the battle, and usually terminates the dispute. In order to qualify themselves for these martial exploits, they apply with much ardour to active and athletic exercises, such as running, leaping, wrestling, pitching stones, and throwing lances. Their religion consisted chiefly in a superstitious dread of an evil being, and of departed spirits, whom their magicians (who also practise surgery) teach them to appease by stated fasts, and various ceremonies. They have also poets among them, who are greatly admired; and whose songs (which consist in eulogies on their ancestors and nation) the women are accustomed to sing in bands, with a considerable degree of harmony of voice, and gracefulness of gesture. See *Modern Universal History*, vol ix.; Anson's *Voyages*, book ii. ch. i; Byron and Wallis' *Voyage in Hawkesworth's Collection*; Marchand's *Voyage round the World*, vol. ii.; and Mortimer's *Observations during a Voyage to Teneriffe*, &c. and the article GUAM (*q*).

LAGOON ISLAND, is an island in the Pacific Ocean, discovered in 1765 by Captain Cook, and so named from its having a Lagoon in the middle which occupies the greater part of it. It is of an oval form, and is covered with trees, principally cocoa-nut trees, and palm trees. West Long. 139° 28′, South Lat. 18° 47′. See Hawkesworth's *Voyages*, vol. ii.

LAGUNA. See TENERIFFE.

LAHORE, a large and fertile province in Hindostan; lying between the 30° and 34° of North Lat. and extending about 320 miles in length, and 220 in breadth. It is bounded on the north by the province of Cashmere; on the south by Delhi, Ajmeer, and Mooltan; on the east by the river Sutuleje, separating it from Northern Hindostan; and on the west by the Indus, which divides it from Afghanistan. It was reduced by the Mahommedan invaders under Sultan Baber, in the year 1520, and continued for some time to be the principal seat of the Mogul government, before they had established their power in the central parts of Hindostan. In 1582, as described by Abel Fazel, it contained five circars, which were subdivided into 234 pergunnahs; and was capable of furnishing 54,480 cavalry, and 426,086 infantry. It has, of late years, fallen under the dominion of the Seiks, and greatly decayed in its prosperity. It consists of two portions of nearly equal extent; the mountainous districts, which occupy the whole space from 32° north; and the flat country, to the south of this latitude, which is generally known by the name of the Punjab. This appellation is sometimes erroneously applied to the whole province, but properly describes the lower part, referring to the five noble rivers by which it is intersected, viz. the Sutuleje, the Beyah (or Hyphasis), the Chinaub (or Acesines), the Ravey (or Hydraotes), the Behat (or Hydaspes). The climate is generally temperate; and in the northern regions the degree of cold, during winter, is little inferior to that of the central countries of Europe. The Punjab is by far the most fertile part of the province; and, when properly cultivated, produces abundantly wheat, barley, rice, pulse of all sorts, sugar-cane, tobacco, and various fruits. In the eastern parts, the sides of the inhabited mountains, where the earth washed down by the rain is supported by buttresses of loose stones, so as to form ranges of separate flats, produce wheat, barley, and a variety of small grains; while rice, though not the usual food of the inhabitants, is cultivated in the narrow vallies. In the mountainous tract towards Cashmere, pines and willows are seen on the sides of the hills; but the climate of the northern districts being too hot for the Persian productions, yet not sufficiently warm to mature those of India, is unfavourable for fruits and vegetables. In many parts of the province large beds of fossil salt are found; and it is conjectured, that the mountainous tracts are rich in all sorts of minerals. As the country is subject to so many petty chiefs, in a great degree independent of one another, and scarcely subject to any authoritative head, the commerce of the country is greatly obstructed by heavy duties in passing through their different territories; and the regular trade, which the Punjab used to carry on with the other parts of Hindostan, has in a great measure ceased. The Seik chiefs, however, have begun to perceive their error, and are endeavouring to afford facilities, and restore confidence to the merchant. A trifling commerce is, in the mean time, carried on by petty traders, who procure passports from the respective rajahs through whose boundaries they have to pass. In this way the province exports to the countries west of the Indus, sugar, rice, indigo, wheat, and white cotton cloths; and imports from these countries, swords, horses, fruits, lead, and spices.

To Cashmere, its exports are nearly the same; and its imports shawls and other cloths, saffron, and fruits. To the Deccan are exported horses, camels, sugar, rice, white cloth, matchlocks, swords, bows, and arrows; and from that country are imported sulphur, indigo, salt, lead, iron, spices, and European broad cloth. With the inhabitants of the mountainous parts of the province, the people of the Punjab exchange cloth, matchlocks, and horses, for iron, and other smaller commodities. The general rate of the revenue exacted by the Seik chiefs is one half of the produce; but the whole of this assessment is never levied, and the ryots or cultivators are treated with considerable indulgence. Owing, however, to the number of petty hostile states into which the country is divided, and the frequent devastations to which it is exposed, many of its best portions, especially that which lies betwixt the Jumna and the Indus, are very imperfectly cultivated, and much of the land entirely waste. The inhabitants are composed of Jauts, Mahommedans, Rajpoots, and other Hindoos of lower castes, Seiks, and Singhs. The Jauts, originally a tribe of Hindoos, who erected a state in the province of Agra, but no longer exist as a nation, and are chiefly found among the cultivators of the soil in Lahore. The Mahommedans, who are numerous, are, in the Seik territories, a poor, oppressed, and despised race, employed chiefly in tilling the ground, carrying burdens, and performing other kinds of hard labour. They are not allowed to eat beef, or say their prayers aloud, and seldom permitted to assemble in their mosques, of which few in the province have escaped destruction. The natives of the mountains are composed of different classes of Hindoos, and differ very little from the Southern Hindoos. The goitre or swelled throat is very common among them. The inhabitants of the north-west borders are chiefly Afghans, living in small forts, or walled villages, mutually distrusting one another, and often subjected to the depredations of the Seiks. The Seiks, whose religion is a kind of deism, blended with many of the Hindoo and Mahommedan tenets, form one-fourth part of the inhabitants of the Punjab; and are daily increasing in number by converts from other classes. They are chiefly descended from the Hindoos, whom they resemble in their cast of countenance; but, from their fuller diet, are more robust and active, even than the Mahrattas. The original Seiks are full of intrigue, and remarkable from their insinuating manners, possessing all the artifice of the lower classes of Hindoos employed in business, and resembling them in dress, &c. so as to be with difficulty distinguished. The Singhs, a name signifying lions, are those Seiks, by far the majority, who follow the tenets of Gooroo Govind, their last acknowledged religious ruler; and have become a band of ferocious soldiers, distinguished by the free growth of the hair on their heads and beards. They are all horsemen, though many of them serve as infantry in other armies; and their courage is equal to that of any of the natives of India, frequently roused, by their enthusiasm, to a degree of absolute desperation. They are extremely rough and intrepid in their address, speaking invariably in a loud tone of voice. They indulge freely in spiritous liquours, as well as in opium and bang, and are rarely quite sober after sunset. The whole lower orders of the Seiks, or Singhs, are tolerably well protected from the oppression of their chiefs by the precepts of their religion, which teaches universal equality among all who hold their faith, and by the condition of their country, which enables them easily to transfer themselves to the territories and service of a new leader. Owing, however, to the unsettled nature of the government, the whole province is in a most wretched state of cultivation, and is one of the most thinly inhabited in India. The population, dispersed over a surface of 70 000 square miles, is not supposed to exceed four millions. It might otherwise, with its great natural advantages, the remarkable fertility of its southern plains, and the temperate climate of its northern districts, form the basis of a powerful empire; and, from its topographical situation, has been considered as the country from which Hindostan might best be ruled or conquered. See Malcolm's *Political History of India, and History of the Seiks*; Foster's *Journey from Bengal*; and *Asiatic Annual Register*, vol. xi. (*q*)

LAHORE, the capital of the last mentioned province, is situated on the south side of the Ravey river, in North Latitude 31° 50′, and East Longitude 73° 48′. It is a place of great antiquity, and has undergone many revolutions. After its capture by Sultan Baber in 1520, it was for some time the residence of the Mogul sovereigns; and was greatly improved by Acber and his immediate successors. It was afterwards for a long time possessed by the Abdalli Afghans of Cabul, by whom it is named Sikrei; and is now occupied by Rajah Runjeet Singh, the most powerful of the Seik chiefs.* But as Amristir, about 40 miles to the south-east, is the capital of the Seik nation, Lahore has been greatly neglected, and may be said to be in a progressive state of desolation. In 1665, it is said to have been about a league in extent, and is still a town of considerable size, with a good bazar. The walls are lofty and decorated on the outside, but hastening to ruin. The fort is a place of little strength, having no ditch, or defences for cannon. The river on its northern flank, though about 300 yards in breadth, is neither deep nor rapid, except at the height of the rains. There are several manufactories of matchlock barrels, which are esteemed the best in India, and also of cotton cloths, and curious carpets. But the wealthier inhabitants have migrated to Amristir, as a place of greater safety, and many of the best private houses are falling into decay. An avenue, celebrated by early Indian travellers, formerly extended from Lahore to Agra, a distance of more than 500 miles, having an obelisk at the end of every coss, and at every third coss a well for the refreshment of travellers. The principal remaining curiosity in its neighbourhood is the magnificent mausoleum of Jehangeer, within a wall nearly 600 yards square, about two miles north of the city. Lahore is 380 miles from Delhi; 517 from Agra; 639 from Lucknow; 1356 from Calcutta. See Rennel's *Memoir of a Map of Hindostan*; *Asiatic Annual Register*, vol. xi.; and *Asiatic Journal*, vol. iii. (*q*)

LAKE. See Physical Geography.

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* The more recent accounts from India communicate the following intelligence respecting the personal qualifications and political conduct of this enterprising chief. To a fine and prepossessing figure he unites a countenance remarkably animated. His eyes are large, and of jet black, his forehead high, nose aquiline, mouth small, and smile expressive. He possesses a richly endowed mind, is well versed in the Eastern dialects, and speaks with fluency one or more European languages. He selects his ministers with great discrimination, and with a constant regard to their abilities. During the whole of his reign, war has been his delight; but, in a late attempt to conquer Kashmir, he sustained a severe discomfiture, through the treachery of his Sirdars, and gave a cruel vent to his impatience upon his unhappy attendants. He has little confidence in his own subjects as soldiers, but places his chief reliance on the hardy mountaineers of Afghanisdan. At Lahore he is said to appear to great advantage as the father of his people, administering mild and equal laws, patronising genius, relieving poverty, and, without the tyranny of Indian princes, at once awing and attaching his subjects. He is amiable in private life, and courteous in his demeanour, though rather reserved in conversation; but is deceitful in politics, and terrible to his enemies. Under his administration the Punjab is daily regaining its prosperity, by rebuilding of villages, clearing of canals, and sinking of wells.

LALANDE, Joseph Jerome le Français, a celebrated French astronomer, was born at Bourg in Bresse, in the department of the Ain, on the 11th July 1732. At the early age of six, he was anxious to know how the stars were attached to the firmament; two years afterwards, his whole time was spent in writing sermons, which he preached in the habit of a Jesuit; and in 1744, his time was occupied in observing the comet which then appeared. Having been sent to the Jesuits at Lyons, he conceived a great taste for poetry and eloquence; but an eclipse of the sun, which happened about that time, turned his views towards astronomy. His friends, however, had destined him for the bar, and in obedience to their wishes, he went to Paris to study law. A visit to the observatory, however, excited in young Lalande an ardent passion for astronomy, and from that moment he abandoned for ever his professional studies. Having placed himself under the tuition of Delisle, at that time one of the most celebrated of the French astronomers, and professor of astronomy in the College of France, he made rapid progress in his new studies, and endeared himself to his master by the goodness of his disposition, and by his ardent love of knowledge. Lalande also attended the lectures on natural philosophy delivered in the College of France, by Lemonnier, another celebrated astronomer, who was much pleased with the progress of his pupil. The law studies of Lalande being now finished, he received the title of advocate at the age of 18; and, but for an accidental event, he would have been for ever fixed in the profession which had been chosen for him. When Lacaille was about to set off for the Cape of Good Hope, for the purpose of determining the moon's parallax, and her distance from the earth, it was found necessary that corresponding observations should be made in the same meridian, and at the greatest distance from the Cape that could be conveniently obtained. Berlin was chosen as the fittest place for this purpose, being 85° distant from the Cape, and Lemonnier had indicated an intention of making the observations himself; but when the time of his departure arrived, he contrived to get his pupil Lalande appointed in his stead, although he was then only 18 years of age. When the young astronomer was presented to Frederick, he shewed some astonishment at his youth, and remarked, "the academy of sciences has, however, appointed you; and you will justify their choice." From that moment he was admitted at Court, welcomed by the academy, and became acquainted with the most eminent persons of Berlin. The observations of Lalande were made at the observatory of Berlin in 1751 and 1752, and he has published an account of them, and of the results deduced from a comparison of them with the observations of Lacaille, in three memoirs, which appeared in the memoirs of the academy for 1751, 1752, and 1753

Lalande was elected adjunct astronomer in the academy of sciences, on the 7th of February, 1753. He was admitted associate on the 20th December, 1758, and pensioner on the 4th March, 1772.

The first separate work which he published, was entitled *Etrennes historiques à l'usage de la province de Bresse*, and appeared at Paris in 1755.

In 1757, he published his discourse, entitled *L'esprit de justice assure la gloire, et la durée des Empires* which gained the prize offered by the the academy of Marseilles in 1757.

His next work, which appeared in 1759, was a translation of the astronomical tables of Halley, enriched with several new tables, and the history of the comet of 1759.

In 1760, he published the *Oraison funebre de Maurice Comte de Saxe*. In 1763, a discourse *sur la douceur;* and in 1764, appeared the first edition of his *Traité Astronomique*. The only French works on astronomy which then existed, were those of Cassini the younger, Lemonnier, and Lacaille, and there was great room for a fuller and more correct system of astronomy. A second edition of this valuable work appeared in 1771, in three vols. 4to. and was followed in 1781 with a fourth volume, which contained a treatise on the tides, and a large memoir by Dupuis on the astronomical origin of Fables. A third edition was published in 1792, in three vols. 4to. and was regarded as the best work on the subject, till it was superseded by the masterly work of M. Le Chevalier Delambre.

In the year 1760, Lalande was charged with the compilation of the Connaissances des Temps; and between the years 1775 and 1807, he published no fewer than *thirty-two* volumes of that work. In 1770, he published his *Dissertation sur la cause de l'elevation des liqueurs dans les tubes capillaires;* and in 1769, appeared in 8 vols. 12mo. his *Voyage d'un François en Italie dans les Années* 1765 *et* 1766, containing the fullest and best description of Italy that has been published.

Lalande composed all the astronomical articles for the Encyclopedia of Yverdun, which was published in 38 vols. quarto, and also those for the Supplement to the Encyclopédie; and those for the Encyclopédie Méthodique. He wrote also the mathematical articles in the Journal de Savans, from 1766 downwards.

In the year 1761, Lalande succeeded M. De Lisle in the chair of astronomy in the College of France, and he discharged the duties of his new office with such ability, that his school became a seminary of disciples, who filled most of the observatories in the world.

In 1788, M. De Lalande made a journey into England, with the view of witnessing the progress of the arts and sciences in our country, and of bringing to perfection the third edition of his astronomy, with which he was then occupied. He spent much of his time with Dr. Herschel, Dr. Maskelyne, and Mr. Ramsden, and he considered himself as peculiarly fortunate in having had the honour to walk through the 40 feet telescope of Dr. Herschel.

He published about this time his *Traité des Canaux*, and in 1793 appeared his *Bibliographie Astronomique*, in one volume 4to; a work which contains the most complete catalogue of astronomical works that has ever been published, with occasional biographical notices of the different authors. In 1793, he published his *Abrégé de Navigation Historique, Theorique, et Pratique;* and in 1802 he published a new edition of Montucla's *Histoire des Mathematiques*, in 4 vols. 4to. The two last volumes were prepared from the papers of Montucla, with the assistance of Laplace, Lacroix, and other eminent mathematicians. In the same year, he published his pocket volume, containing tables of logarithms, sines, tangents, &c. During the last years of Lalande's life, he published an annual history of astronomy, containing a short view of the most remarkable facts, discoveries, and inventions, with which the science had been enriched during the preceding year.

When the old observatory of the Military School was demolished in 1788, a new one was constructed, at the solicitation of Lalande, and furnished with the best instruments which could then be obtained. The direction of it was given to Lalande; and in 1789, he and his nephew began their observations. Between 1789 and 1791, they had observed about 10,000 of the northern stars, with very excellent instruments.

Lalande was a member of almost all the distinguished academies and societies in Europe, and corresponded with all the principal astronomers of the age. He published no fewer than 150 memoirs in the Memoirs of the French Academy. He died at Paris, on the 4th April, 1807, in the 75th year of his age.

Although the name of Lalande is not associated, in the history of astronomy, with any important discovery, yet there is perhaps no individual to whom this science is under deeper obligations. By the most unremitting activity, during more than half a century, he excited a love for astronomy, and contributed essentially to its progress in every part of the world. He had the honour also of founding an annual medal, which the Academy of Sciences awards to the author of the best astronomical memoir, or of the most curious observation made during the year. A full account of the character and writings of Lalande will be found in M. Delambre's Eloge in the *Memoires de l'Institut*, tom. x.

LAMA. See THIBET.

LAMBERT, John Henry, an eminent German philosopher, was born at Mühlhausen, in the Sundgau, on the 29th of August, 1728. He was descended from a family which had emigrated from France, during the religious persecutions after the revocation of the edict of Nantes. Notwithstanding his early disposition for study, and the testimony which his first teachers bore to the superiority of his talents, the limited circumstances of his parents precluded the possibility of their conferring upon him the advantages of a liberal education, and he was destined to follow his father's trade, which was that of a tailor. But the genius of Lambert soon enabled him to surmount all the difficulties of his situation. In order that he might not lose the knowledge of Latin, which he had acquired at school, he read all the Roman classics that came within his reach; and he procured light for the prosecution of his nightly studies by selling to his companions small drawings, which he found the means of executing amidst his domestic occupations. A work on mathematics having accidentally fallen in his way, it laid open, at once, the richest vein of his genius; and from this book, without farther assistance or instruction, he taught himself the principles of arithmetic and geometry.

With such talents and industry, the uncommon scientific attainments of a youth of fourteen, in his unfavourable circumstances, could not fail to attract notice; and as he had learnt to write an elegant hand, he was taken from the shop-board, and placed, as a copyist, in the chancery of his native town. Soon after, he went, as book-keeper, into the service of M. de la Lampe, who possessed some iron-works in the neighbourhood of Mühlhausen. Here he learnt the French language. Two years afterwards, he was engaged by M. Iselin, at Basle, as his secretary or amanuensis; and in this situation he found opportunities of acquiring instruction in philosophy and the *belles lettres*; while, at the same time, he successfully prosecuted his favourite mathematical studies.

In the year 1749, M. Iselin recommended Lambert to M. de Salis, president of the Swiss confederacy, as a proper person to superintend the education of his children; and, during his residence in the house of the president, at Coire, his thirst for scientific information was amply gratified, by the use of a large and valuable library. Here he accordingly gathered in a store of useful knowledge in various sciences, and learnt several dead and living languages. Here, too, he began to exhibit some of the fruits of his mathematical attainments, by the invention of several machines for facilitating scientific operations; such as his mercurial chronometer, his arithmetical and logarithmic scales, and his machine for drawing in perspective. About this time he was admitted a member of a learned society, instituted at Coire; and he was also elected a member of the Helvetic Society, whose transactions he enriched with a number of mathematical and physical treatises. After a residence of several years at Coire, he accompanied his pupils on their travels through a great part of Germany, Holland, and France; and had thus an opportunity of conversing with a number of the most eminent cultivators of science in Europe. In the year 1758, he formed an intimate acquaintance with the celebrated philosophical mechanic Brander, at Augsburgh; and wrote his *Treatise on Photometry*, in which he set forth new principles upon this interesting, but hitherto neglected subject. During his residence at Augsburgh, he was chosen a member of the newly established Bavarian academy of sciences, with a pension; and, at the same time, with permission to reside abroad, provided he contributed to their transactions; an engagement which he faithfully performed. In the year 1763, he was appointed one of a commission employed to settle the boundaries between the territories of the Valteline and the duchy of Milan; and, after the termination of this business, he repaired to Leipsic, where he published his *New Organon*, a comprehensive system of logic, containing many original ideas, which procured for its author no small portion of celebrity. At length, on the invitation of the great Frederic of Prussia, who fully appreciated his scientific attainments, he went to reside at Berlin, where he was appointed an ordinary member of the academy, and became a valuable contributor to its transactions. On the establishment of a college, for the purpose of superintending the general improvement of the Prussian state, Lambert was appointed chief counsellor for buildings; which situation he held until his death, on the 25th of September, 1777.

Lambert was not less esteemed for the amiable qualities he displayed in the intercourse of life, than he was respected on account of his scientific acquirements. In his manners and habits, indeed, he exhibited many traces of his originally humble situation in life; but these peculiarities were amply compensated by the excellence of his heart, and his uncommon talents. His morals were correct, and he was impressed with a deep veneration for religious truths.

If we compare the difficulties with which Lambert had to contend with the actual extent of his knowledge, and the success with which he prosecuted his scientific researches, he must undoubtedly appear to have been a man of no ordinary genius. Of him, it may be said with truth, that he derived his knowledge more from the resources of his own mind, than from books; and, hence, he always places the subject of which he treats in a new and original point of view. The sciences of logic, metaphysics, and mathematics, were those which he chiefly cultivated. In the two former sciences, as may be seen from his *New Organon*, and his *Architectonic*, he endeavoured to investigate our simple notions, as the basis of all philosophical knowledge, with the same acuteness and precision as the notion of quantity is treated in mathematics. The various branches of mathematical and physical science are eminently indebted to the researches of this philosopher; and his treatises on *Practical Geometry*, *Spherical Trigonometry*, *Optics*, *Astronomy*, *&c.* may be studied with advantage, even in the present more advanced state of the sciences which he proposed to illustrate or extend.

The following list, we believe, will be found to comprehend all his most important publications.

Photometria, s. de mensura et gradibus luminis, colorum et umbræ Augsburgh. 1760. 8vo. This work is very scarce. *Kosmologische Briefe.* Ibid. 1761. 8vo. *Insig-*

niores orbitæ Cometarum proprietates. Ibid. 1761. 8vo. *Neues Organon.* Leipsic, 1764. 2 vols. 8vo. *Beytrage zum Gebrauch der Mathematik.* Berlin, 1765-1772. 3 vols. 8vo. *Architektonik.* Riga, 1777. 2 vols. 8vo. *Freye Perspectio.* Zurich, 1759. 8vo. Second Edition, 1774. 2 vols. 8vo. *Hygometrie.* Augsburgh, 1774. 8vo.

The "*Berliner Ephimersden,*" an astronomical journal, on the plan of the Parisian *Connoissance des Temps*, was originally undertaken at the suggestion of Lambert.

LAMBETH. See Surrey.

LAMP is a well known apparatus for producing artificial light.

A lamp, in the most simple form, has a wick, composed of several cotton threads, partially immersed in oil, contained in a flat dish, furnished with some small support, to hold the upper end of the wick in a perpendicular direction, a small height above the surface of the oil; this oil-holder, or dish, when suspended in a globular glass-case, is the common street lamp. When the wick is lighted, by the application of a burning torch, the heat of its flame causes the oil, which is contained in the wick, to boil, or rise in vapour; and the combustion of this vapour is the flame which produces the light. As fast as the oil in the wick is carried off, by this vaporization, a fresh supply is drawn up, by the capillary attraction of the wick, from the oil contained in the oil-holder.

Hence it appears, that lamps and candles, are both of the same nature as gas-lights. The difference consists in the materials from which the gass is to be extracted, and the manner in which the extracting of it is performed; but in all cases, flame is nothing more than the combustion of gas. In gas lights, an apparatus is previously employed, to make and preserve the gas, and to conduct it to the place where artificial light is to be obtained from its combustion; but in lamps and candles, the heat of the same flame, which produces the light, is employed to vaporize the combustible matter, and form gas for its own maintenance. The difference between lamps and candles is, that lamps are supplied with the combustible matter in a fluid state, but candles are supplied with a solid material; and the heat of the flame must first be employed, to reduce the tallow or wax to a fluid state; and this fluid, which forms itself round the base of this wick, sustains the flame just in the same manner as the oil in lamps. The process of burning in candles has been explained in our article Candle; but, as the combustion is more perfect in well constructed lamps than in candles, it is now necessary to explain these circumstances rather more fully.

The flame which we employ for artificial light, is produced by the combustion of some gas which contains carbonaceous matter; and it is most probable, that the matter, while it burns in these gases, is chiefly composed of particles of carbon, in a very minute state of division. Combustion takes place when the carbon combines with the oxygen of the atmospheric air, in the requisite proportion to produce the carbonic acid gas: and if the oxygen is supplied in a less proportion, the oxide of carbon will be produced in the form of smoke or soot.

The chief circumstance influencing the combustion of the different carbonaceous matters which are used for producing light, is the degree of temperature which they require, in order to make them combine with the oxygen of the atmosphere, in sufficient proportion to produce flame.

The relative affinities of oxygen and carbon increase or diminish according to the degree of heat which they possess at the time of union; and, for this reason, the same carbonaceous matter, which, when properly heated, will combine with oxygen in such a proportion as to produce flame, will only produce smoke, when heated to a less degree; and that degree of heat, which is sufficient to volatilize the carbonaceous matter, is not sufficient to create that affinity for oxygen, which will inflame it; but a higher degree of heat must be applied, or we shall have smoke instead of flame. This we see, whenever a lamp burns with the wick drawn up too high, or when a candle burns with too long a snuff. The wick then exposes a greater quantity of oil to volatilization than the flame can perfectly consume; for the heat of the flame is carried off so rapidly by this volatilization, that it is not sufficient to heat all the gas to that temperature which is necessary for its inflammation. In this state of things, such a portion of the gas as is sufficiently heated, combines fully with the oxygen, and produces flame; another portion is heated sufficiently to combine with the oxygen in that proportion which produces soot; and some small portion will be so little heated, as to escape in the state of vapour of oil, or tallow, part of which will condense by cold into an empyreumatic grease.

The nature of this oily vapour is most clearly exhibited when a candle is blown out by a sudden current of air; this removes the flame sideways from the wick, and carries off so much heat from it, that the gas which it still continues to afford, in the form of a thick white smoke, will not combine with the oxygen of the atmosphere, in sufficient degree to produce either soot or flame. This white smoke, when it cools, forms a rancid tallow, as is evident from its unpleasant odour. This is less obvious in a lamp, because oil seems to require a greater heat to volatilize it than tallow.

These particulars being understood, we may deduce from them the requisite properties for a perfect lamp.

1st, It must be supplied with carbonaceous matter, and with oxygen; 2d, It must convert the former into a gaseous state; and, 3d, it must bring the gas, so produced, in contact with oxygen, at such a temperature, that the carbon will combine with the oxygen, in the fullest degree, to produce the greatest quantity of flame, without any smoke.

With respect to the supply of oxygen, we have no means sufficiently simple for common use, in any greater degree of concentration, than as it exists in atmospheric air; hence all that can be attained in lamps is, to cause a constant and liberal supply of atmospheric air to be given to the flame.

The proper supplying of oil to the flame, depends principally upon the wick. The best material for a lamp-wick, is coarse cotton thread, very loosely twisted; but a coarse article has, of late years, been manufactured from the refuse of the tow of hemp and flax. The most common form of a wick is several threads, put together, and twisted slightly round each other; this is called the *round* wick. It burns well, when of a small size, but does not answer so well for large flames, because the vapour produced from the central part of the wick is not sufficiently supplied with air.

The best form of a wick, is a flat band, composed of a number of threads, disposed parallel, and united by a weft of very slight cotton. If a very great body of light is required, the flat wick is bent into a cylindrical form, so as to form a circle of flame, and the air is admitted to the inside of the ring, as well as the outside.

To make a lamp burn with a clear and steady light, the length of wick standing up above the tube or nozzle, which supports the wick, must be regulated according to its capacity for conducting the oil, otherwise the whole of the oil which it supplies will be volatilized by that portion of flame which surrounds the lower part of the wick. In this case, the upper part of the wick, which is in the centre of the flame, will burn to a charcoal or snuff, which will be an extraneous body in the centre of the flame. This is an unavoidable evil in candles, and must be corrected by the constant application of the snuffers. In a lamp, a snuff must be avoided, by keeping the wick to a proper height.

A snuff in the centre of the flame, produces a smoke, and a great diminution of light, which it occasions, by increasing the body of the wick; and as the air cannot have free access to the wick in the centre of the flame, the gas there produced cannot burn immediately, but must rise upwards, and will inflame when it gets high enough to meet the air, provided it then retains a sufficient heat. This ascent of the vapour before it inflames, is the cause of the pyramidal form of the flame, the vapour arising from the central parts of the wick being obliged to rise to a greater height before it can meet with sufficient oxygen to burn. A large snuff to a lamp or candle, occupies the space that should be filled with flame, and thereby diminishes the heat; it also divides the flame into several small points, instead of being in one pyramid. The real point of the pyramid is wanting; and great part of the gas which should form this point rises in smoke, for want of sufficient heat to make it burn when it has risen into the open air. On the other hand, a wick, which is too little raised above the nozzle, or tube which holds the wick, will not volatilize the oil so fast as it draws it up, because the heated body of wick through which the oil is diffused, is too small in proportion to the quantity of oil contained in it: hence the action of the flame is exerted upon too large a quantity at once to volatilize it perfectly. Still what is volatilized is perfectly burned, and smoke is not produced; but the flame is diminutive, and liable to be extinguished by any shock or current of air.

The simple lamp, of which we have spoken, with a flat dish of oil, is very imperfect. The oil is liable to be spilled, and the oil vessel intercepts a considerable portion of the light in one direction.

On this account, another form of the lamp is used in houses. The oil vessel is a small globe, and the wick rises out of a nozzle formed on the upper side of it. The only objection to this is, that the surface of the oil sinks down as it is consumed, and at length the wick has to draw the oil up from such a depth, that it can only yield a diminished supply to the flame.

The fountain reservoir is a very good method of supplying the wick of a lamp with oil: See Plate CCCXLII. Fig. 11. In this, the reservoir AA, which contains the store of oil, has only one opening in it, and that is in a neck B proceeding from the lowest part. The reservoir must be inverted in order to fill it with oil; but when it is in use, the opening into the neck is immersed beneath the surface of the oil contained in the small cup or dish D. Where the wick C is placed, the oil in the cup D precludes the admission of air, and consequently the oil cannot descend out of the reservoir. But when the oil in the cup D is so far diminished, as to allow a bubble of air to enter into the opening of the neck B, it will rise up into the reservoir, and allow an equal quantity of oil to descend into the cup for the supply of the wick. But as this will raise the oil in the cup, so as to cover the opening into the neck, no more oil can come out until that which is in the cup is consumed. By this means, as long as the reservoir contains oil, the oil in the cup must always preserve the same level, but will never run over. E represents the small nozzle, which holds up the wick in a perpendicular direction. It is a short piece of tube, with three projecting feet at the lower part, which stand in the bottom of the cup.

The fountain reservoir was known by the name of the lamp of Cardan in the time of Mr. Boyle. That gentleman made one in an improved form, which is described in the early *Philosophical Transactions*. It consists only in making the cup D, into which the oil descends, of a considerable area, and forming a communication between this and another small cup, which receives the wick. By this means, the oil is less liable to descend in gluts.

Fig. 10. is a simple lamp, which has the property of supplying the wick very regularly with oil. This is called the automaton lamp; and a Mr. Porter had a patent for it in 1804. The wick is situated at *f*, at one end of a rectangular vessel AA, which contains the oil. The whole lamp is suspended by a wire loop R on centre-pins at *k*, in the manner of a scale beam, so that the lamp is at liberty to librate freely. The position of the centre *k* is such, that the lamp will incline as the oil contained in it diminishes, as is shewn by the dotted lines; and the inclination will in all cases be such, that the surface of the oil will just reach to the proper height on the wick. The makers of these lamps have attained this end from experiment with great precision, and the drawing, Fig. 10. is taken from one of them.

The best kind of lamp is that of Argand, which was invented in France about 1784. The wick is a hollow cylinder or tube; and the upper part of it when lighted, forms a ring or short tube of flame. A rapid current of air is made to pass through the inside of the tube as well as the outside. To produce this current, a cylindrical glass chimney is placed over the flame, and the rarified air which ascends through the chimney, causes a current to pass on each side of the flame, that is, on the outside and inside of the ring of flame.

This lamp is exhibited in Plate CCCXLII. Figs. 1 and 2, the former representing the external form, and Fig. 2, a section of the part called the burner, which contains the wick. A, Fig. 1, is the oil reservoir, from which the oil descends into the oil cistern B, one drop at a time, and is thence conveyed by a pipe C to the burner E. The external appearance of the burner is a perpendicular tube, E; within this is a smaller tube F, (Fig. 2.) which is closely united to the former at the lower end, but both are open at top. The space between the two tubes, therefore, forms a narrow circular cistern, which is freely supplied with oil through the pipe C, but the oil cannot rise above the dotted line *e*, because the oil reservoir A is constructed in the manner of the fountain. The wick G is a circular tube of cotton, placed in the space between the two tubes E and F, and the top or upper end of the cotton rises a little above the tubes at *f*. At that part the flame is produced. H is the glass chimney, which rises up to a considerable height, as shewn in Fig. 1; the lower part is enlarged, and stands on a small circular gallery I I. The interior tube F, Fig. 2. is open at the lower end, and the air can freely enter therein as shewn by the arrows; and this air rising up through the tube F, must pass in contact with the interior of the circular ring of flame. The air for the supply of the external part of the flame enters between the gallery I I, and rises up within the glass chimney, which is contracted at the place most favourable for projecting the air upon the flame. This chimney is one of the great improvements introduced by M. Argand. The heated air in the glass chimney, being lighter than the external air, is forced upwards by the cold air which rushes in beneath the edge of the glass chimney, and also up the interior tube as shewn by the arrows. This cold air passing in immediate contact with the flame affords oxygen to it; and that portion of air which is not consumed becomes heated, and, by ascending the chimney, gives place to a fresh supply of air, so that a constant current is kept up.

Another valuable improvement, first introduced by Argand, is the mechanism to elevate or depress the wick at pleasure above the tops of the tubes E, and thereby regulate the height of the flame. In Argand's original lamps, the wick was raised up by a rack and pinion, but the more modern construction is shewn in Fig. 2. The exterior surface of the tube F, Fig. 2. has a spiral groove or notch formed round it, and the cylindrical cotton wick G is stretched tight over a short piece of tube or ring *r*, which slides up and down upon the tube F, a small tooth projects on the inside of the ring *r*, and enters into the spiral groove. Now it is plain, that if the ring *r* is turned round, its tooth acting in the spiral groove will cause the tube to ascend and descend, and also the wick which is attached to it. To give motion to the ring *r* from the outside, a moveable tube is placed within the tube E and F, and incloses the ring *r* within it. On one side of this tube a notch is cut from top to bottom, and a second tooth, which projects from the outside of the ring, enters into this notch. The tube rises a little above the top of the external tube E of the burner, and has three small wires *p* fastened to it, which descend to the gallery I I, and are fixed thereto so as to support it; the same wires also fit the interior of the glass chimney, and prevent it from being overthrown. By turning the gallery I I round, the tube attached to it is made to turn round, and the projecting tooth of the ring *r* communicates motion to the ring also. As before mentioned, the interior tooth of the ring, acting in the spiral groove, moves the ring *r* and the wick up or down; the notch in the side of the tube, which turns the ring, allows it to rise or fall without communicating a similar motion to that tube or gallery. R is a shade which surrounds the light and prevents its action on the eyes. This is particularly useful for reading or writing, as it also reflects the light upon the paper.

The construction of the fountain reservoir for the Argand lamp, is also explained in Fig. 2. The oil reservoir A terminates at the lower end with a neck which screws into the oil cistern B. A hole *n* is made in the neck at one side for the oil to come out; but this cannot happen until the surface of the oil in the cistern B is drawn down below the dotted line, so as to admit air to enter the opening, and then a drop of oil comes down. The air has free admission into the cistern B through a hole *x*. When the lamp is extinguished, the small knob or handle *t* is drawn up, which closes the hole *n* by the short tube *o* sliding over it, and prevents the oil from being spilt if the lamp is inclined.

The fountain reservoir casts a very extensive shadow, and is therefore best adapted to be placed against a wall. It is a great advantage in lamps to have the oil reservoir situated beneath the burner, so that the light will not be intercepted in any direction; and there are several ingenious methods of raising up the oil to a constant level for the supply of the wick.

Dr. Hook's semicylindrical counterpoise, described in our article HYDRODYNAMICS, Vol. xi. p. 484, was intended to retain the oil of a lamp always at a constant height.

The hydropneumatic lamp is a small Hungarian machine or Chemnitz fountain; see our article HYDRONAMICS. The pedestal of the lamp contains three oil cisterns, one above the other. The upper cistern is at the top of the pedestal, immediately beneath the burner or wick holder, and is made air tight; it has a pipe ascending from the bottom of it to feed the burner with oil; this is therefore the oil reservoir. The second cistern is placed beneath the former, and is open to the external air; a pipe descends from it to the bottom of the third or lower cistern. The latter is made impervious to air, and has a pipe ascending from the top of it to the top of the upper vessel or reservoir.

Suppose the two upper cisterns to be full of oil, and the lower one empty; the oil in the second cistern being pressed upon by the air, the oil in it descends through the pipe to the bottom cistern, and enters therein; but as the contained air cannot escape from this vessel except through the air pipe to the upper vessel or reservoir, it ascends therein, and presses upon the surface of the oil so as to force it up the pipe to the burner, which is constructed, on Argand's plan, as in Fig. 2. The height to which the oil will rise in the space between the two tubes EF of the burner, is regulated by the height of the middle cistern above the lowest, because the pressure of that column of fluid is transferred by the medium of the air to elevate the oil out of the top cistern into the burner.

When all the oil in the second cistern has descended to the lower cistern, the power of action will be exhausted, and must be renovated by inverting the whole lamp, and then the oil from the bottom cistern runs back, and the oil reservoir being again filled, the lamp is again ready to proceed. In lamps for common use, the reservoir is made sufficiently capacious for the consumption of one night; but they have been made for halls and staircases of a sufficient size to hold oil for a month's consumption.

This lamp is called the French lamp, because they were first brought from France. But we have seen a letter from Mr. Watt to M. Argand, dated 1787, suggesting this plan in a form very little different from what is at present used; and in consequence of this, M. Argand first made them in France.

We have lately found a figure of such a lamp in an Italian work, entitled *Le Machine*, by Branca of Rome, published in 1629.

The hydrostatic lamp, first described by Dr. St. Claire in the *Philosophical Transactions*, and afterwards improved by Mr. Keir, is shewn in section in Fig. 3. FF is the burner where the wick G is placed. This may be constructed upon Argand's plan, as we have already described, but the figure represents a flat wick G, with a rack and pinion for elevating and regulating its height above the nozzle. The oil reservoir is situated in the bottom of the pedestal at A, and is closed on all sides, except where a pipe *a b* ascends to the burner E; and also another pipe, which communicates with a small cistern R. The latter is open to the atmosphere, and is filled with a solution of salt and water, which fluid being of greater specific gravity than the oil, a column of it, which is equal in altitude to AB, will sustain a higher column of oil, viz. from A to the dotted line F, which is the level at which the oil will stand in the burner. The proportion of the column of water to that of the oil is generally as three to four. As the oil is diminished by burning, the height of the column of oil will be diminished, and will no longer balance the column of water, which will therefore descend; but on entering into the vessel A it will displace the oil from it, and before the two come again to an equilibrium, the water will have restored to the oil column three-fourths of that height which it had lost by waste. As this loss of weight is to be reckoned on the surface of the large reservoir A, it is very slow; and from the above contrivance, the height of oil only partakes of one-fourth of it. Therefore the height of the oil in the burner is kept sufficiently constant to supply the flame very regularly.

A statical lamp for the same purpose is shewn in Fig. 4. It was invented by M. Edelcrantz. This is on the same principle as Mr. Keir's, except that the maintaining power to raise up the oil is the weight of the lamp itself, or rather the weight of the upper part of it. The oil reservoir is at AA, and is capable of enlarging and diminishing its dimensions. The bottom of the pedestal is a cylindrical vessel LL, which is open at top, and within it is a hollow cylinder n n, closed at the top; the two cylinders are closely joined together at bottom, and form a narrow circular space L n between the two; this space is filled with mercury. The real oil vessel AA is open at the bottom, and the lower edge of it is immersed in the mercury L n, so that the oil cannot escape. A tube a b rises from the oil vessel up to the burner E, which is made the same as in Fig. 2. Now the oil vessel AA, and the burner E, being filled with oil as high as the dotted line DD, it will not be able to escape, because the lower edge of the vessel is immersed in the mercury contained in the circular space n n, but the oil will press on the upper surface of the oil vessel AA with a force proportional to the altitude of the column; and to resist this the vessel must be loaded with weights, x x, in addition to the weight of the burner and superstructure. As the oil diminishes, the oil vessel and the upper part of the lamp will descend, and diminish the capacity of the oil vessel A as much as the oil has lost by burning; because the weight being constantly the same, it will always require a column of the same altitude to keep it in equilibrium, viz. from I to D. Hence in this lamp, though the oil does not stand always at the same level, yet the lamp sinks as much as the oil wastes, so that it is always at the same height below the flame. R is a wire fixed perpendicularly, to guide and steady the lamp when it rises or falls.

Mr. Barton's hydrostatic lamp is on the same principle as that of Mr. Edelcrantz, but is more complete, because it is not so liable to be deranged by a small difference of the load. In Mr. Barton's the external vessel L is carried upwards to a sufficient height to employ water instead of mercury; this will be when the water is as high as the dotted line KK, and it is evident that the effect will then be the same as before described.

Mr. Barton does not employ the Argand burner, but 4 burners with wicks the size of that of a candle.

The lamp which we consider the most perfect for the closet of a student, is the mechanical lamp of Carcel. In this the burner is upon Argand's construction, and the oil is always supplied to it by small double pumps worked by a piece of mechanism in the lower part of the pedestal. The advantage of this lamp is, that the oil can always be supplied in abundance without ever rising too high or sinking too low; the pumps are adapted to raise more oil than the flame consumes, and the superfluity runs over the top of the tube containing the wick, and runs down to the pumps again.

Fig. 5. is a view of this lamp, and a section of the part containing the mechanism for the pumps. AA is the oil vessel; B the pumps from which the oil is carried up by a pipe X to the burner at the top of the pedestal. The mechanism which gives motion to the pumps is contained in the space beneath the oil vessel A; the maintaining power is a clock-spring D, which must be wound up every day by a key like a watch. On the lower edge of the barrel is a cog wheel of 108 teeth; this turns a pinion of 12 leaves on the arbor of a second wheel which has 84 teeth, and turns a pinion of 12 on the arbor of a wheel of 96; this turns a pinion of 12, on the arbor of which is a small crank to give motion to the pumps B; on the same arbor is a wheel which turns a worm, and a fly or fan, to regulate the motion. To convey the motion to the pumps B, which are in the upper chamber or oil vessel, a small arbor rises perpendicularly up through the bottom of the oil vessel. This arbor has a lever on the lower end which the crank actuates, and on the upper end a double lever with two arms turning down to work the two pump pistons; the arbor of the lever passes through a tube joined to the bottom of the oil vessel, and a small glass is cemented round the tube to contain a few drops of treacle, which is viscid, and will not suffer the oil to leak down by the arbor into the wheel-work.

Figs. 6 and 7 represent the double pump. It has two barrels or chambers, with a piston working in each. The pistons a b are only small pieces of steel wire, and the chambers or barrels are holes drilled horizontally in a thick piece of brass B, the wires are accurately fitted to these holes, and require no packing. The valves of the pumps are shewn in Fig. 7; and for the convenience of repairing them, they are situated in the joints between the piece of brass B, which receives the pistons, and two others, plate E and F, one above and the other below; the ascending pipe C is soldered to the upper piece, and all three are firmly joined together by a screw at each angle.

These lamps are in great use in Paris; and we have found them answer their intended purpose better than any of the others which we have tried.

Street Lamps. The common lamps for illuminating the streets of London, are upon a very imperfect construction, being only a flat oil dish for a burner, suspended in a glass vase. No provision is made for the entrance of the fresh air, except through the same chimney at which the smoke and heated air issue. From the defective supply of air, the flame is very weak, and the glass is soon obscured by the smoke. To increase the light, some parishes in London have adopted lamps with lenses, to concentrate the light, and throw it upon particular parts of the foot-path; but as this must abstract the light from other parts of the space which should be illuminated, no advantage whatever is gained by this addition.

Fig. 8. and 9. represent Lord Cochrane's patent lamp, which possesses all the advantages without any of the defects of the common lamp. The glass vase N is made of a hemispherical figure, and the light is placed in the centre, so that the rays pass through the glass perpendicular to its surface. The top of the vase is covered up by a close cover K, from the centre of which a chimney L rises up nearly to the top of the roof or head M, and terminates beneath the openings at the top of the same, where the smoke and heated air issue. To supply the lamp with fresh air, a curved tube f is carried beneath the oil reservoir e, and supplies a constant current of fresh air to the flame, which is situated just between the orifices, or mouths, at the extremity of the air pipe f, one being on each side of the wick, so that they project the air immediately upon the flame. The heated air, which is contained in the chimney L, cannot balance the cool atmospheric air which enters freely through the air-pipe f, and rushing by the flame, displaces the hot air; but, becoming heated, it will be forced up the chimney by the fresh air which follows through the air-pipe. By this means a most brilliant flame is kept up. That as little light as possible may be lost, the oil-vessel e is made very narrow, and the light which is thrown upwards to the cover K, is reflected downwards again on the pavement. The head, or roof M of the lamp, is made with holes all round the lower edge to admit fresh air, and has also an opening in the top to allow the hot air to pass out; but both the air pipe e, and the chimney L, are open to the chamber or space within the head M, and the consequence is, that the flame is never disturbed by winds, because, by the blowing of the wind, the air in the chamber KL is rendered more dense, it will increase the pressure equally upon the orifice of the chimney L, and upon that of the air pipe e, so that the two actions will be balanced.

For the convenience of trimming and lighting this lamp, the roof M is made to take off, but not the cover K. The chimney L is not fastened to the cover, but to a piece which lays upon it: this piece being lifted up, as shewn in Fig. 9. will rise upon a joint, or hinge, at *a*. and the oil vessel *e*, being suspended on the same joint, will be turned up likewise, so that the part containing the wick will rise up through a hole in the centre of the cover into a convenient situation for lighting the wick or replacing the cotton, as seen in Fig. 9. The oil vessel *e* is of the fountain kind; and when it is raised up in this way, the hole, or orifice for the admission of air, will be higher than the vessel, so that the oil can be poured in; but when the oil vessel is restored to its proper situation, as in Fig. 8. this hole will be immersed beneath the surface of the oil in the little cup which contains the burner, so that it can only afford the oil as fast as it is consumed. Lord Cochrane has two patents for these lamps, taken out in 1813, and they are used to great advantage in some districts in London. (J. F.)

A very neat improvement upon the lamp has lately been introduced into this country from France. The oil is contained in a circular rim, in the centre of which is placed the burner, which is supported upon a vertical stand. This circular rim is supported by two slender arms, proceeding to the stand; and as the rim answers the purpose of a support for a hemispherical shade of paper on ground glass, the lamp has the appearance of being supplied with its oil, either hydrostatically or mechanically, from the lower part of the stand.

It would be foreign to the present article to enter into any account of the recent and beautiful discoveries of Sir Humphrey Davy, respecting flame and combustion, or to describe the ingenious safety lamps which he has invented. There is one invention, however, which has arisen from these discoveries, namely, a *lamp without flame*, which we shall here describe, as it may be of great use even for domestic purposes. If a cylindrical coil of thin platina wire, about the hundredth of an inch in diameter, is placed so that part of it surrounds the cotton wick of a spiral lamp, and part of it is above the wick, and if the lamp is lighted so as to heat the wire to redness; then if the flame is blown out, the vapour which ascends from the alcohol will keep the upper part of the wire *red hot*, as long as there is any alcohol remaining in the lamp. This red hot coil of wire is capable of kindling German fungus, or paper prepared with nitre, so that a sulphur match, &c. may be at any time lighted. It is of great importance that the wire should be as nearly as possible the 100dth of an inch in diameter, as a wire of a larger size yields only a dull red light, and a smaller one is very difficult to use. About 12 turns of the wire coiled round a cylindrical body, a little larger than the diameter of the wick, will be sufficient. Four or five coils should be placed on the wick, and the remaining seven or eight coils above it. Mr. Thomas Gill, who has been the first to give a description of this lamp, found, by experiment, that a wick, composed of 12 threads, of the ordinary sized lamp cotton yarn, with the platina wire coiled round it, will require half an ounce of alcohol to keep it red hot for eight hours. During the ignition of the lamp, a slightly acid smell is given out, arising from the decomposition of the alcohol. This lamp has in one case been kept burning for upwards of sixty hours. Mr. Gill used it for several nights in his bed-room with great convenience, and we have no doubt that it will not only come into general use as a night lamp for domestic purposes, but will be of some utility in the arts. See the *Annals of Philosophy for March* 1818. vol. xi. p. 217.

LAMP. Safety. See *Coal* Mines and Safety *Lamps*.

LANARK, the county town of Lanarkshire, is situated on the northern bank of the Clyde, on an elevated situation, 32 miles south-west of Edinburgh, and 25 miles south-east from the city of Glasgow, in 55° 34′ of North Latitude, and 3° 5′ of West Longitude from Greenwich.

Lanark is a place of great antiquity. It is supposed to be the *Colania* of Ptolemy, a Roman road having passed either through or near the town to the site of its castle, formerly a station of that people, in the direction of Loudon-hill into Ayrshire. At an after period, it seems to have been a place of some importance; for here, according to Buchanan, Kenneth II. in the year 978, held a parliament, or meeting of the estates of the realm, the first mentioned in Scottish history.

Lanark was erected into a royal burgh by Alexander the First, whose charter, together with those granted by Robert I. and James V. were confirmed by Charles I. in 1632. These charters, from the ample privileges they confer upon the burgesses, prove that it was at least, in the time of Alexander, the principal place in this district of the country, and even then, the county town, and as such, its inhabitants had the sole right of carrying on commercial business within the shire, all others being prohibited from buying " wool or leather within our said sheriffdom of Lanark, or exercising any other merchandize,"— " or making and dyeing cloths"—" except burgesses of our said burgh."—*Charter of Alexander I.*

In 1244, Lanark, according to Fordun, was almost entirely destroyed by fire, but from what cause it proceeded is now unknown.

At this town, in 1297, Wallace made his first effort to redeem his country from a foreign sway, by taking the place, with a few of his friends, and killing Hesilrig, the governor or sheriff, and upwards of 200 of his countrymen, in consequence of his wife having been unjustly put to death by Hesilrig's orders. The castle of Lanark, which was erected upon the site of the Roman station, or *castellum*, has undergone several sieges. It was built by David I. and, at times, was the residence of that monarch. From this castle, in the year 1197, is dated the charter granted by William the Lion to the town of Ayr, erecting it into a royal burgh. In the negociation which took place between Philip of France and John Baliol, relative to the marriage of Philip's neice to Baliol's son, Baliol, in security of the lady's jointure, mortgaged this castle along with his estates in France and some other lands.

Lanark has, from a very remote period, had the privilege of keeping the standard for all weights that are used in Scotland, as appears from several authentic documents; particularly an act of parliament in 1617, narrating, that of old, the keeping and outgiving of the weights to the burghs and others was committed to this town, and again of new committing to it " the care of the weights," for the public use of the realm. In consequence of enjoying this privilege, new standard weights were sent from London to Lanark at the Union, by which the other weights in Scotland should be regulated.

This town is built nearly in the form of the letter K, its streets diverging from the centre in a similar manner: These are, the *High Street*, which runs east and west in a line with the Bloomgate, and terminates at the cross—a little below which the *Bloomgate* begins, and extends west to the extremity of the town—the *Wellgate*, which branches from the cross in a south-east direction—and the *Castlegate* and *Broomgate*, which likewise diverge from the same point towards the south-west.

Lanark is governed by a provost, two bailies, a dean of guild, and 13 councillors; and has seven incorporations. It is classed with Linlithgow, Selkirk, and Peebles, in sending a member to the British senate. The number of inhabitants has increased greatly since the introduction of the cotton manufacture, and amount at present to about

3000. The general aspect of the town is now much superior to what it was formerly, such new houses as are built being erected in the modern style, and in every respect more agreeable and commodious. In Lanark are several public buildings, such as a town-house, near the centre of the town, with a county-hall, a council-room, court-hall, and weigh-house. Immediately adjoining is the prison, containing the office of the town-clerk, &c. The parochial church is situated in the centre of the town. It was erected in 1772, and is a large modern building, with a square spire, and two bells. The grammar school in Broomgate Street has, besides a commodious teaching room, a large room, containing a library for the use of the inhabitants, bequeathed by the late Dr. William Smellie, a gentleman well known for his skill in the obstetric art. In addition to these, may be mentioned the public markets and the county inn, the last of which is situated in Bloomgate Street, and was built by the subscription of a number of gentlemen interested in the county, the magistrates of the town, and several others. At Lanark are also two churches, or meeting-houses, belonging to such of the inhabitants as are of the Burgher or Relief persuasion.

The principal manufacture carried on here is the cotton manufacture, the staple of the county. A great number of the people are employed in the weaving of muslins, and many at the spinning establishments of New Lanark. Formerly a great quantity of shoes was manufactured, and exported to our army in America, during the war with that country; but this manufacture has been long on the decline. The manufacture of stockings, cabinet-work, the making of [illegible], and tanning of leather, are also carried on. Here are seven fairs annually for the transacting of business, and the buying and selling the produce of the county. They are, in general, well frequented, and often by people from a considerable distance.

The country around Lanark is celebrated for its beautiful and picturesque scenery. The chief objects of attention, and which have long and deservedly been admired, are the *Falls of the Clyde*—the scenes upon the Mouse, called *Cartlane Craigs*—and the great *cotton manufactories*. There are three remarkable water-falls in this vicinity, viz. those of *Stonebyres*, *Corra*, and *Bonnington*. *Stonebyres Fall*, or *Linn*, is situated about two miles below Lanark, and consists of three successive falls, over which the whole body of the river rushes into a deep chasm below. Its height is 64 feet. The ear-stunning noise, the lofty rocks which arise on every side, the variegated copse-wood which covers their summits, and the effect produced from the union of the whole, renders this cataract a scene of great beauty and interest.

The *Corra Linn* is situated about a mile and a half from Lanark, in a southerly direction, and is reckoned the most picturesque of the falls of the Clyde. Here the river, forming two separate falls of upwards of 80 feet, rushes with impetuous force into a deep abyss, and with an incessant and overpowering noise. On every side, the course of the river is environed with rocks of a great height, of the most romantic forms, and covered with trees of every diversity of foliage. Upon the summit of one of the highest, and directly above the upper fall, stands the ruinous castle of *Corra*, formerly the residence of a family of the name of Somerville; and in its near neighbourhood, the modern house of the same name, the seat of Miss Edmonstone. Between these, and situated in a very singular and romantic situation, and immediately upon the verge of the fall, is a picturesque mill, whose feeble wheel, and rugged walls, totter, as it were, with the concussion of the waters. To describe, however, in adequate language, the beauties of the scene, or the effect it has upon every spectator of taste, would be a difficult task. The rushing of the stream—the rapidity of its motion—the dashing of its waters from rock to rock—the thundering noise occasioned by these concussions—the height of the rocks—the ivy-clad and mouldering castle of Corra—and the clouds of mist rising majestically from the abyss below—form altogether a scene unrivalled in the island, and surpassed by few in any other situation.

From the Corra Linn, a walk conducts to the *Fall of Bonnington*, at the distance of about half a mile. This walk is beautifully picturesque: Here, it passes through groves of trees, intermixed with the honeysuckle, the wild rose, and other flowering shrubs; there, it approaches the brink of some precipice, from which the Clyde is seen deep ingulphed amongst rocks, thundering and boiling through a broken and contracted channel. Proceeding thus, a view is at length obtained of the *Fall of Bonnington*.

This fall, or *linn*, consists of one unbroken sheet of water, precipitating itself over the rock into the channel below. Its height is about 30 feet; and though inferior in this and some other respects to the other two falls of *Corra* and *Stonebyres*, yet, with its accompaniments of wood and rock, it presents a scene of much interest and grandeur, and well merits the attention of the stranger.

Returning along the banks, a walk leads to a pavilion, near the house of Bonnington, a seat belonging to Sir Charles Lockhart Ross, Bart. from which, by the position of a mirror, another and reflected prospect is obtained of the Corra fall pouring downwards, as it were, upon the head of the spectator, and which, from the singularity of the view, produces a pleasing and striking effect. From the windows of this summer-house a variegated and romantic prospect is obtained of the scenery down the river and the adjacent country, comprehending the town of Lanark, the village of New Lanark, its extensive cotton works, and many other objects at a greater distance.

To the north-west of Lanark, and on the Mouse, there are also many fine scenes deservedly esteemed. The most remarkable in this direction is Cartlane Craigs, at the distance of somewhat less than a mile from that town. This place, which extends nearly half a mile on both sides of the river, is a most romantic *dell*, bounded on either side by lofty rocks, diversified with natural wood and plantations. The approach from the north, which is the most common point of entry, is particularly striking. A level piece of ground, around which the Mouse makes a sweep, conducts to the mouth of this great chasm, which consists through its whole extent of a succession of grand and picturesque scenes, enlivened by the water of the river, flowing over an irregular and broken channel. In the most sequestered part of this ravine, at some height above the Mouse, and embowered in copses, is a natural chasm in the rock, called Wallace's cave, which tradition and history concur in assuring us was often resorted to by that hero.

Nor is this place valuable merely to the admirer of the scenery of nature—the naturalist will also find ample scope for entertainment, whether by examining its geological formation, or its rich botanical treasures, many rare and curious plants presenting themselves on every hand in traversing its devious windings. An account of the mineralogy of the Cartlane Craigs has been given by Dr. Macknight, in the *Wernerian Transactions*, vol. ii. (D. J.)

LANARKSHIRE, the name of one of the counties in the southern division of Scotland.

The county of Lanark is situated between 55° 14′ 42″, and 55° 56′ 10″ of North Lat.; and 3° 22′ 51″, and 4° 22′

51″ of West Long. from Greenwich. On the north it is bounded by the counties of Dumbarton, Stirling, and Linlithgow; on the south by Dumfries-shire; on the east by Peebles and Edinburghshires; and on the west by those of Renfrew and Ayr. The length of Lanarkshire, from Queensberry-hill on the south, to near the eastern extremity of the burgh of Renfrew on the north-west, is 52 miles; and its greatest breadth, nearly in a line at right angles to its length, from the confines of Peebles-shire on the east at Garvaldfoot, to the source of the Avon, on the frontiers of Ayrshire on the west, is 33 miles. It contains an area of 926 square miles, or 471,278 Scots statute acres.

The principal river of the county, and in point of commercial importance the first in Scotland, is the Clyde; which, traversing the whole length of Lanarkshire, gives it the name of Clydesdale. It collects its supplies from no less than 1200 square miles of surface, including the areas described by its tributary streams. Its farthest source is situated near Queensberry-hill, at the southern extremity of the county, at the head of a rivulet called the Crook-burn, flowing into the river Daer, and which, after a course of several miles, is joined by a stream called Little Clyde; this last has its rise near the mountain of Clydeslaw, in the vicinity of which the rivers Tweed and Annan have also their sources.

The general direction of the river is towards the northwest. In its course, by a noble sweep, it winds around the base of the mountain of Tinto; then leaving the hilly district of the county, and entering the more cultivated division, at no great distance from the southern extremity of the vale of Clyde, it forms the celebrated waterfalls of Bonnington, Corra, Dundaff, and Stonebyres, in the vicinity of the town of Lanark. Continuing to flow through this fine vale, it passes Hamilton, Rutherglen, and the city of Glasgow, a few miles above which it first receives the influence of the tide; and then gliding onwards, with a smooth and gentle current, and passing Renfrew, Dumbarton, and Port Glasgow, it forms the Frith of Clyde, nearly opposite to Greenock, after a length of course from its most distant source to this point, including its various windings and sinuosities of 106$\frac{3}{4}$ miles, and during which it falls no less than 1100 feet.

The Clyde is navigable for upwards of two miles above Glasgow for small vessels and steam-boats, and to that city for such as do not exceed 170 or 180 tons. The improvement of this navigation has been always considered by the inhabitants of Glasgow as an object of great importance; and from an early period, much attention has been paid to it, particularly of late years, by which the trade of the river has greatly increased; and vessels drawing 9 feet 6 inches, can now navigate the Clyde up to the city. This increase will appear from the following short statement, for which the writer of this article is indebted to the politeness of James Spreul, Esq. city-chamberlain and superintendant of the operations upon the river.

On the 8th January, 1813, the number of vessels at the Broomielaw was

	116	amounting to 5591 Tons.
On 2[illegible]th May 1813	125	. . 6056
On 6th May 1817	157	. . 9203
On 16th Jan. 1818	179	. . 10,907

Of this last number there were

30 of 40 tons.
48 of from 48 to 60 tons.
64 of from 60 to 80 do.
29 from 60 to 100 tons, and
8 of 100 tons and upwards.

The revenue of the river, from 8th July, 1816, till 8th July, 1817, amounted to *L*7028 : 0 : 7 Sterling.

The tide flows up the river about three miles above Glasgow, and in spring tides even farther; the flow continues at an average about 4 hours and 20 minutes; and at that city the neap tides rise 3 feet 6 inches, and the spring tides 2 feet higher.

The Clyde is very subject to inundations. The most remarkable on record took place in the years 1712 and 1782. In the former of these years, the water rose 18 feet 6 inches higher than the level of the tide, and in the latter year, on the 12th of March, from 12 to 24 feet, according to the expansion or contraction of the banks in different places. The principal tributary streams of the Clyde are the Daer, the Coulter, the Methvens, the Douglas, the Mouse, the Nethan, the Avon, Calders, North and South, Rotten Calder, Kelvin, Cart, and Leven.

There are three canals connected with this county, viz. the Forth and Clyde Canal, the Monkland Canal, and that of Ardrossan.

The first connects the firths of Forth and Clyde, and runs across the isthmus betwixt the middle and southern divisions of Scotland. It was first proposed in the reign of Charles II.; and the idea was afterwards several times revived, and attempts made to carry it into execution. Many unforeseen obstacles, however, prevented any thing from being done till the year 1764, when a survey having been made by Mr. Smeaton, by desire of the Board of Trustees, a company was formed, and an act of parliament obtained for this purpose in 1768, for making a canal seven feet deep. By this act, the company were empowered to raise *L*.150,000, in 1500 shares, of *L*.100 each, and to borrow *L*.50,000: The dividends to the proprietors not to exceed 10 per cent.; and when it exceeded that sum, the act ordained that the tolls were to be lowered.

The operations upon this canal began on the 10th of July, 1768; and in July, 1775, it was completed as far as Stocking Field, where a side-cut goes off to Port Dundas, in the immediate vicinity of Glasgow. The expence having at this time exceeded the estimate, and the funds being exhausted, an act was obtained from government of *L*.50,000 from the forfeited estates, government drawing dividends with the other proprietors. In consequence of this assistance, the work again recommenced; and the canal was finished in July 1790, when the opening of the navigation took place. This canal is raised from the Carron near the Forth by 20 locks, to the summit level 156 feet, and descends to the Clyde, after passing a remarkable aqueduct over the river Kelvin, by 19 locks, in the whole 39. The extreme length of the navigation is 35 miles; the medium width of the surface of the canal is 56 feet, and of the bottom 27; the depth throughout the whole being 8 feet. Vessels of 19 feet beam, 60 feet keel, and drawing 8 feet water, can pass along the navigation, the banks having been raised a foot since 1787. The canal is supplied with water by 8 reservoirs, which yield annually 24,902 lockfulls. In addition to these, are several streams and feeders, by which an increased annual supply of 29,593 lockfulls can be obtained when required.

That this canal has been productive of great advantages to the country in a commercial point of view, will appear from the following state of its revenue at different periods.

In the year 1774, the revenue amounted to	678	15	$7\frac{3}{4}$
1780, . . .	5236	14	11
1786, . . .	5781	18	$5\frac{1}{2}$
1792, . .	14,122	9	3
1798, . . .	22,17[illegible]	1	0

In the year 1804, the revenue amounted to	*L* 20,872	17	7
1810, . . .	43,454	14	10
1815, . . .	46,974	16	10
1816, . . .	38,361	14	10
1817, . . .	45,000	0	0

The canal connects the city of Glasgow with the extensive coal fields in the parishes of Old and New Monkland. It was projected and cut, principally for the purpose of supplying that city with coal. It is 35 feet in breadth on the level of the water, and 24 at the bottom; its depth is 4 feet 6 inches; and the upper and lower levels (at a place called Blackhill, where the ground ascends to the east) are connected by 4 locks of 2 chambers, of 71 feet in length. The principal article carried on the canal is coal; but, besides this, there are also transported iron, manure, &c. paying a certain tonnage per mile; and as it is now connected with the Forth and Clyde Canal, its utility is every year becoming more apparent, and more especially since boats have been established upon it for the conveyance of passengers.

The Ardrossan canal was projected by the Earl of Eglinton, about the year 1805. It was intended to form a communication betwixt the city of Glasgow and the frith of Clyde at Ardrossan. A stock having been raised by subscription, a survey made, and legislative authority obtained, the operations were begun in 1807; and in October 1811, that part of the canal, betwixt Port Eglinton, near Glasgow, and the village of Johnston, was opened, being a distance of 11 miles. Upon this part of the canal, which is all that has been yet finished, the sum of *L*.110,000 Sterling has been expended. The cutting of the remaining part of it to the harbour of Ardrossan, is estimated at *L*.143,000; but, owing to the want of funds, the work is at present at a stand. When completed, its length will be 32¾ miles; its breadth is 30 feet, and 4½ in depth. Before it is completed, it will require 21 locks, viz. 8 betwixt Johnston and the summit level, and 13 betwixt that point and the sea at Ardrossan. Besides the vessels employed upon this canal for commercial purposes, there are 3 boats for the conveyance of passengers to and from the city of Glasgow.

The principal roads are those leading from Glasgow to Edinburgh; from Glasgow to Carlisle; from thence to Greenock, Ayr, Paisley, Lanark, Muirkirk, Dumfries, and Stirling; and from Edinburgh, by Hamilton, into Ayrshire; from the same city, by Biggar, to Leadhills, &c.; and from Lanark to Edinburgh. From the great resort to the city of Glasgow, the tolls upon such of the roads in this county as lead thither, let annually at a great rent. These in the immediate neighbourhood, in 1815, yielded *L*.20,000 Sterling; and one in particular, the Gallowgate toll, let at no less a sum than *L*.5630 Sterling, being nearly *L*.100 more than the rent of the preceding year.

The chief bridges in the county are upon the Clyde. In the upper part of the river, are the bridges over Little Clyde; and at Elvanfoot, along which the great road leads from Glasgow to Carlisle. Farther down are Wolf Clyde bridge and Thankerton bridge. Hyndford bridge, two miles from Lanark, crosses the river where it is 140 feet in breadth, and is a very beautiful structure, built about 40 years ago. The old bridge of Lanark was erected about the end of the 18th century. It has three very fine semicircular arches, and had lately a gateway, but which is now removed. Garion bridge is situated nearly half way betwixt Lanark and Hamilton. It is the latest structure on the Clyde, and was opened 12th January, 1818, for the accommodation of the public. Hamilton bridge was built in 1780. From a sudden inundation of the Clyde, part of it gave way, and fell into the river about five years ago, and it has never yet been repaired. Bothwell bridge is an ancient structure, famous for a skirmish in the reign of Charles II. between the covenanters and the king's army, in which the former were defeated with great slaughter. Rutherglen bridge, near that town, was built in the year 1776. The old bridge of Glasgow. This is the most ancient structure, it is believed, on the river, having been erected by Bishop Rae in 1345. It consisted of eight arches. Two of these, on the north side, have for many years been built up. One of its arches fell in 1671, and was again rebuilt: it was also since widened and repaired. Eastward from this bridge, is a very handsome wooden bridge erected in 1803, and placed in the situation of a stone bridge founded in 1794; but which, before it was completed, was swept away by an inundation. The New or Jamaica-street bridge is the lowest on the Clyde. It was founded in 1767, and opened for carriages in 1772. The aqueduct bridge across the Kelvin, and along which the great canal is carried, is a very strong and beautiful structure, about three miles north-west from Glasgow. It is the largest in Britain, being 275 feet in length, and 68 feet in height above the river Kelvin. It cost the Canal Company *L*.9058, and was founded in the year 1787. Excepting an old Roman bridge over the South Calder, the most ancient bridge upon the other rivers of the county is perhaps Avon bridge, near Hamilton. It was built previous to the middle of the 16th century. The old bridge of Partick, over the Kelvin below Glasgow, is likewise of some antiquity, having been founded about the year 1577; and great part of it erected at the expence of Crawford of Jordan Hill, whose arms are still to be seen on the west side.

A reference having been made to Lanarkshire in the article GLASGOW, in this work, for an account of the Gorbals, in that county, the following short historical sketch and description of that barony is in consequence inserted here.

The barony of Gorbals, including the populous villages of Hutcheson town, Larieston, and Tradestown, is situated on the south bank of the Clyde, immediately opposite to the city of Glasgow. The lands of Gorbals appear anciently to have belonged to the see of Glasgow, with the exception of a certain space towards the eastern boundary, which, in the 13th century, was the property (together with the grounds upon which the Bridgegate of Glasgow is built) of Lady Campbell of Lochow. That lady having erected an hospital for lepers upon her lands near Gorbals, named St. Ninian's Croft, she assigned the revenues thereof, together with the feu duties of Bridgegate, for its support, and which were collected as late as the year 1634.

Upon the erection of the barony and regality of Glasgow by James II. in 1450, the lands of Gorbals were included in that jurisdiction; and, immediately after the Reformation, they were feued out by Archbishop Boyd to George Elphinston, merchant in Glasgow, whose son Sir George Elphinston, Lord Justice-Clerk, obtained a charter of confirmation from James VI. in 1611 of the grant of the archbishop; and by which charter these lands were disjoined from the barony of Glasgow, and erected into a separate barony and regality with the usual powers and privileges. Sir George Elphinston having become insolvent, the property was attached by his creditors, and sold by them to Robert Douglas, Lord Viscount Belhaven; who, dying without issue, was succeeded in his estates by Sir Robert Douglas, of Blackerston, by whom the barony of Gorbals was sold in 1647 to the magistrates and town-council of Glasgow, the Trades' House, and Hutcheson's Hospital; the latter having purchased one half of the property at the price of *L*.40,666. 13s. 4d. Scots, and the other half being equally divided betwixt the magistrates and the

Trades' House. In virtue of this disposition, the magistrates of Glasgow became vested in the superiority and right of regality, which they still retain.

The lands and barony of Gorbals, till the year 1771, formed part of the parish of Govan. In that year the village and burying ground, containing about 12 or 14 acres, were erected into a new parish; and afterwards the lands of Little Govan and Polmadie, containing about 500 or 600 acres, together with the whole barony of Gorbals, including upwards of 400 acres, were annexed to the parish of Gorbals. The village of Gorbals had most likely its origin soon after the building of the old bridge of Glasgow, and at an early period, from its situation, was called Bridgend. It had for many years, however, made little progress; as we are informed, that so late as the beginning of the last century it consisted only of a few thatched houses on each side of the great road from the south end of the old bridge. These were mostly possessed by maltmen, who carried on the principal business of the village. In the year 1730, it had increased considerably; the intermediate spaces betwixt the old houses being filled up with others, so as to form a regular and connected line of street. In 1748, the greatest part of the village was burnt, after which the houses were built after a more modern plan, some consisting of two and others of three stories in height. It is only, however, within these 28 years that any remarkable improvements or additions have been made with respect to the laying out of new streets, or erecting buildings on this barony. Previous to that time, the only street, properly so called, was that running southward from the old bridge, and from which branched two or three lanes, as Rutherglen lane and Paisley lane, leading to these places. Since then, and in 1794, the directors of Hutcheson's Hospital have feued their property to the east of the old village of Gorbals, which now forms Hutcheson Town, having several broad and spacious streets, and regular and well built houses. The Trades' House of Glasgow and other proprietors have, in like manner, feued the grounds to the west; and in this situation are Lawrieston and Tradestown; the last feued in 1790, which also contain many excellent streets. The finest of these is Carleton Place, a beautiful range of buildings, scarcely to be surpassed in Scotland, upon the banks of the Clyde, between the old and new bridges of Glasgow, and immediately opposite to Clyde street, Charlotte and Claremont places, in that city.

It has been already mentioned, that an hospital, called Leper's Hospital, was erected here about the middle of the 13th century; it was situated, with its burying ground, to the east of the Old Bridge, but no vestiges of it have been observed for more than a century. An old chapel, dedicated to St. Ninian, still remains on the east side of the principal street of Gorbals, adjoining to which is a square tower, with turrets, now used as a prison, &c. which was built by Lord Viscount Belhaven, about the beginning of the 16th century. The chapel is now used as a court-house, police office, &c. The old church of Gorbals, situated to the west of the main street, was built as a chapel of ease to Govan in 1729, and used as the parish church till within these few years. It is now a Gaelic chapel, where worship in that language is regularly celebrated. The new church is a handsome modern building, facing the Clyde to the east of Carleton Place, with a fine spire, 174 feet high; it was erected in 1810. In Hutcheson Town is a meeting-house for a Relief congregation, built several years ago, and in Tradestown, another for the Methodists, on an elegant plan, erected in 1812.

The barony of Gorbals is governed by a magistrate, appointed by the magistrates and town-council of Glasgow, who is one of that body, and under whom are two deputies or magistrates resident within the barony, who hold regular courts for the discussion of cases, either civil or criminal. An excellent system of police has also been established of late years, which has been found of the greatest service to the public, by the protection it affords to the persons and properties of the inhabitants.

The population of the parish of Gorbals, including Hutcheson Town, Lawrieston, and Tradestown, has of late rapidly increased. An enumeration was made two years ago, when it was found that the inhabitants amounted to 17,000; but, as the buildings have been still increasing, the amount of the population may be stated at present, January 1818, at no less than 20,000. See Denholm's MS *History of Lanarkshire;* Nasmyth's *Agriculture of Clydesdale;* Denholm's *History of Glasgow;* Hopkirk's *Account of the Forth and Clyde Canal; Statistical Account.* (D. J.)

LANCASHIRE is a maritime county on the north west coast of England. It is bounded on the north by Westmoreland, and a part of Cumberland; on the east by Yorkshire; on the west by the Irish sea; and on the south by Cheshire. In shape, it is very irregular; at the northern extremity, there is a considerable portion of it entirely detached from the rest, across an arm of the sea. Indeed it may, in some measure, be regarded as composed of three peninsulas, of which this just mentioned is one. This is comprehended between the river Dudden, which separates it from Cumberland, and the Ken, which divides it from Westmoreland; the second peninsula lies between the Ken and the Ribble; and the third between the Ribble and the Mersey, which is the boundary betwixt this county and Cheshire. The first of these, which Camden and other ancient geographers call Furness-falls, and which is still known by the name of Furness, is in some places 14 miles from north to south; but in most, not above seven, and about 18 from east to west; the line of coast, however, stretches upwards of 30 miles. The second peninsula, or natural division of Lancashire, which is comprehended between Westmoreland, that divides Furness from the rest of the county, and the river Ribble, was called by the Saxons, Acmundi-ness; by the Normans, Agmardernesse; and now commonly Anderness, extends about 25 miles from north to south, and about 12 miles from east to west. The last natural division of the county lies between the rivers Ribble and Mersey; it is the largest and finest part of Lancashire, extending about 22 miles from north to south, and in some places 35 from west to east.

The greatest length of the whole county is about 74 miles; its greatest breadth, which is at the southern end, 45; its circumference 34 miles; its area covers about 1800 square miles; and the number of acres is about 1,200,000. It is divided into six hundreds; Salford, West Derby, Leyland, Blackburn, Amounderness, or Anderness, and Lonsdale. The number of parishes in Lancashire is extremely small, considering the size of the county, proving its thin population at the period when they were divided; they amount only to 61. There are 27 market towns, of which the principal are, Lancaster, the county town; Liverpool and Manchester, nearly of a size, and next in population to London; Bolton, Rochdale, Preston, Garstang, Wigan, Berry, Warrington, &c. It returns 14 members to Parliament; two for the county; two for Lancaster; two for Preston; two for Clitheroe; two for Wigan; two for Liverpool; and two for Newton. It is in the province of York, and diocese of Chester and Carlisle, and in the northern circuit.

Lancashire is a county palatine. The duchy was forfeited to the crown in the first year of Edward IV.; and at the same time an act was passed to incorporate it with the county palatine. The landed property which his majesty possesses, as Duke of Lancaster, is of great extent, and lies in the most northern parts of the county. The court belonging to the duchy of Lancaster has the power of deciding all causes belonging to it; and amongst its officers, has a chancellor, attorney-general, &c.; the offices of the duchy court are at Somerset-place, London.

The principal rivers of this county are, the Irwell, the Mersey, the Douglas, the Ribble, the Calder, the Wyre, and the Lune; they all direct their course to the west, and fall into the Irish sea. The Irwell rises on the hills that form the boundaries between Lancashire and Yorkshire. Its first course is to Bury; it then bends to the west, and afterwards to the south-east, to Manchester, where its waters are enlarged by two streams: its course is again changed to the west, till it falls into the Mersey below Flexten. The Mersey rises on the borders of Cheshire and Derbyshire; it divides Cheshire and Lancashire, for a course of nearly 60 miles, about 35 of which are navigable from Liverpool, where it falls into the sea, to the mouth of the Irwell. The Ribble rises in the Craven Moors in Yorkshire: its course is first south to Clitheroe; it afterwards declines to the west to Rochester, and the valley of Ribblesdale, to Preston; and soon afterwards falls into the Irish sea, by a very broad estuary. The Lune rises in the falls of Westmoreland; and, being formed by several streams, it flows through the valley of Lonsdale to Lancaster; here it becomes navigable; and two miles below the town, bears ships of considerable burden; it also joins the sea by a very broad estuary. The Dudden, which divides the west side of Furness from Cumberland, at its junction with the sea, forms a considerable bay, at high water. The Crake, which runs nearly parallel to the Dudden, connects Thursten water with the sea, at Leven sands.

In describing the sea coast of Lancashire, we shall begin at its southern extremity. The Mersey empties itself into a great estuary filled with banks, and crossed by a bar, over which, at low tide, there is but a foot or two depth of water; but the tides rise very high, from 21 to 28 feet. The coast here is very flat, and in some places the sea is encroaching on it, particularly between the Ribble and Morecombe Bay. In the estuary of the Ribble there are many sand banks, dry at low water, but on which the tide rises six fathoms. Morecombe Bay is a large gulf, between the mainland of Lancashire and the peninsula of Furness. Off the extremity of this peninsula are several islands, the principal of which is called Walney; which is ten miles long and one broad. It is so low that it is frequently nearly inundated. It would appear that these islands were formerly in one, and probably connected with the main land.

In our description of the rivers and coast of this county, it will be seen that the former generally empty themselves into the sea, with very broad and shallow mouths, filled with sand banks. This is caused by their taking their rise in the mountainous districts in the east county—the constant rapidity of their streams—and the shortness of their course. The sands of Lancashire most noted, are those of Lancaster and Leven. By an inspection of the map of the county, it will appear that the shortest route to the Furness district is across these sands; hence, though this route is extremely dangerous, it is frequently pursued. At three miles from Lancaster the Lancaster sands commence. They are fordable at low water for a distance of about nine miles. The Leven sands lie between Cartmel and Ulverton. At spring tides the water sometimes rises 15 feet over them.

In the north of Lancashire are several lakes. Coniston lake, or Thurston water, is about seven miles long, from north to south; but its greatest breadth is not more than three quarters of a mile from east to west. Its greatest depth of water is forty fathoms. There are several small bays on its shores, which are lined with coppice woods, small farms, and rocks. The scenery of this lake is much praised by Mrs. Radcliffe. It abounds in fish; and the char found in it is much esteemed for its flavour. Esthwaite water is about two miles in length, and half a mile broad. It is nearly divided by two peninsulas, one of which projects from each shore. The scenery of this lake is rather mild and pleasing, than bold, romantic, or picturesque. Formerly there was in it a floating island; but latterly it has become stationary. There are several varieties of fish in it; but it is remarkable, that though it is connected with Windermere, no char is found in it. The lake of Windermere may be regarded as belonging partly to Lancashire and partly to Westmoreland, as it divides the district of Furness from the latter county. It is fifteen miles long, with an average breadth of one mile; but, in some parts, its breadth does not exceed 500 yards. Its greatest depth is about 201 feet. It is famous for its char.

No county in England abounds more in canals than Lancashire. The first complete artificial navigation was formed in it. This is called the Sankey Canal, and forms a navigable communication between the Mersey and the coal and copper works near St. Helen's. Its length, from the place where it separates into three branches, is 9¾ miles. The whole distance from the Mersey is 11¾ miles. There are eight single and two double locks upon it, with 60 feet fall. The chief article carried upon it is coal. Besides this canal, Lancashire is intersected by parts of nine others, four of which communicate with Manchester. The Ashton-under-line runs from that town to Manchester. Its length is 11 miles, with a rise of 152 feet. Near Duckenfield-lodge it unites with the Peak-forest canal; and at Fairfield, a branch goes off towards Oldham. One part of the Duke of Bridgewater's canal runs from Manchester to Worsley, a distance of nine miles. At Worsley it is carried under ground to the collieries. Near this place, a cut branches off to Chat Moss. Another portion of the Duke of Bridgewater's canal runs from Manchester to Runcorn, in Cheshire. The Manchester, Bury, and Bolton canal, commences at the Mersey and Irwell navigation, near Manchester, and terminates at the town of Bolton. At Bury is a branch four miles long, which joins the Haslingdean canal. The Rochdale canal connects the Bridgewater canal, at Manchester, with the Calder navigation, near Halifax. The Douglas river navigation commences at the estuary of the Ribble, and terminates in the Leeds and Liverpool canal, at Brier's Mill. The whole rise from the Ribble is 49 feet. The Leeds and Liverpool canal begins in the Mersey, at the lower part of Liverpool. It passes by Ormskirk, crosses the river Douglas, and afterwards the Lancaster canal, near Houghton Tower. The Lancaster canal runs upwards of 75 miles, through nearly the whole county of Lancashire, and part of Westmoreland. It begins at West Houghton, and thence proceeds to Wigan, Preston, Garstang, and Lancaster. Here it is carried over the river Seine by an aqueduct of five arches. It passes out of Lancashire near Burton. The great object of this canal, one of the most important in the kingdom, is to open a communication between the coal and limestone counties; the county north of Preston being destitute of coal, but abounding in lime.

Besides these canals, several rivers in Lancashire have been rendered more fit for navigation than they naturally were. In order to render the Mersey, above Warrington, navigable as far as Manchester, through its communicating branch the Irwell, an act of parliament was obtained near a century ago; and the object has been effected by means of wears, locks, &c.; but the Duke of Bridgewater's canal has rendered this navigation of little use or profit. About the same time, the navigation of the river Douglas was also improved by artificial means; but this has been since purchased by the proprietors of the Leeds and Liverpool canal, who have, in part, substituted an artificial cut for the natural channel of the river.

The most abundant and valuable of the minerals of Lancashire are its coals. Immense beds of them are found in the southern parts, and towards the centre; but none, as has been already remarked, beyond Preston. The hundreds of West Derby, Salford, and Blackburn, are most abounding in this valuable article. There is one species of it almost peculiar to Lancashire. This is called Cannel coal. It is found at Haigh, near Wigan. It burns with uncommon brilliancy, without smoke. It is very apt to fly into pieces, if not placed on the fire in a particular position. It is very hard, and susceptible of a high polish. If broken transversely, it presents a smooth conchoidal surface. Limestone abounds in the north and north-east parts of the county; but none is found in the south or western parts, except near Liverpool, where it is met with in small quantity, and at a great depth; and near Leigh and Manchester, where lime peculiarly adapted for tarras occurs. Marle is abundant in the south and western parts of the county. Stone of various sorts abounds in Lancashire. Quarries of an excellent sort are wrought near Lancaster. It bears an excellent polish. Lancaster is entirely built of it. At Holland, near Wigan, there are quarries of flap and grey slates; and large quantities of blue slates are procured from the hills near Hawkshead. They form a lucrative branch of the export trade of the county. Scythe stones are obtained near Rainford. With respect to the metals, iron ore abounds in Furness; and at Anglesark, near Chorley, is a lead mine, consisting of several veins, intersecting the strata of the county almost perpendicularly, and running in various directions. These mines are noted for containing carbonate of barytes. In the north of the county some copper mines have been wrought, but not to much advantage.

It has been observed, that there is a greater length of roads in this county, in proportion to its extent, than in any other county in the kingdom: in the north, and north-eastern parts, they are made of limestone: in the middle and southern parts, the roads are paved with stones, principally brought from the Welsh and Scotch coasts. On the road between Manchester and Liverpool, slag or copper scoria has been advantageously used.

Lancashire is the most manufacturing county, without exception, in the kingdom. Its staple manufacture is that of cotton in all its branches; but as we have entered very fully into a view of this manufacture, in our account of the Statistics of England, our notice of it here must be brief and general. Manchester may be considered as the centre of the cotton spinning and manufacturing district. From this town this branch of trade has spread southwards into Cheshire, and northwards as far as Preston; various branches of it are also carried on at Bolton, Chewbent, Bury, Wigam, Blackburne, &c. Besides those employed in spinning and weaving cotton, there are bleachers, dyers, printers, tool and machine makers, &c. There are also in Lancashire, manufactories of woollen goods, hats, especially at Oldham, stockings, pins, needles, nails, watch-movements, tobacco, and tobacco-pipes, snuff, earthen-ware, English porcelain, paper, &c. There are also large works for smelting iron and copper, and for casting plate glass, and the making of common glass, white lead, lamp black, vitriolic acid, &c.

The commerce of Lancashire is also very great; almost entirely from Liverpool to America, the West and East Indies, Africa, the Mediterranean, Spain, Portugal, Ireland, &c. Lancaster also enjoys some commerce, but the quantity is proportionally small; and it seems to be declining. The principal articles of export are the various manufactures of the county; and the principal articles imported, are cotton, wool, sugar, tobacco, rice, timber, corn from Ireland, &c.

It is generally supposed that the Brigantes inhabited Lancashire at the period of the Roman conquest. According to the authority of Ptolemy, however, they were preceded by a tribe, whom he calls the Segantii. The Romans entered their territory, under Julius Agricola, about the year A. D. 79; and Mr. Whitaker says, that the principal Roman stations were formed at this period, of which Mancunium, or Manchester, was one. The Romans also formed several excellent roads through the county. The whole of Lancashire, along with Yorkshire, &c. was called by the Romans Maxima Cæsariensis, or Britannia Superior; by the Saxons it was included within the kingdom of Northumbria. Soon after it was conquered by Egfrid. About the year 680, it was formed into a separate county. Soon afterwards it was divided into hundreds, tithings, &c. South Lancashire was at first divided into three hundreds, and just before the conquest, subdivided into six. Previous to and under the early Norman sovereigns, this county was distinguished as an *honour*. Landed honours generally belonged to the king, but were sometimes granted in fee to noblemen. Soon after the conquest, three noblemen held the honour of Lancaster; but king Stephen confirmed it on his son, and thenceforward it seems to have been attached to those of royal blood. In the time of Henry III. it was constituted an earldom; and in the time of Edward IV. the dukedom of Lancaster was created. John of Gaunt procured it to be raised to the dignity of a county palatine. The antiquities of this county are by no means numerous or interesting.

In the year 1803, the poor's rate of this county amounted to 230,765*l.*: for the year ending 25th of March 1815, the sum paid by 449 places (for, in consequence of the great extent of its parishes, they are subdivided into townships) amounted to 383,217*l.* 3*s.* 10¼*d.*: returns had not been obtained from three places. From comparing the returns in 1803 and 1815, it will appear, that the poor-rates of this county have not increased in a very great degree. In the year 1776, the sum of 56,163*l.* was raised; and the average of the years 1783, 1784, and 1785, was 80,301*l.* In 1803, the number of persons relieved was 46,200, or 7 in the 100 of the population; the money raised was 6*s.* 10½*d.* per head on the population; the rate at which each pauper was relieved, was 3*l.* 9*s.* 3¼*d.* Nine hundred and fifty-seven friendly societies were enrolled at that time; and the number of members was 104,776, or 16 in the 100 of the population; the number of children in schools of industry was 1704.

The population of Lancashire was very thin before it became a manufacturing county. In the year 1700, it amounted only to 166.200; in the year 1750, it had increased to 297.400: in the year 1801, it had augmented extremely, being 695,100; and in the year 1811—828.309.

The population, in 1811, is nearly at the rate of 380 the square mile. The baptisms were 1 to 29, the burials 1 to 48, and the marriages 1 to 108. See Aikin's *Manchester; Beauties of England and Wales*; and Dickson's *Agricultural Survey*. (W. S.)

LANCASTER, a town of England, in the hundred of

Lonsdale, in the county of Lancashire, lies in 54° 4′ North Lat. and 2° 56′ West Long. It is 239½ miles N. N. W. from London. It is a borough, the civil government of which is vested in a mayor, 12 aldermen, a recorder, 2 bailiffs, 12 common councilmen, or capital burgesses, &c. It returns two members to parliament. The right of election is vested in the freemen, who amount to about 1000. The returning officers are the mayor and two bailiffs. This town is situated on a gentle ascent, on the top of which stand the church and castle. The river Lune makes nearly an acute angle on the north side of the town. The direction of several of the principal streets are from it to the south, the church and castle being in some measure detached. Hence it will appear, that the situation of Lancaster is, upon the whole, striking. The houses are in general good, being built of an excellent freestone found in the neighbourhood, and covered with slate. Many of the streets, however, are narrow. The most important, as well as the most interesting public building in Lancaster, is the castle. It is supposed, that the Romans first built a castle on the site of the present one, and that part of the old foundations are still visible; and it is pretty well ascertained, that the large square keep was the work of the Saxons. But the main building was the work of Edward III. and his son John of Gaunt, whom he created Duke of Lancaster. Its walls cover an area of 380 feet from east to west, by 350 feet from north to south. At present, the whole is appropriated to the county gaol. The summit commands very extensive views, embracing the windings of the Lune, Morecambe bay, the mountains of Cumberland, Westmoreland, and Yorkshire. The shire hall, a beautiful modern structure, and the county courts, are attached to the castle. The other public buildings are, the town hall, theatre, custom-house, assembly-room; and over the Lune there is a very grand bridge, which was built by the county at the expence of 12,000*l*. About a mile to the north-east of the town is the aqueduct-bridge of the Lancaster canal, which consists of five arches, and cost 45,000*l*. Barges of 60 tons can pass over it. This town has communication, by internal navigation, with the rivers Mersey, Ribble, Ouse, Trent, Derwent, Severn, Humber, Thames, Avon, &c. This navigation, including its windings, extends about 500 miles into the counties of Lincoln, Nottingham, York, Westmoreland, Cheshire, Stafford, Warwick, Leicester, Oxford, Worcester, &c. There is scarcely any manufactory of consequence in Lancaster. It is chiefly celebrated for its cabinet ware. The spinning of twine, printing of cotton, and weaving of sail cloth, is also carried on to some extent. Ship-building has been carried on to a considerable extent, and vessels of 450 tons have been launched here. The river being obstructed by shoals, only vessels of 250 tons can reach the quay. Its trade is principally to America and the West Indies. In 1799, 52 vessels cleared out for the latter, with cargoes estimated at upwards of two millions; but at present the trade is not so considerable. On the 30th of September 1800, the registered shipping consisted of 140 ships, 19,094 tons, navigated by 1926 men. In the immediate neighbourhood of the town is an excellent salt marsh, of about 501 statute acres, which belongs to 80 of the oldest burgesses, or their widows. In the year 1801, Lancaster contained 1601 houses, and 9030 inhabitants. In the year 1811, the returns were as follow:—1731 houses, and 9247 inhabitants.

LANCASTER, a city of Pennsylvania, the capital of Lancaster county, and the largest inland city of the United States. It is pleasantly situated, on the declivity of a hill, about a mile and a half west of Conestoga creek. It was incorporated, as a borough, on the 1st of May, 1742; and erected into a city on the 20th of March, 1818, under the government of a mayor, nine aldermen, and select and common councils; the former consisting of nine, and the latter of fifteen members. It contains about 1000 houses, mostly of brick, and very plain; but, of late years, many elegant buildings have been erected. The streets are wide, and at right angles, and the town generally has the appearance of neatness and convenience.

Lancaster is a place of considerable trade, being surrounded by a rich and populous country. It has extensive manufactures of fire-arms, and several large tan-yards, distilleries, and breweries. The public edifices are a court-house, and market, of brick; and a strong stone jail: the former of these is erected in a hollow square, near the centre of the town, from which the four principal streets lead, in opposite directions. There are two banks, incorporated in 1814, with a capital of 1,200,000 dollars; and also a branch of the Bank of Pennsylvania. It has seven places of public worship, belonging respectively to the Presbyterians, Episcopalians, German Lutherans, German Calvinists, Moravians, Catholics, and Methodists; there is also a meeting-house belonging to the society of Friends, but the members of that society having generally left the place, their meetings have been discontinued several years. It is the seat of Franklin college, founded in 1787, and designed to educate Germans in their own language and habits. In that year the state endowed it with 10 000 acres of land, worth about $30 000; and the following year added a public store-house, and two lots, valued at $2,000. The trustees consist of an equal number of Lutherans, Calvinists, Presbyterians, and Episcopalians. The principal is a Lutheran, and the vice-president a Calvinist.

Lancaster is 58 miles west of Philadelphia, Lat. 40° 3′, north; Long. 76° 10′ west. The population, as returned by the census of 1800, was 4292
And by that of 1810, ... 5405
The inhabitants are principally of German descent.

It was formerly the seat of the state government, but, in 1812, the assembly passed an act for its removal to Harrisburgh.

LANCEROTTA. See CANARY ISLES.

LANDEN, JOHN, a celebrated mathematician, was born at Peakirk, near Peterborough, in Northamptonshire, in January 1719. So early as 1744, he was a contributor to the *Ladies Diary;* but it was not till the year 1754 that he published in the *Philosophical Transactions*, his first paper, entitled, *An investigation of some Theorems, which suggest several very remarkable properties of the Circle, and are at the same time of considerable use in resolving Fractions, the denominators of which are certain multinomials into more simple ones, and by that means facilitate the computation of Fluents.* In 1755, he published a small volume, entitled *Mathematical Lucubrations*, containing a variety of tracts relative to the rectification of curve lines, the summation of series, the method of finding fluents, and other branches of the higher mathematics.

About the end of 1757, he published proposals for printing, by subscription, the *Residual Analysis;* and in 1758, he published his *Discourse on the Residual Analysis*, in which he resolved a great variety of problems by an entirely new mode of reasoning, and pointed out the superior elegance of his method to that which had been derived from the fluxionary calculus.

In the Transactions of the Royal Society for 1760, he published *A new method of computing the sums of certain Series*, a subject which he afterwards pursued in his *Mathematical Memoirs*, which appeared in 1780.

Hitherto Mr. Landen had lived as a farmer at the village of Walton, near Peterborough; but in 1762, he removed to Milton, the seat of Earl Fitzwilliam, where he discharged the duty of land steward to that nobleman till within a few years of his death.

In the year 1764, he published the first book of the *Residual Analysis*, in which he applies it to the drawing of tangents; to the finding the properties of curve lines; to describing their involutes and evolutes; finding the radius of curvature, their greatest and least ordinates, and points of contrary fluxure; and to the determination of their cusps, and the drawing of asymptotes. He proposed in a second book, to shew its application to a great variety of mechanical and physical problems; but he never found leisure to complete this part of his plan.

On the 16th of January 1766, Mr. Landen was elected a member of the Royal Society; and in 1768, he published his *Specimen of a new method of comparing Curvilineal Areas, by which many such areas may be compared, as have not yet appeared to be comparable by any other method.* In the same work for 1770, he gave *Some new Theorems for completing the Areas of certain Curve Lines.*

In the *Phil. Trans.* for 1770. he published *A disquisition concerning certain Fluents, which are assignable by the Arcs of the Conic Sections; where are investigated, some new and useful Theorems for computing such Fluents.* This subject had been previously treated by Maclaurin in his *Fluxions*, and by D'Alembert in the *Memoirs* of the Berlin Academy; but Landen had the merit of removing a very great defect in their methods. In the same year he published his *Animadversions on Dr. Matthew Stewart's computation of the Sun's distance from the Earth*, a work written in a style of acrimony disgraceful to a man of genius.

In the same work for 1775, he published an *Investigation of a general Theorem, for finding the length of any Arc of any Conic Hyperbola by means of two Elliptic Arcs; with some other new and useful Theorems deduced from it.* In this paper he has shewn, that both the elastic curve, and the curve of equable recess from a given point, with many others, may be constructed by the rectification of the ellipsis only, without failure in any point; whereas the elegant method by Maclaurin, of constructing them by the rectification of the hyperbola and the ellipse, fails, when some principal point of the curve is to be determined, as the hyperbolic arc and its tangent then become infinite, though their difference be at the same time finite.

In 1777, he published in the *Philosophical Transactions*, *A new Theory of the Motion of Bodies revolving about an Axis in free Space, when that Motion is disturbed by some extraneous force, either percussive or accelerative.* In this paper, he considers only the motion of a sphere, spheroid, and cylinder; but in consequence of his having afterwards found, that D'Alembert had treated of the same subject, he purchased the *Opuscules* of that eminent author; where he found it stated, that some mathematician doubted, whether there is any solid whatever besides the sphere, in which any line passing through the centre of gravity will be a permanent axis of rotation. He was thus led to resume the subject, and he succeeded in pointing out several bodies, which, under certain dimensions, have that remarkable property. This paper was published in a volume of memoirs, which appeared in 1780, and which contains also a large appendix, with a complete collection of *Theorems for the calculation of Fluents*, principally investigated by himself.

Mr. Landen published three small tracts on the summation of converging series, in which he explained and extended the theorems of De Moivre, Stirling, and Thomas Simson.

About the commencement of the year 1782, Mr. Landen had made such additions to his theory of rotatory motion, that he thought himself capable of resolving the general problem, namely, to determine "the rotatory motion of a body of any form whatever, revolving without restraint about any axis passing through its centre of gravity." Having found, however, that the result was materially different from that given by d'Alembert, he declined publishing his solution. The solution of the same problem given by Euler, in the *Memoirs* of the Berlin Academy for 1757, happened to fall into his hands, and he saw that the result was the same as that of d'Alembert; but the great perspicuity of Euler's investigations enabled him to discover the point in which the solution differed from his own. After repeated examinations of his own solution, he was firmly convinced of its correctness, and at last published it in the *Philosophical Transactions* for 1783. The Rev. Charles Wildbore, a respectable mathematician, attacked Landen's solution in the *Phil. Trans.* for 1790, in a paper on *Spherical Motion*, and obtained the same solution as that of Euler and d'Alembert. Mr Landen was thus led to revise and extend his solution, and having found a result similar to that of Euler, in Frisi's *Cosmographia*; and having also learned that Euler had revised his own solution, and obtained the same result, in his *Theoria Motus corporum Solidorum seu rigidorum*, which appeared in 1765, he set about a full explanation of his own views.

He was now severely afflicted with the stone; but during the painful intervals of that agonizing disorder, he continued to write the second volume of his Memoirs, which appeared after his death. This volume contains, among other important papers, a solution of the general problem concerning rotatory motion, the resolution of the problem relative to the motion of a top, and an investigation of the precession of the equinoctial points, in which he had the honour of detecting, for the first time, Sir Isaac Newton's mistake in his celebrated solution of the same problem. Mr. Landen had the satisfaction of receiving a copy of this work on the day before his death, which took place at Milton, near Peterborough, on the 15th of January, 1790, in the 71st year of his age. A flat stone in the north aisle of the church of Castor, in Northamptonshire, is the only monument to the memory of this distinguished mathematician.

As a mathematician, Mr. Landen is entitled to a very high reputation; but he possessed, in no small degree, a coarseness of mind, and a disposition to contemn the pursuits of others, which, we regret to say, is too often exhibited by those who exclusively cultivate the mathematics. His treatment of Euler is by no means handsome; and the controversy with Dr. Henry Clarke, respecting that gentleman's translation of Lorgna's treatise on series, was carried on with an asperity of language unworthy of a man of genius. From the singular contrast between the manners of Mr. Landen and those of his noble friend the Earl of Fitzwilliam, the villagers often exclaimed, when they were seen to pass together, "There goes Lord Landen and Mr. Fitzwilliam." Mr. Landen left one daughter, who, we believe, is still alive. His manuscripts were sold to the shop-keepers of Peterborough for waste paper.

LANDES, Les, is the name of a department in the south-west region of France. It is bounded on the north by the department of the Gironde; on the east by that of Lot, and Garonne, and Gers; on the south by the Lower Pyrenees; and on the west by the sea. It contains 480 square leagues, or 9475 square kilometres, and is watered by the river Adour, and by the Medan, which passes by Mont Marsan. Its principal productions are barley, wines, cork, charcoal, and resin; but the soil is in general sandy and unfruitful, the north and west parts consisting of heath and marshes. The sea is said to have once covered this department, and to have flowed as far as Dax. The villages and hamlets stand on spots of fertile ground, like islands, among the sand. The shepherds are remarkable for being mounted on stilts, which raise them from three to five feet above the ground, for the double purpose of keeping them out of the water, which lies deep on the sands, and of enabling them to see their sheep at a greater distance on the level ground. The principal towns are,

	Population.
Mont de Marsan	2866
St. Sever	5844
Dax	4398

The forests of pines and oaks cover about 2018 acres, and belong in general to individuals. The contributions, in 1803, were 1,207,597 francs; and the population of the department 228,889. Mont Marsan is the capital.

LANDSCAPE GARDENING.

In the infancy of human arts, all gardening would be comprehended in the culture of a few fruits and esculent plants in a very limited space; but at present, the word garden has at least three distinct significations: to designate a spot, destined for the culture of fruits and culinary vegetables; to mark a space, devoted to flowers and botanical pursuits; and to denote a more extended scene, characterized by forest trees, and walks for shade and recreation, and combining such other objects belonging to external scenery, as taste, art, or locality, may confer. For kitchen gardening and botanic gardening, we refer to our view of Horticulture. The art of forming the third class of gardens, and to which we propose in this article to confine our attention, has been, till of late, indifferently known, under the terms *pleasure*, *ornamental*, and *rural* gardening; but is now more generally designated *landscape gardening*, a very happy term, particularly as applied to the modern style of laying out grounds. But as we intend directing our attention to both styles, we shall employ the term gardening as a generic distinction, comprehending both the geometric or ancient, and the modern or landscape gardening. We shall arrange our observations in the following order:

1. An historical view of ornamental gardening, ancient and modern.
2. The object of this art, and the principles of composition adapted to it.
3. The application of these principles to the different materials employed in forming a country residence.
4. The application of these principles, in uniting these materials in compositions or constituent parts of a country residence.
5. The union of these constituent parts, in the formation of the different varieties of country residences.
6. The practice of landscape gardening.

CHAP. I.

History of Ornamental Gardening.

What is known of the history of this branch of gardening, may be arranged in four different epochs. 1st, From the earliest accounts, that is, from about the tenth century antecedent to the vulgar era, to the second century before the same era; referring chiefly to the Jewish, and some of the Greek authors, as Moses, Solomon, Homer, Hesiod, Pausanias, &c. 2d, From the above period to the decline of the Roman empire, including the Roman poets and philosophers; as Cato, Varro, Virgil, Pliny, Columella, &c. 3d, From the revival of the arts to the introduction of the modern style, or what is properly called landscape gardening, about the middle of the 18th century; including Zanoni, Clarici, &c. among the Italians; Gesner, Trinkhouse, &c. among the Germans; Lobel, Liebault, &c. among the Dutch, and the United Provinces; Bertrand, d'Argenville, &c. among the French; and Didymus Mountain, Temple, James, Switzer, &c. among the English. 4th, From the introduction of the modern style to the present time; among the principal writers during which period may be reckoned Lauguier, Girardin, Watteiét, &c. among the French; Hirschfield, Grohmann, &c. among the Germans; and Shenstone, G. Mason, Chambers, Wheatley, Mason the poet, Price, Knight, Repton, &c. among the English. We shall take a cursory view of each of these periods, and in our progress, refer the more inquisitive reader to such works as will afford him ample information.

Sect. I. *Asiatic and Grecian Gardening.*

The first garden on record is known to every reader. Moses, in describing it, no doubt intended to combine every sort of excellence of which he deemed a garden susceptible; and it is remarkable, that in so remote an age, his outline should contain so much of general nature. What was sketched by Moses, was ably completed by Milton, whose finished performance, as Mr. Walpole observes, exhibits all the higher beauties of the rural scenery of a modern country residence. Thus the origin of gardening, as of most other arts, is traced to the eastern nations, through the writings of the Jews. It is to be regretted, that Solomon has left so imperfect an idea of the manner in which his garden was laid out, though he has made some degree of compensation for this omission, by the hints of what it contained. Besides fruits and odoriferous flowers, there were baths, summer-houses, and water in various forms. It was powerfully enclosed, as is generally the case with eastern gardens to this day, for the sake of privacy and seclusion. That it was contiguous to some of his palaces, appears more than probable, from the circumstance of Ahasuerus, one of his successors, being mentioned as going forth from the banquet of wine into his garden, and returning; and king Ahab, wishing to extend his garden, desired the vineyard of Naboth for that purpose, "because it was near his palace."

The next garden, in the order of time, was situated on an island in the Archipelago, on the confines of Europe, and is that of the Phœnician king Alcinous. It is very minutely described in the Odyssey, and seems to have been little more than an orchard of four acres, containing three or four sorts of fruit trees, some beds of flowers or vegetables, two fountains to water it, and a hedge as the boundary enclosure. That of Laertes, also described in the Odyssey, was very similar to the above. Both appear to have been placed adjacent to the house, and evidently intended for use more than ornament. *Odyss.* lib. v. 112.

The paradises of Semiramis, or, according to Mr. Bryant, (*Anal. of Ancient Mythology*, vol. ii. p. 100, &c.) of a people called Semarim, ancient Babylonians, are the next in order. They were distinguished by their elevated and romantic situations, and also by their extent. "When Semiramis came to Chanon," observes Diodorus Siculus, (book ii. chap. 13) a city of Media, she observed on an elevated plain, a rock of stupendous height, and of considerable extent. Here she formed another paradise, exceeding large, enclosing the rock in the midst of it; on which she erected sumptuous buildings for pleasure, commanding a view both of the plantations and of the encampment."

Where nature did not furnish an adequate site, art supplied the deficiency; and hence those well-known stupendous mechanical constructions, entitled the hanging gardens of Babylon, and ranked among the ancient wonders of the world. "This surprising and laborious experiment," observes Mr. G. Mason, (*Essay on Design in Gardening*, p. 9.) "was a strain of complaisance in king Nebuchadnezzar to his Medean queen, who could never be reconciled to the flat and naked appearance of the province of Babylon, but frequently regretted each rising hill and scattered forest she had formerly delighted in, with all the charms they had presented to her youthful imagination. The king, who thought nothing impossible for his power to execute, nothing to be unattempted for the gratification of his beloved consort, determined to raise woods and terraces, even within the precincts of the city, equal to those by which her native country was diversified."

The word paradise, among the eastern nations, seems to have had different shades of meaning, as well as the word garden of modern times. The paradise of Alcinous was an orchard; while those of queen Semiramis seem to have included all the external scenery appropriated to a country residence.

Those of the Persians combined use with beauty. Xenophon, in his *Economics*, makes Socrates say of the Persian king, "Wherever he resides, or whatever place he visits in his dominions, he takes care that the gardens called paradises, shall be filled with every thing both beautiful and useful the soil can produce." *Memorab. Socratis*, lib. v. p. 829. Lysander finds the younger Cyrus in his paradise at Sardis. As he avows to the Spartan general, that "he planted the whole himself," it seems to have been of a more simple description. But another paradise at Celenæ was very extensive, and abounded with wild beasts; and we are informed, that the same prince there mustered the Grecian forces, to the number of thirteen thousand." *De Cyri Expeditione*, lib. i. Aulus Gellius informs us, that the vivarium, or park of the Romans, which contained game and wild beasts, was the same as the paradise of the Greeks. The Greeks, there can be little doubt, would in this, as in other particulars, copy from the Persians.

The trees in the Persian gardens, were arranged in straight lines and angular figures, and the ground was covered with tufts of roses and odoriferous flowers. The kings themselves often assisted, as we have seen, in their culture with their own hands. A considerable variety of trees were introduced, among which the plane and the resinous tribe seem to have held conspicuous places. The Persian gardens, described by modern travellers, differ little from the accounts derived from ancient writers. Figuerosa, who was ambassador from the court of Spain to that of Persia, in 1617, informs us, that at Schiraz, the royal garden was so large that it appeared like a forest, the trees consisting of cypress, planes, and elms, which were planted in squares and avenues, intermingled with thickets of roses. The fruits were grapes, pears, pistachio nuts, and almonds. In the middle was a large and beautiful lake." Daines Barrington *in Archælogia*, vol. vii. p. 114. Chardin, Le Bruyn, Sir John Malcolm, and other modern travellers, add nothing material to the above features of an ancient and modern Persian garden.

Turning from Asia to Africa, we find only the fabulous gardens of the Hesperides. They are ranked by Pliny with those of Alcinous and Semiramis, (*Nat. Hist.* lib. xix. c. 4.) and described by Scylax as situated to the east of Berenice, in Cyrenaica, and "lying in a place eighteen fathoms deep, steep on all sides, and two stadia in diameter, covered with trees of various kinds, planted very close together, and interwoven with one another." *Historical View of the Gardens of Antiquity*, &c. p. 29. Among the fruit trees, were apples, pomegranates, mulberries, vines, olives, almonds, and walnuts; and the ornamental trees included the arbutus, myrtle, bay, ivy, and wild olive.

Little is known of the private gardens of the Greeks, though it is more than probable, that, from their connection with Asia, they would imitate, as far as the difference of climate and other circumstances would permit, the paradises or gardens of the Assyrians and Persians. This supposition appears justified, from the admiration which Xenophon, a Greek philosopher of the fourth century before Christ, expresses for the gardens of Cyrus at Sardis. We are informed by Diogenes Laertius, that Epicurus delighted in the pleasures of a garden, and made choice of it for his school of philosophy. Plato lays the scene of his dialogue on beauty in an umbrageous spot on the banks of the Illisus: from which proof of his taste for the beauties of natural scenery, it may not be too much to infer, that something of wildness and irregularity might have been sometimes admitted in Grecian paradises, as well as art and uniformity.

The Academus, or public garden of Athens, Plutarch informs us, was originally a rough uncultivated spot till planted by the General Cimon, who conveyed streams of water to it, and laid it out in shady groves, with gymnasia, or places of exercise, and philosophic walks. Among the trees, were the olive, plane, and elm, which had attained to such extraordinary size, that at the siege of Athens by Sylla, in the war with Mithridates, they were selected to be cut down, to supply warlike engines. In the account of these gardens by Pausanias, we learn, that they were highly elegant, and decorated with temples, altars, tombs, statues, monuments, and towers; that among the tombs, were those of Pirithous, Theseus, Œdipus, and Adrastes; and at the entrance was the first altar dedicated to love. In the first eclogue of Theocritus, the scene is laid under the shade of a pine tree; and the beauty of Helen is compared to a cypress in a garden. It would appear from this and other circumstances, that the love of Terebinthinate trees, so general in Asia, was also prevalent in Greece; and the same flowers were probably cultivated in both countries. The narcissus was common to both, as also the ivy and the rose. It may be remarked generally, respecting the Asiatic and Grecian gardens of these early ages, that forest trees were chiefly cultivated for their shade, fruit trees for their produce, and flowers for their odour. At any rate, it does not appear that mere beauty of form or foliage entered into their idea of excellence.

Such are the scanty particulars which can be collected respecting the gardens of ancient Greece. If we may be allowed to hazard a conjecture on the subject, we would say that the country of Greece, being by nature more picturesque, its climate more temperate than the Asiatic regions, and its inhabitants comparatively active and frugal, paradises of the most luxurious description would not find a place. Kitchen gardens, and ornamental orchards, would no doubt be general; but had any very extensive gardens or parks been possessed even by the princes, it is highly probable we should have had some traditionary hints respecting them, through their own, or the early Roman authors. That their poets and philosophers had a just taste for the beauties of natural scenery, is sufficiently evident, from Homer's description of the grotto of Calypso, (*Racemazionen zur Gartenkunst der Alten, bei Her von Bættinger*, &c. 1800,) and from various descriptive passages in Hesiod, Ælian, Theocritus, Atheneus, and other writers. It may just be remarked, however, that their descriptions enlarge chiefly on the shade, coolness, freshness, breezes, fragrance, and repose of such scenes. The picturesque is a species of beauty, which it is not clear that either the Greeks or Romans recognised so distinctly as the modern Europeans.

Sect. II. *Roman Gardening.*

The first mention of a garden in the Roman history, is that of Tarquinius Superbus, by Livy and Dionysius Halicarnassus. From what they state, it can only be gathered, that it was adjoining to the palace, and abounded in flowers, chiefly poppies. The next in the order of time are those of Lucullus, situated near Baiæ, in the bay of Naples. They were of a magnificence and expence rivalling that of the eastern monarchs, and procured to this general the epithet of the Roman Xerxes. They consisted of vast edifices projecting into the sea; of immense artificial elevations; of plains formed where mountains formerly stood; and of vast pieces of water dignified with the pompous titles of Nilus and Euripides. (Plutarch, *in vita Luculli;* Sallust, &c.) Lucullus had made several expeditions to the eastern parts of Asia, and it is probable he had there contracted a taste for this sort of magnificence, which Varro afterwards ridiculed for its sumptuosity. Lucullus had the merit, however, of introducing the cherry, the peach, and the apricot, from the east; a benefit which still remains to mankind.

We know little of the gardens of the Augustine age of Virgil and Horace, generally thought to be that in which taste and elegance were eminently conspicuous. Virgil and Propertius mention the culture of the pine tree, as beloved by Pan, the tutelar deity of gardens; that the shade of the plane, from the thickness of its foliage, was particularly agreeable, and well adapted for convivial meetings. The myrtle and the bay, they describe as in high esteem for their odour; and to such a degree of nicety had they arrived in this particular, that these odours were discovered to mingle well together, and the trees were planted adjoining each other for this purpose. Flowers, and especially roses and the narcissus, were in great repute.

From Cicero and the elder Pliny we learn, that trees were generally planted in rows, or in quincunx; and from these authors and Martial, that the fashion of clipping trees was first introduced by Cneius Matius, a friend of Augustus. Propertius relates, that statues and fountains now became in vogue. A mode of forcing flowers and fruits, and of growing cucumbers in the winter season, was also in use by means of talc cases, (*Speluncaria*) or plates of the *lapis specularia;* which Seneca and Pliny inform us could be split like slate in lengths not exceeding five feet.

Sir Joseph Banks conjectures, that, by the same means, it is highly probable they had peach-houses and vineries. (On the forcing houses of the Romans, in *Hort. Trans.* vol. i.) Daines Barrington seems to be of the same opinion, which he considers more probable from the circumstance, that the luxury of cooling liquors with ice was in use about the same time; these two arts being coeval inventions in England.

Of the form and extent of Pliny's winter garden at Laurentinum, nothing very accurate can be obtained from his letters. It was evidently small, being surrounded by hedges of box, and where that had perished, made good by rosemary. Vines, figs, and mulberries, were the fruit trees. He seems to have valued this retreat chiefly from its situation relatively to the surrounding country, which he describes with delight; " pointing out all the beauties of the woods, the rich meadows covered with cattle, the bay of Ostia, the scattered villas upon its shore, and the blue mountains in the distance." (Preface to Girardin's *Essay on Landscape*, translated by D. Malthus, Esq.) Eustace mentions that the same general appearance of woods and meadows exist to this day. *Classical Tour*, vol. i. p. 14.

The situation of Pliny's Tuscan villa was a natural amphitheatre, formed by the richest part of the Appenines, whose lofty summits, crowned with groves of oak, are broken into a variety of shapes, their sides watered by numerous springs, and diversified by fields, vineyards and copses. Of the artificial part of the grounds, we have a particular and well known description in Pliny's *Epistles*, book v. letter 6th, which is of importance to our purpose, as shewing what was esteemed good taste in the pleasure grounds of a highly accomplished Roman nobleman and philosopher.

" It is almost superfluous to remark," observes Dr. Faulkener, speaking of Pliny's gardens, " the striking resemblance which they bear to one in the French or Dutch taste. The terraces adjoining to the house; the lawn declining from thence; the little flower garden, with the fountain in the centre; the walks bordered with box; and the trees sheared into whimsical artificial forms, together with the fountains, alcoves, and summer-houses, form a resemblance too striking to bear dispute." " In an age," observes Lord Walpole, " when architecture displayed all its grandeur, all its purity, and all its taste; when arose Vespasian's amphitheatre, the temple of peace, Trajan's forum, Domitian's bath, and Adrian's villa, the ruins and vestiges of which still excite our astonishment and curiosity; a Roman consul, a polished emperor's friend, and a man of elegant literature and taste, delighted in what the mob now scarce admire in a college garden. All the ingredients of Pliny's garden corresponded exactly with those laid out by London and Wise on Dutch principles; so that nothing is wanting but a parterre, to make a garden in the reign of Trajan serve for the description of one in the reign of king William." We consider these remarks of this eloquent author as dictated by too limited a view of the subject. Because the Roman gardens were considered as scenes of art, and treated as such, it does not follow that the possessors were without a just feeling for natural scenery. Where all around is nature, artificial scenes even of the most formal description will please, and may be approved by the justest taste, from their novelty and contrast, and other associations. If all England were a scattered forest like ancient Italy, and cultivation were to take place only in the open glades or plains, where would be the beauty of her parks and pleasure grounds? The relative or temporary beauties of art should therefore not be hastily or entirely rejected in our admiration of the more permanent and absolute beauties of nature.

That the ancient Romans admired natural scenery with as great enthusiasm as the moderns, is evident from the writings of their eminent poets and philosophers; scarcely one of whom has not, in some part of his works, left us the most beautiful descriptions of rural scenery, and the most enthusiastic strains of admiration of all that is grand, pleasing, or romantic, in landscape; and some of them, as Cicero and Juvenal, have deprecated the efforts of art in attempting to improve nature. " Whoever," says Mr. G. Mason, " would properly estimate the attachment to rural picturesque among heathen nations of old, should not confine their researches to the domains of men, but extend them to the temples and altars, the caves and fountains, dedicated to their deities. These, with their concomitant groves, were generally favourite objects of visual pleasure as well as of veneration."

SECT. III. *French Gardening.*

As the French made the most conspicuous figure in gardening during this period, we shall commence with such notices as we have been able to collect of its progress in France, and pass successively to the other countries in Europe.

The earliest notice which we have been able to find of a garden in France, is in the *Capit. de villis et curiis imperatoris Caroli Magni*, prepared about the end of the eighth century, and referred to by Montesquieu as a "*chef-d'œuvre* of the prudence, good administration and economy." It contains 70 articles, recommending or proposing every possible attention and precaution; and the 70th contains a list of the plants and trees to be cultivated. Among these, medicinal plants hold a considerable place; there are but few shrubs, and only the common fruit trees. This monarch had domains in most parts of France, and gave every encouragement, as the Abbe Schmidt (*Encyc. Method.* tomes 4 and 5.) informs us, to clearing away forests, and planting vineyards and orchards. From his intimacy with the Saracenic Prince *Haroun al Raschid*, he introduced many charming varieties of the rose, the best sorts of pulse, melons, and the finer sorts of fruits. He had a noble palace at Ingleheim, on the Rhine, supported by a hundred columns of Italian marble, and containing an immense number of apartments. The whole is consecrated by Nigellus, in a Latin poem of considerable length.

The next notice of a garden in France, unaccompanied by any details, is that of the *Hotel de St. Paul*, at Paris, formed by Charles the V. in 1364. The scene of the *Romaunt de Rose* is in a garden; but, excepting that there were edgings of violets and primroses, there is not a hint as to its form or productions.

Little appears to have been done in France before the beginning of the 16th century, when, in consequence of the marriage of Francis the I. with the daughter of Leo the X., something of what that illustrious pontiff revived in Italy would be transplanted to France. Stephens and Liebault published their *Maison Rustique* towards the end of this century; from which it appears, that gardening, and every other rural art, had made considerable progress in France. What relates to ornament in *La Maison Rustique*, may be included in the directions given for forming arbours of jessamine, rows of box, juniper, and cypress, and the plates for parterres and labyrinths. Botany began also to be cultivated about this time, the taste having been imported from Italy, where it originally had its rise, this country being now looked up to by all Europe as the fountain of learning and elegance.

The Royal Botanic Garden of Paris was first opened in 1634; and Boyceau published his *Traité du Jardinage selon la raison de la nature et de l'art*, with figures, in 1638. From this book it appears, that considerable progress had been made in the more common and easy descriptions of planting and orcharding, but very little, as Bénard, a modern writer, also informs us, in the culture of exotics.

Le Notre, during the reign of Lewis the XIV. improved and settled the French taste in laying out grounds. This taste, Eustace mentions, they acquired originally, as they did every thing else, from Italy; to which country Le Notre was sent to study the art He returned, and seems to have determined on exceeding, at least in magnitude, every thing he had seen. His chief work is that of Versailles; though there is scarcely a country in Europe for which he has not given designs. His taste and manner continued in full repute for above a century: and appears to have been in general vogue so late as 1771, 50 years after the introduction of the modern style in England; for the editor of the *Journal Encyclopédique* of that year, in a critique on the French translation of Wheatly's *Observations on Modern Gardening*, after the most liberal encomiums on the work, expresses his doubts as to how it would be received in France, where he adds, "Le Notre's school is still followed, and every rich proprietor is anxious that his garden, if it does not resemble, shall, at least, recall to his mind those of the court at Versailles, Trianon, Meudon, Sceaux, or Clugny."

The editor, Millin, mentions Dufresnoy, a cotemporary of Le Notre, as an artist of greater genius, and more attached to natural beauties, though less known by his talent for designing gardens than by his comedies. The French nobles, as Hirschfield has remarked, were not attached to a country life. As they did not engage in agriculture, and took little or no interest in the welfare of their tenantry, all that they had to detain them at their chateaux was the enjoyment of field sports, (to which, as a nation, they are not greatly attached,) and the inability of supporting the expences of a residence in town. The splendour of the court, and the gaiety and bustle of a city life, better suited their natural character; which this erudite author thinks may account for their best gardens being in or near to their large towns, as well as for a too profuse introduction of little and trifling ornaments. Among these he reckons vases and flower pots, with which, in Lord Walpole's time, every walk in Marshal Biron's garden, of 14 acres, was "carefully buttoned."

It is very probable that gardening was never entirely neglected in Italy from the time of the Romans; though in what consideration it was held during the earlier periods of the Western Empire does not appear. With the other arts, it was revived and patronized by the Medici family, in the beginning of the 16th century; and the most celebrated gardens, we are informed by Mr. Roscoe, were those of Lorenzo de Medici, and of the wealthy Bernard Rucellai. The latter served as a model for the famous Boboli garden at Florence, and those of the Vatican, and of the Medici, Borghese, Aldobrandini, and other palaces in Rome." (*Quarterly Review*, Jan. 1817; Roscoe's *Life of Leo the X.* vol. ii. octavo edit.) Public botanic gardens, established in Italy about the middle of the preceding century, (*Istoria Batanico di Giacomo*, Bologna, 1675.) led to an extension of the culture of flowers in private gardens, and rendered them less exclusively architectural than formerly. Warton, in his *Essay on Pope*, 5th edit. mentions, that in *l'Adamo*, a poem written and published at Milan in 1617, by G. B. Andreini, a Florentine, "the prints that are to represent Paradise are full of clipt hedges, square parterres, straight walks, trees uniformly lopt, regular knots and carpets of flowers, groves nodding at groves, marble fountains and water-works;" a fact which gives rise to many curious reflections. In a very complete and learned work, ***Istoria e coltura del piante con un Trattato del Architettura d'un Giardino***, &c. published at Venice in 1726, by B. Ciarici, the same style is treated of and displayed in an elegant engraved bird's-eye view of the palace and gardens of S. Gerardo Segredo, at Morocco, near Venice. In Percier's *Choix des plus celebres maisons de plaisance de Rome*, Kraft's *Views*, and Laborde's *Designs*, may be seen the general arrangement of an Italian villa, both of the last century, and the present day. It differs nothing in the general features from the description of the French style which we have just given; but in detail is much more architectural; and the area of the garden being less, the statues, termini, marble fountains, seats, &c. which characterize it, are placed more closely together. Their effect, however, is well harmonized by the exuberant vegetation, rich display of oranges, and other fruits and flowers, and by the clear sky, and mild climate.

From Italy the taste for gardening, and especially systematic botany, was first carried to Holland and the Belgic provinces during the flourishing periods of Dutch commerce in the beginning of the 16th century. This attachment to the study of plants led to a great degree of horticultural perfection among the Dutch, and ultimately characterized their style. We are informed by Deleuze that, in 1560, exotic plants were more cultivated in the Low Countries than any where else. This taste, which had existed among them from the time of the crusades, and increased by the commercial intercourse of the Flemings with the West Indies, was particularly prevalent under the Dukes of Burgundy. During the civil wars which afterwards desolated these provinces, many of the estates of the wealthy were ravaged and destroyed. Lobel, in his "*Histoire des Plantes*," published in 1576, deplores the misfortunes of his time, and gives a list of the most considerable country seats and gardens which had been desolated by the enemy.

The parterre and botanic gardens appear to have arrived at perfection in these countries, probably from the great number of species, then introduced and cultivated, requiring to be arranged in some regular form. This characteristic of the Dutch style is a very natural invention of a plodding industrious people, with few overgrown nobles, and occupying a dull flat country. The Dutch have still the reputation of excelling every other people in the culture of bulbous roots; and it is only in Holland that a citizen's garden can be found wholly occupied by beds and knots of flowers, without either trees, shrubs, or culinary productions.

To the flatness of the country may also be traced, in some degree at least, their attempts to find resources in grassy terraces and slopes, perspectives of hedges, and other topiarian works, which they carried to a greater extreme than the Italians, of whose architectural decorations these verdant ornaments supplied the place. The climate of the Low Countries is particularly favourable to pasturage; and turf work and parterres may, therefore, be termed the characteristics of the ancient Dutch style of laying out grounds. Of country seats on a grand scale, they necessarily had few; but in these, there can be little doubt the Italian and French arrangement would be imitated. There are two royal palaces at the Hague, joined to which are level gardens, bounded by a moat, and passed by drawbridges. The one is entirely in the ancient style, the other partakes of a more free manner. In neither are many ornaments, buildings, or statues; but the utmost attention is paid to neatness and culture.

According to Professor Hirschfield, little was done in the art of laying out grounds in Germany till about the time of Le Notre, when a sort of gallomania seized the German nobles, and various avenues and parks were planted in the French style in the different states. Nothing of great consequence, however, was done previously to the middle of the last century, when the gardens of Schoenbrunn were greatly enlarged, and magnificently laid out, under the Emperor Francis I. by Stockhoven, a Dutch artist.

The Augarten at Vienna deserves to be mentioned. It was formed from a design of the celebrated German architect Fischer, during the reign of the emperor Joseph. Its form is square; the boundary enclosure an elevated terrace walk; and the space within filled with wood, intersected by right-lined avenues and alleys, some covered and shorn, and others natural and open. Attached is a public banqueting or coffee-room, free to every citizen.

The ancient, royal, and principal private gardens at Dresden exhibit nothing remarkable in the way of art. They were formed chiefly during the electorate of Frederick Augustus, king of Poland, and are remarkably confined, and by no means interesting in detail. The situation and environs of Dresden every one feels to be delightful; but there is perhaps no city of the same rank on the continent equally deficient both in ancient and modern gardens.

Almost all the gardens of Prussia were formed during the propitious reign of Frederick the Great. The Thiergarten is a sort of ancient park, on a flat sandy soil adjoining the gates of Berlin. It is intersected by public roads leading to the city; and contains private alleys and walks, a large place for military exercises, statues, and obelisks, and several public coffee-rooms and sheds for music and rural fêtes.

The royal gardens at Potsdam, laid out during Frederick the Great's reign, are in a mixed style, very much in Switzer's manner; uniting straight with serpentine and naturally winding walks, with every appendage and ornament of the French, Italian, and Dutch taste. Various artists, but chiefly Manger, a German architect, and Salzmann, a gardener, (each of whom has published a voluminous description of his works there,) were employed in their design and execution; and an ample history and description of the whole, accompanied by plans, elevations, and views, has been published by the late celebrated literary bookseller, Nicolai of Berlin. The hill of terraces in front of Sans Souci, in which every terrace wall has a glass roof placed against it for ripening fruit; the superb picture gallery; the magnificent architecture of the new and marble palaces; the avenues, open promenades, alleys, statues, fountains, and other artificial decorations in the fore ground; the architectural riches of Potsdam, the lakes, the river, and extensive fir woods in the middle distance; and a horizon of bleak and barren sands, varied but little with spots of verdure, compose altogether a scene unrivalled in its kind, though less grand or elegant than it is artificial and picturesque.

Very little was done in Poland previously to the time of the unfortunate Stanislaus Augustus. That monarch built the beautiful palace or villa of Lazenki, or the Bath, in a situation originally a marsh, from the designs of Camsitzer, a German architect. This beautiful piece of Roman architecture consists of a centre and two wings. The centre is placed in the middle of a narrow part of the lake, and the wings are on opposite shores, joined to the centre by arches, with orangeries over. The entrance is through a carriage portico in one of the wings, to which you arrive without seeing the water. On entering the orangery, the effect is surprising and delightful. In the lake, at one side near the palace, is an island, which served as the proscenium to an open Roman amphitheatre of stone on the shore. The orchestra was placed close to the brink; and in addition to the common business of a theatre, ships and naval engagements were occasionally exhibited. The theatre was open to every person without exception; and the effects of the music and the performances are still mentioned in raptures by the more elderly inhabitants of Warsaw. The grounds were not extensive, and, excepting near the palace, not highly ornamented. They contained various coffee-rooms, ice cellars, circles of turf, or dancing places, situations for tents and rural fêtes, and three pavillions for the king's mistresses, connected by covered alleys with the palace.

The principal private garden in the ancient style, was that of Villaneuve, late the property of Count Stanislaus Potocky, a few miles from the capital, and now modernised. Judging from the excellent views of these gardens, painted by Canaletti, and now in the royal zamosk, or castle, in Warsaw, they were more in the verdant and simple style of the Dutch, than in the enriched Italian or French taste.

It is questionable whether the ancient style was at all introduced into Russia before the time of Peter the Great. Peterhoff, near Petersburgh, is the creation of that monarch, through the French artist and author Le Blond, and is worthy of the patron and the designer. Its chief merits consist in its water works, which are equal if not superior to those at Versailles.

The principal private ancient garden in Russia, is that at Petrowsky Razumowsky, near Moscow. The hedges and alleys are chiefly formed of spruce fir, which are shorn, and seem to flourish under the sheers. It contains also a labyrinth, and a turf amphitheatre, on which the Count at one time had operas performed by his domestic slaves.

Sophiowski, in Padolia, is a magnificent residence of the Countess Potocki, laid out by a Polish architect, M. Metzel, in the manner of Switzer. It has a magnificent terrace or promenade, and extensive avenues, conservatories, and gardens.

Little or nothing appears to have been done in the ancient style in Sweden. Hermand, who published his *Regnum Sueciæ*, in 1671, mentions gardens only once. These belonged to the court, and were used, he says, for delight and recreation. The most beautiful were those between the Palatium and Vivarium. The latter contained some wooden buildings, in which were kept specimens of lions, leopards, and bears. As kitchen gardeners and botanists, the Swedes, even at the period of which we now speak, were in a considerable state of advancement, of which there are proofs in the history of the gardens of Upsal, given in the first volume of the *Amœnitates Academicæ*.

Sir John Carr, and Her von Lehmann, have mentioned some ancient royal gardens at Denmark, which, however, are now in a state of dilapidation, and could never have been considerable.

The Spaniards appear to have had less taste for gardening than any of the other nations of Europe. The botanic garden of Madrid was not formed till 1757, but they had at one time two or three magnificent examples in the French style; those of the Escurial and Aranjuez, from designs by Le Notre; and that of Ildefonso, of which we have not been able to learn the name of the designer. Hirschfield describes these gardens from the journal of an Italian, in 1775. A detailed account of those of the Escurial has been published in England by J. Thomson. They appear to have contained a splendid profusion of water works, and covered alleys, rock works, statues, and other details of an ancient garden; and we regret to find, from more recent travellers, that they are now in a state of dilapidation. The oldest gardens in Spain are undoubtedly those of the religious houses. There are still some water works, walks, and umbrageous scenes, adjoining the Alhambra and the Alcazar. At the Retiro, near Malaga, a seat of Count Villacasa, and formerly a royal residence, are gardens in the Moorish style, with straight cypress walks, and excellent water works. Granja, the seat of Don Ramon Fortuny, near Tarragona, appears to be in good taste, combining the ancient style, and the cultivation of orange, olive, and other orchards, with vineyards; and with an accidental mixture of rocks and picturesque scenery.

Montserrat, near Cintra, a seat of the late eminent merchant Mr. Beckford, was laid out by his English gardener, but is in no respect remarkable.

Wherever Europeans have settled, and enriched themselves in other quarters of the world, it is natural to suppose they would attempt to introduce their native style of gardening. We know of no remarkable instance applicable to that of the ancient style, excepting that of the Dutch governor at the Cape of Good Hope. In Lachman's *Travels of the Jesuits*, published in 1767, it is described as a square enclosure, occupying 19 acres, with "covered and open walks, natural thickets, and rills of water;" and, "on the whole," says Father Premare, "is one of the most beautiful spots in the world, in which art had taken far less pains than nature." Lachman's *Travels*, vol. i. p. 37.

One of the earliest notices which we find of a garden in England, is in Leland's *Itinerary*. He states, that "at Wresehill castelle, in Yorkshire, the gardeins within the mote, and the orchardes without, were exceeding fair. And yn the orchardes, were mountes, *opere topiaris*, writhen about with degrees like turnings of cokil shelles, to com to the top withoute payn." (*Itinerary*, &c. p. 60.) Such a mount still exists in the garden of the castle inn at Marlborough, not ascended by steps or degrees, but by a winding path. It is covered with ancient yew trees, no longer *opere topiaris*. Leland also mentions the gardens at Morli, in Derbyshire, and some others of less note in the northern counties.

The first park (*habitationem ferarum*) of which we have any notice, is that of Henry I. at Woodstock, mentioned in Henry of Huntington's history. Lib. 7.

The features of a pleasure garden in Chaucer's days, may be guessed at from three lines of his *Troilus and Cressida*:

> "The yerde was large, and railed all the aleyes,
> And shadowed wel with blosomy bowis greene.
> And benched newe, and sondid all the weyes." v. 821.

During the century of disputes between the houses of York and Lancaster, little or no attention could be paid to the peaceful arts; and accordingly we find no other notice of a garden till the time of Henry VIII. when the royal gardens of Nonsuch were laid out and planted. These gardens were of limited extent, and contained only two or three species of shrubs, (see our article HORTICULTURE, where this garden is more particularly described,) and fruit trees, with a bowling-green and dial. Not a vestige of any part of these improvements remain at that seat, which is now private property, and arranged in the modern style.

During the reign of Elizabeth, an Italian published some Latin poems, in which he represents her majesty as curious in flowers. In the same reign, Hentzer informs us, that there was in the privy garden a jet-d'eau, which, by turning a cock, wetted all the spectators who might be standing near. Hampton Court was laid out at the end of this reign by Cardinal Wolsey. The labyrinth, one of the best which remains in England, occupies only a quarter of an acre, and contains nearly half a mile of winding walks. There is an adjacent stand, on which the gardener places himself, to extricate the adventuring stranger by his directions. Switzer condemns this labyrinth for having only four stops, and gives a plan for one with twenty. Daines Barrington says, that he got out by keeping close to the hedge. It is not perfectly clear, that the whole of the ancient gardens at this palace were laid out during the Cardinal's life. We know, that some additions were made in King William's time, and others during the reign of George I. Here, in fact, the Dutch style was first displayed under the first of these monarchs.

James I. formed or improved the gardens at Theobalds, of which a description from Mandelso has already been given under the article Horticulture. The same author mentions, a royal garden at Greenwich, improved by this monarch. Lord Bacon attempted to reform the national taste during this reign, but with what success is not known. He wished still to retain shorn trees and hedges; but proposed winter, or evergreen gardens, and rude or neglected spots, as specimens of wild nature. "As for the making of knots or figures," says he, "with divers coloured earths—they be but toys. I do not like images cut out in juniper, or other garden stuff—they are for children." (*Essay on Gardens*)

The Gardener's Labyrinth by Didymus Mountain, was published in the reign of Elizabeth; and Lawson's *New Orchard* in 1626. Both contain plates, exhibiting "knots and mazes, cunningly handled for the beautifying of gardens."

In a *Janua Trilinguis*, published at Oxford during the commonwealth, we are informed that "gardening is practised for food's sake, in a kitchen garden and orchard; or for pleasure's sake, in a green grass plat and an arbour." As to the formation of the latter, he adds, "The pleacher (*topiarius*) prepares a green plat of the more choice flowers and rarer plants, and adorns the garden with pleach work; that is, with pleasant walks and bowers, &c. to conclude with purling fountains and water works." Chap. 32. We learn also from this comprehensive author (Commenius) the ancient use of parks. We are told "the huntsman hunteth wild beasts; whilst he either allureth them into pit-falls, and killeth them, or forces them into toils, and what he gets alive he puts into a park." Chap. 37.

We are informed by Daines Barrington, that Charles II. sent for Perrault and Le Notre; that the former declined coming to England, but that the latter planted Greenwich and St. James' parks. The magnificent seat of the Duke of Devonshire at Chatsworth, was laid out in this reign, and, it is conjectured, from a design by the same artist. (*Beauties of England and Wales. Derbyshire.*) Waller the poet formed his residence at Beaconsfield about the same time. The grounds there being very irregular, he has been at considerable labour in reducing the parts near the house and banqueting-room, to regular slopes and levels, and in forming an oblong basin or canal. It is but justice to the memory of this amateur, who was undoubtedly reckoned a man of taste in his day, that, in the more remote walks, no appearances of art are discernible, or seem ever to have been intended. They are mere gravelled paths through natural woods, and exhibit a fine contrast to the artificial scenes at Prior's Park.

It is conjectured, that one of the first garden buildings was erected during this reign by Inigo Jones, at Beckett, near Farringdon. This banqueting-room is placed on a point of land, projecting into a lake, and is surrounded with a broad base, or platform, protected by a parapet wall, and shaded by the far projecting eaves of the building. It consists of one apartment, with a cellar below; and the covered platform, or base, is conjectured to be for the purpose of angling. (Daines Barrington in *Archæologia*)

Lord Keppel, and the Earl of Essex, are mentioned by Switzer as eminent encouragers of gardening during this reign. The latter sent his gardener, Rose, to study the much celebrated beauties of Versailles, and, on his return, he was appointed royal gardener. He produced such remarkable dwarfs at Hampton Court, Carleton House, and Marlborough gardens, that London, his apprentice and successor, and afterwards a nurseryman, in his *Retired Gardener*, published in 1697, challenges all the world to produce the like. Daines Barrington thinks it probable, that forcing-houses and ice-houses may have been introduced by Charles II. since, at the installation dinner, given at Windsor in April 1667, there were cherries, strawberries, and ice creams. Orangeries and green-houses had been introduced before, oranges having been first planted at Beddington, in Surry, by Sir Francis Carew, previously to 1595. (Camden.) And from one of Leland's poems, entitled *Horti Gul. Guntheri hyeme vernantes*, we may conjecture that green-houses of some sort were known before his time.

Evelyn's gardens at Sayes Court, near Deptford, and at Walton in Surrey, flourished about this time. Those at Deptford are described as most *boscaresque*. They contained a fine holly hedge, of which the owner was proud; and complains in his letters to Ray and Sir Hans Sloane, that it was destroyed by the Czar and his servants, who had taken the house at Sayes Court, to be near the docks. This edifice is now a miserable work-house; and of the garden, only the soil remains.

Little seems to have been done to the royal gardens during the short reign of James the II. His successor, Mr. Barrington informs us, gave vogue to clipt yews, with magnificent gates and rails of iron, not unfrequent in Holland, and about this time introduced into France; and in reference to the opaque stone walls which they supplanted, called *clairs voyée*. (*Huetiana.*) The more extensive iron screens of this sort in England, next to those of Hampton Court, were formed by Switzer, at Leeswold, in Flintshire, laid out by that artist in a mixed style, or what is called Bridgeman's first manner; but they are far surpassed by those of the summer gardens at Petersburgh. Hampton Court being at this time the actual residence of the royal family, the gardens underwent considerable improvements. An elegant alcove and arched trellis were added at the end of one of the alleys; and four urns, placed before the principal part of the house, supposed (Daines Barrington in *Archæologia*) to be the first that were thus placed in England. Botany received the patronage of this king, who most probably had acquired some knowledge and taste in that science before he left Holland. Towards the end of this century, vegetable sculpture, and embroidered parterres, were probably in their highest vogue, a conjecture confirmed by the works of Le Blond, James, Switzer, &c. published during this and the following reign. Sir William Temple's *Essay* on the garden of Epicurus had been previously published. His picture of a perfect garden, is that of a flat or a gentle descent, of an oblong shape, lying in front of the house, and descended to by steps from a terrace, extending the whole length of the house. The enclosure is supposed to be cultivated as a kitchen garden and orchard. Such a garden he found at Moor Park, Hertfordshire, laid out by the countess of Bedford, celebrated by Dr. Donne. Sir William describes it as "the sweetest place, I think, that I have seen in my life, before or since, at home or abroad."

Lord Walpole observes on this description, that any man might form as sweet a garden, who had never been out of Holborn. It has long since been destroyed, and a beautiful lawn occupies its place, and forms an appropriate fore ground to the now highly cultivated vale, probably at that time unenclosed, but varied with scattered groups of trees and cottages, as a distance, to the garden described by Sir William Temple, would form in its turn a landscape equally interesting.

The principal alteration of the royal gardens, mentioned by D. Barrington, as having taken place in Queen Anne's time, was that of covering the parterre before the great terrace at Windsor with turf. Switzer mentions, that her majesty finished the old gardens at Kensington, begun by King William. Wise, who had been apprentice to Rose, and succeeded him as royal gardener, turned the gravel-pits into a shrubbery, with winding walks; with which Addison was so much struck, that he compares him to an epic poet, and considers these improved pits as episodes to the general effect of the garden. Wise and London afterwards turned nurserymen and designers of gardens, in which capacity they were nearly in as great demand as was afterwards the celebrated Brown. They made regular journies every summer for this purpose; and from their nursery at Brompton, which was the first of any consequence established in this country, they are said to have gained *L*.2000 a-year. To London and Wise succeeded Bridgeman, who appears to have been a more chaste artist than any of his predecessors. He banished vegetable sculpture, and introduced wild scenes and cultivated fields in Richmond Park; but he still clipt his alleys, though he left to their natural growth, the central parts of the masses which they enclosed.

Blenheim, Castle Howard, and indeed almost all the principal noblemen's seats in the ancient style, were laid out during this, the preceding, and part of the latter reigns, or between the years 1660 and 1720.

Nothing of consequence appears to have been done to the royal gardens in the reign of George I. though, near the end of it, Vanburgh was appointed surveyor of the gardens and waters of the crown. In the succeeding reign, Queen Caroline enlarged and planted Kensington gardens, and formed what is now called the Serpentine river, by uniting a string of detached ponds. This was a bold step, and led the way to subsequent changes of taste. Lord Bathurst informed Daines Barrington, that *he* was the first who deviated from the straight line, in pieces of made water, by following the natural lines of a valley, in widening a brook at Riskins, near Colebrook; and that Lord Strafford, thinking it was done from poverty or economy, asked him to own fairly how little more it would have cost to have made it straight.

Cannons, the magnificent seat of the Duke of Chandos, is one of the principal places laid out in the ancient style in this reign. We are not acquainted with the French artist who gave the design, but the execution was superintended by Dr. Blackwell, a physician and agriculturist of some note. As far as we have been able to learn, the last extensive residence laid out in the ancient style, in the south of England, was Exton Park, in Rutlandshire, finished about the year 1730. Kent had already returned from Italy, and been employed as a painter and architect, and began to display his genius a few years afterwards, as a landscape gardener.

In this brief outline of the progress of the ancient style in England, we have not had room to detail the numerous improvements made by private individuals; preferring rather to notice what had been done in the gardens of the court, which, as they generally lead the fashion in every country, may be considered as a tolerably exact index of the state of a nation's taste. The reader who is desirous of tracing more minutely the history of gardening and laying out grounds, among the landed proprietors of England, will find himself amply gratified by consulting "*The Beauties of England and Wales*," a work in which is exhausted every source of antiquarian and topographical research, up nearly to the present time.

Useful and decorative gardening, in the early ages, are necessarily so much connected, that in our history of the former art in Scotland, we have necessarily embraced the greater part of what was known of the latter. We have, therefore, to refer to the article HORTICULTURE for some part of what might have here occupied our attention. From the early and long continued connection of this nation with the French, much of the manner, style of living and of art, bears the marks of importation from that people. This is obvious to the most indifferent observer, in the common architecture and arrangements of the towns built previously to the union, and not less so to the curious enquirer in that of the country seats and gardens of the same period.

The earliest distinct notice of a royal attention to gardens is well known; James III. being blamed for "delighting more in musick and policie, (probably from the French *polir*, to remove, level, or improve; or from a corruption of *se polir*, to improve one's self, levelling and smoothing the grounds about a house, being naturally the first step after it is built,) and building, than he did in the government of his realm." (Pitscottie's *Chronicles of Scotland*, 1590.) The general residence of this monarch was Stirling Castle; and a marsh in the vale below is said to have been the site of the royal gardens. Enough remains to justify a conjecture, that at this early period they displayed as much skill as those of any other country. We allude to a mound of earth resembling a table, surrounded by turf seats, the scene, no doubt, of rural festivities, and an existing proof of the royal attention to the subject.

At Falkland is a large square enclosure, on a dull flat, in which there exists only a few stunted ash trees, though the boundary stone wall is still a formidable fence. The gardens of Holyroodhouse appear to have been exceedingly confined; the boundary wall only remains, and there are some indications of the rows of trees which stood in the park, which seems to have extended to the base of the adjoining hill, Arthur's Seat. The palace of Scone, we learn from Adamson, a poet of the 17th century, was surrounded by "gardens and orchards, flowers and fruits;" and the park, in which are still some ancient trees, "abounded in the hart and fallow deer."

Generally a few old trees in rows adjoin the other royal residences, and oldest baronial castles; but they give no indications to what extent art was carried in their disposition, till about the end of the 17th century, when the grounds of the duke of Hamilton were planted, in all probability by a French artist. The design of Chatelherault, an appendage to that palace, named after, and in imitation of the residence of that illustrious family in France, there can be little doubt would be taken from the plan said to have been given by Le Notre, for the original residence near the town of that name, in the department of Vienne.

About the beginning of the 18th century, the Earl of Lauderdale is said to have sent plans, sections, and sacks of earth, from his domain at Hatton, to London and Wise, in London; and these artists, it is added, formed a plan, and sent down a gardener to superintend its execution.

Switzer, Laurence, and Langley, mention in their works, that they were frequently called into Scotland to give plans of improvement. Switzer appears to have resided a considerable time in Edinburgh, as he there published, in 1717, a tract on draining, and other useful and agricultural improvements.

The Earls of Stair and Haddington, (who wrote on trees,) both great planters, before or about this time, probably consulted them; as would, perhaps, Fletcher of Saltoun; the proprietors of Dundas Castle, Barnton, Saughtonhall, Gogar, and particularly Craigie-hall, a residence laid out with much art and taste, and next in rank, in these respects, to Hatton. New Liston, Dalkeith House, Hopeton House, and various other places near Edinburgh, are also in Switzer's style. New Liston and Hopeton House, planted, we believe, from 1735 to 1740, were probably the last considerable seats laid out in the ancient style in Scotland.

It is observed by the author of an "*Essay on the Rise and Progress of Gardening in Ireland*," (J. C. Walker, in *Trans. R. I. Acad.* vol. xiv. part 3d,) "that Fynnes Morrison, a minute observer, who travelled through that kingdom in the reign of Queen Elizabeth, does not once mention a garden, as appertaining either to a castle or to a monastery; he only observes, "that the best sorts of flowers and fruits are much rarer in Ireland than in England; which, notwithstanding, is more to be attributed to the inhabitants than to the ayre." In an inedited account of a Tour in 1634, also quoted by Mr. Walker, (*Trans. R. I. A.*) Bishop Usher's palace is said to have a "pretty neat garden."

Some of the largest sculptured evergreens in Ireland are at Bangor, in the county of Down; and at Thomas-town, in the county of Tipperary, are the remains of a hanging garden, formed on the side of a hill, in one corner of which is a verdant amphitheatre, once the scene of occasional dramatic exhibitions.

Blissington gardens, if tradition may be relied on, were laid out during the reign of James II. by an English gentleman, who had left his estate at Byfleet in Sussex, to escape the persecution of Cromwell. The first forcing house is supposed to have been erected in these gardens; and the first plant stove at Moyra, in the succeeding reign, by Sir Archibald Rawdon, an ancestor of the Marquis of Hastings.

In king William's time, knots of flowers, curious edgings of box, topiary works, grassy slopes, and other characteristics of the Dutch style, came into notice. Rowe and Bullein, Englishmen, who had sussessively nurseries at Dublin, were, in these days, the principal rural artists of Ireland; though Switzer and Laurence, as well as Batty Langley, occasionally visited these countries.

Of the state of country seats in Ireland during the 16th and 17th centuries, we are not sufficiently acquainted to be able to give any general outline. If tradition is to be credited, they were more in the English than in the Scotch manner; and, as might be expected, inferior to both in respect to domestic conveniences.

Having now completed an historical outline of the ancient style, or what may be, with equal propriety, called French or Roman gardening, in Europe, we shall proceed to our next epoch, which embraces the modern style.

SECT. IV. *Chinese Gardening.*

We have chosen this period to introduce what is known of the art of gardening among the Chinese; not only because we have now brought down our history to the time it first received the attention of Europeans, but also because a previous account of it will serve greatly to facilitate our investigations into the origin of the English style.

The first authentic notice of Chinese gardening received in Europe, is contained in the well known "*Lettres Edifiantes et Curieuses*," &c. in a letter dated Pekin, 1743, giving an account of the Emperor's gardens there. It was translated by Mr. Spence, under the fictitious title of Sir Harry Beaumont, whom Lord Walpole describes as having "both taste and zeal for the present style;" and was published in Dodsley's collection in 1761. The chief features in the Emperor's gardens were buildings, mock towns, villages, artificial hills, vallies, lakes, and canals; serpentine bridges, covered by colonades and resting places, with a farm and fields, where his imperial majesty is accustomed to patronize rural industry, by putting his hand to the plough; or, as it has been otherwise expressed, "to play at agriculture once a year."

But some idea of the Chinese style must have been known, from the verbal accounts of Chinese merchants or travellers, nearly a century before. A proof of this is to be found in Sir William Temple's *Essay*, written about the middle of the 17th century. He informs us, that though he recommends regularity in gardens, yet, for any thing he knows, there may be more beauty in such as are wholly irregular. "Something of this sort," he says, "I have seen in some places, but heard more of it from others, who have lived much among the Chinese." Referring to their studied irregularity, he adds, "When they find this sort of beauty in perfection, so as to hit the eye, they say it is *sharawadgi*, an expression signifying fine or admirable." It appears from this passage, that the Chinese style had not only been known, but imitated in England nearly a century previously to the publication of the *Jesuits' Letters*, and, at least, 60 years before Kent's time. Sir William Temple retired to Moor Park in 1680, and died in the year 1700.

The first detailed account of this style, however, was brought to England by Sir William Chambers; and published in an essay in the appendix to his "*Designs of Chinese Buildings*, &c. in 1757; and at greater length in his "*Dissertation on Oriental Gardening*, in 1772; and commended, as G. Mason observes, by so good a judge as Gray. (*Life*, p. 387.)

This author avows, that his information is not derived entirely from personal examination, but chiefly from the conversation of a celebrated Chinese painter; and it has been very reasonably conjectured, that he has drawn, in some cases, on his own imagination, in order to enhance the reader's opinion of Chinese taste, with the laudable end of improving that of his own country. In his *Essay* of 1757, which was published in French as well as English, and was soon translated, as Hirschfield informs us, into German, he says, "the Chinese taste in laying out gardens is good, and what we have for some time past been aiming at in England." With the exception of their formal and continual display of garden buildings, and their attempts of raising characters, not only picturesque and pleasing, but also of horror, surprise, and enchantment, Sir William's directions, especially in his second work, will apply to the most improved conceptions of planting and forming pieces of water for the modern style; or, in other words, for creating scenery such as will always resemble, and often might be mistaken for that of nature.

By perusing the work of Sir William Chambers, some idea may be formed as to the probability of its having given rise to the English manner, and how far the two varieties of gardening still agree.

There can be no doubt of the entire originality of their style; though it may reasonably be conjectured, that their taste for picturesque beauty is not exactly so conformable to European ideas on that subject as Sir William would lead us to believe. At all events, it is carried to such an extreme, so encumbered with deceptions, and what we would not hesitate to consider puerilities; and there appears throughout so little reference to utility, that the more mature and chastened taste of Europeans cannot sympathise with it. It is indeed altogether a peculiar taste, undoubtedly perfectly natural to that people, and therefore not to be subjected to European criticism.

"The Chinese gardens," observes Lord Walpole, "are as whimsically irregular as European gardens were formally uniform and unvaried; nature in them is as much avoided as in those of our ancestors." In allusion to those of the emperor's palace, described in the *Lettres Edifiantes*, as of vast extent, and which contained 200 palaces, all painted and varnished, he says, "this pretty gaudy scene is the work of caprice and whim, and, when we reflect on their buildings, presents no image but that of unsubstantial tawdriness." At the same time, they do not seem to be altogether devoid of picturesque and even wild scenes; for Lord Macartney mentions that the view from one of the imperial gardens might be compared to that from the terrace at Lowther Castle, which is altogether wild and romantic, and bounded by high uncultivated mountains, with no other buildings than one or two native cottages. In what degree of estimation such a view is there held does not, however, appear; it would be too much to conclude, that, because it existed in that situation, it was therefore considered as eminently beautiful or desirable.

His Lordship's other observations, as well as those of Sir George Staunton and Mr. Barrow, do justice to the material facts and general character of Sir William Chambers' account. "It is our excellence," observes his Lordship, "to improve nature; that of a Chinese gardener to conquer her; his aim is to change every thing from what he found it. A waste he adorns with trees; a desert he waters with a river or a lake; and on a smooth flat is raised hills, formed vallies, and placed all sorts of buildings."

The Chinese style most probably originated in that country, as being an arrangement of verdant scenery the most contrasted to common cultivation. So far this is in just taste, as the only means left them of distinguishing ornamental from useful scenes. The farther desire of obtaining distinction among the distinguished, could only be effected by lavishing expense in multiplying objects, or exaggerating expression. Art among them seems to have attained that last culpable extreme, the object of which is to excite admiration of the skill of the artist; and the limited extent of individual territory, and the cramped state of the human mind in that country, seem to account for their approbation of this expression.

An attentive examination of the great majority of those seats in which appeared the first indications of a change of taste in this country, and throughout Europe, will prove that our object was to copy, or, at least, to imitate, the Chinese manner. Sir William Chambers, (see a passage quoted in the beginning of this article,) Hirschfield, (*Theorie des Gartenkunst*, 12mo. Lipsig, 1775,) Watelet, ("Cette nation (the English) imprunté, dit on, elle même l'Indée de ses jardins des Chinois." *Essai sur les Jardins*, Paris, 1774,) say so, in express terms; and the numerous books of grottos, root-houses, covered seats, Chinese buildings of various sorts, rock-works, and other objects, published during the the first 50 years of the 18th century, put this matter, in our opinion, beyond a doubt. The good sense of the country, however, soon disapproved of such expensive and yet heterogeneous scenery; and by introducing greater simplicity, the English style gradually arose from the ruins of that of the Chinese.

SECT. V. *English Gardening.*

In the concluding part of the last section we have expressed our opinion of the origin of the English, or modern, art of laying out grounds; which, after the utmost attention which we have been able to give the subject, we have been, in some degree, reluctantly compelled to adopt; not only as being at variance with that of some names of great authority, but as depriving us, in some degree, of the merit of entire originality. As in a work of this nature it is proper that our readers should judge for themselves, we shall first state the various sentiments of other writers, and next enumerate the first eminent practitioners and artists.

Warton, in his *Essay* on Pope, and Lord Walpole, in his *History of Modern Gardening*, agree in referring the first ideas to Milton; and the former adds, that the *Seasons* of Thomson may have had a very considerable influence. Eustace is of opinion, that we may, with nearly equal propriety, refer to Tasso's celebrated description of the garden of Armida; and Bœttinger, in his *Racemazionen zur Garten Kunst der Alten*, &c. carries us back to the descriptions of the grotto of Calypso, by Homer; the vale of Tempe, by Ælian; and of Vaucluse, by Petrarch. To these opinions may be very properly added a remark of Mr. G. Mason, that "were only classical authorities consulted, it would hardly be supposed that even from the earliest ages any considerable variation in taste had ever prevailed." (*Essay on Design in Gardening*, p. 27.) Mr. Alison seems to consider the modern style as derived from our taste for the classic descriptions of the poets of antiquity. "In this view," (alluding to the progress of art from the expression of design to the expression of variety and natural beauty,) he observes, "I cannot help thinking that the modern taste in gardening, (or what Mr. Walpole very justly, and very emphatically, calls the art of creating landscape,) owes its origin to two circumstances, which may, at first, appear paradoxical, viz. to the accidental circumstance of our taste in natural beauty being founded upon foreign models; and to the difference or inferiority of the scenery of our own country to that which we were accustomed peculiarly to admire."

The poet Gray (*Life and Letters, &c. Letter to Mr. How, dated* 1763,) is of opinion, that "our skill in gardening, or rather laying out grounds, is the only taste we can call our own; the only proof of original talent in matters of pleasure. This is no small honour to us; since neither France nor Italy have ever had the least notion of it."

Mason, the poet, states, in a note to the *English Garden*, that "Bacon was the prophet, Milton the herald, of modern gardening; and Addison, Pope, and Kent, the champions of true taste." The efficacy of Bacon's ideas, Mr. G. Mason considers to have been "the introduction of classical landscapes," though this does not very clearly appear from his essay, the object of which seems to be, to banish certain littlenesses and puerilities, and to create more variety, by introducing enclosures of wild scenery, as well as of cultivation. The title of champion, applied to Addison, alludes to his excellent paper in the Spectator, No. 414, "on the causes of the pleasures of the imagination arising from the works of nature, and their superiority over those of art, published in 1712; and when applied to Pope, it refers to his celebrated *Guardian*, No. 173, published the following year. Bœttinger, however, affirms that the bishop of Avranches had thrown out similar ideas, previously to the appearance of the Spectator. (See "*Huetiana*," Pensée 51, "Beautés naturelles préferables aux beautés de l'art;" and P. 72, "Des jardins à la mode.")

Mr. G. Mason, the third writer on the modern style, (Pope and Shenstone being the two first,) in reference to Sir William Temple's observations on the Chinese manner, observes, "little did Sir William Temple imagine, that in not much more than half a century the Chinese would become the nominal taste of his country; or that so many adventurers in it would do great justice to his observation, and prove by their works, how difficult it is to succeed in the undertaking. Yet to this whimsical exercise of caprice, the modern improvements in gardening may chiefly be attributed." (*Essay on Design*, &c. p. 50.) No man could be a more enthusiastic admirer of the classics, a warmer patriot, or a more rigid critic, than this author; and it appears from another part of his work, (*Discussion on Kent*, p. 1 5) that he was well aware, when he wrote the above passage, that the origin of the modern style was generally traced to Kent. That he should derive it from our attempt at the Chinese manner, we consider as a proof of candour and impartiality. Having now given the different views respecting the origin, we shall next advert to the improvement of the modern style, in which happily there is a greater unanimity of opinion.

It is allowed on all sides, that Addison (who had many years afterwards a small retirement at Bilton, near Rugby, laid it out in what may be called a rural style, and which still exists, with very little alteration besides that of time.) and Pope "prepared for the new art of gardening the firm basis of philosophical principles." Pope attacked the verdant sculpture, and formal groves of the ancient style, with the keenest shafts of ridicule; and in his epistle to Lord Burlington, laid down the justest principles of art—the study of nature, of the genius of the place, and never to lose sight of good sense. In so far as was practicable on a spot of little more than two acres, Pope practised what he wrote; and his well known garden at Twickenham contained, so early as 1716, some highly picturesque and natural-like scenery, accurately described by various contemporary writers. (See *Beauties of England and Wales.*)

But it was reserved for Kent, the friend of Lord Burlington, to carry Pope's ideas more extensively into execution. It was reserved for him, says Daines Barrington, "to realize the beautiful descriptions of the poets, for which he was peculiarly adapted, by being a painter; as the true test of perfection in modern gardening is, that a landscape painter would choose it for a composition." Bridgeman, the fashionable designer of gardens previously to Kent, Lord Walpole conjectures to have been "struck and reformed" by the *Guardian*, No. 173. He banished verdant sculpture, and introduced morsels of a forest appearance in the gardens at Richmond; "but not till other innovators had broke loose from rigid symmetry." The capital stroke was, the destruction of walls for boundaries, and the introduction of ha-has—the harmony of the lawn with the park followed. Kent appeared at this moment, and saw that all nature was a garden; "painter enough to taste the charms of landscape, bold and opinionative enough to dare, and to dictate, and born with a genius to strike out a great system, from the twilight of imperfect essays, he realized the compositions of the greatest masters in painting." "Kent," continues his lordship, "was neither without assistance nor without faults. Pope contributed to form his taste; and the gardens at Carleton House were probably borrowed from the poet's at Twickenham."

The various deviations from rigid uniformity, or, more correctly, the various attempts to succeed in the Chinese manner, appear thus to have taken a new and decisive character under the guidance of Kent, a circumstance, in our opinion, entirely owing to his having the ideas of a painter; for no mere gardener, occupied in imitating the Chinese, or even Italian manner, would ever have thought of studying to produce picturesque effect. Picturesque beauty, indeed, we consider to have been but little recognised in this country, excepting by painters, previously to the time of Pope, who was both a painter and a poet. The continued approbation of the modern style, as purified from the Chinese absurdities, originally more or less introduced with it, and continued in many places long after Kent's time, we consider to be chiefly owing to the circumstance of the study of drawing and landscape painting having become a part of the general system of education: and thus, as Mr. Alison observes, our taste for natural beauty was awakened; "the power of simple nature was felt and acknowledged, and the removal of the articles of acquired expression, led men only more strongly to attend to the natural expression of scenery, and to study the means by which it might be maintained or improved."

Kent was born in Yorkshire, and apprenticed to a coach painter in 1719. He soon afterwards came to London, discovered a genius for painting, was sent to Italy, patronised there by Lord Burlington, returned with his lordship, and lived with him in Burlington House till 1748, when he died, at the age of 63 years. On his first return, he was chiefly employed to paint historical subjects and ceilings, and the Hall at Stowe is from his pencil. Soon afterwards he was employed as an architect, and lastly as a landscape gardener. It is not known where he first exercised his genius as a layer out of grounds; probably at Claremont and Esher, two of his designs, both minutely described by Wheatley, and, judging from the age of the trees, laid out some time between 1725 and 1735. Kent was also employed at Kensington gardens, where he is said to have introduced parts of dead trees, to heighten the allusion to natural woods. Mason, the poet, mentions Kent's Elysian scenes in the highest style of panegyric, and observes in a note, that he prided himself in shading with evergreens in his more finished pieces, in the manner described in the 14th and 15th sections of Wheatley's *Observations*.

Claremont has been celebrated by Garth, and Esher by Warton, (*in the Enthusiast, or Lover of Nature*, 1740,) and Mr. Walpole, with the authority of an eye-witness, has very accurately delineated Kent's manner of realizing landscapes; and has expatiated on his merits, without concealing his few demerits in his profession. "According to my own idea," adds Mr. G. Mason, "all that has since been done by the most deservedly admired designers, by Southcote, Hamilton, Lyttleton, Pitt, Shenstone, Morris, for themselves, and by Wright for others, all that has been written on the subject, even the gardening didactic poem, and the didactic essay on the picturesque, have proceeded from Kent. Had Kent never exterminated the bounds of regularity, never actually traversed the way to freedom of manner, would any of these celebrated artists have found it of themselves? Theoretical hints from the highest authorities, had evidently long existed without sufficient effect. And had not these great masters actually executed, what Kent's example first inspired them with the design of executing, would the subsequent writers on gardening have been enabled to collect materials for precepts, or stores for their imaginations?" P. 112.

Lord Cobham seems to have been occupied in re-modelling the grounds at Stowe, about the same time that Pope was laying out his gardens at Twickenham. His lordship began these improvements in 1714, employing Bridgeman, whose plans and views for altering old Stowe from the most rigid character of the ancient style to a more open and irregular design, are still in existence. Kent was employed a few years afterwards, first to paint the hall, and afterwards in the double capacity of architect and landscape gardener; and the finest buildings and scenes there are his creation. The character of Stowe is well known: Nature has done little; but art has created a number of magnificent buildings, by which it has been attempted to give a sort of emblematic character to scenes of little or no natural expression. The result is unique; but more, as expressed by Pope, "a work to wonder at," than one to charm the imagination. The friends of Lord Cobham seem to have considered Kent as the first who exhibited the new style to his country, if we may judge from the concluding lines of an epitaph to his memory, placed in the garden,

ET ELEGANTIORI HORTORUM CULTU
HIS PRIMUM IN AGRIS ILLUSTRATO
PATRIAM ORNAVIT
1747.

Southcote is supposed to have been one of the first to follow the new system struck out by Kent, by improving his own domain at Woburn, in Surrey. He possessed a genius, in many respects well suited to the purpose, says Mr. G. Mason; but was rather too lavish of his flowery decorations. The extent of the grounds was one hundred and fifty acres; thirty-five of which were ornamented to the highest degree, two-thirds of the remainder were in pasture, on rising grounds, and the rest in tillage. The decorations consisted in having a broad margin of shrubbery, and gravel walk, to almost every fence, but varied by difference of style, views, buildings, &c. It is minutely described in Wheatley's *Observations*, as an example of an ornamented farm. Mr. G. Mason thinks the decorated strip often too narrow, and sometimes offensive, from the impossibility of concealing the fence. To this bordering walk, he thinks, may probably be attributed the introduction of the belt. His remarks refer to the year 1768. In 1803, it had repeatedly changed proprietors, and scarcely a vestige remained, to distinguish it from a common farm.

Pains Hill, the creation of Hamilton, is supposed to have been one of the next specimens exhibited of the modern style. Hamilton was originally a gardener; but is said to have studied pictures, with a view to the improvement of scenery. He purchased seats, and improved them for public sale. Pains Hill, which was his own residence, is a small park, surrounded on three sides by garden and picturesque scenery. Excepting from the house, there is no distant prospect; but the grounds being considerably undulated, the views from the walks across the park have some variety, and are always agreeable. This place is one of the few, described by Wheatley, which is still in perfect preservation.

Hagley seems to have been improved about the same time as Pains Hill, in effecting which, Lord Lyttleton might probably receive some hints from the poet Thomson, who was then his guest. The grounds are much varied, and the distant prospects picturesque. A very small rill, which passed through the grounds in a sort of dell, was surrounded with shrubbery and walks, from which the park scenery formed a sort of fore ground, and sometimes a middle distance to the offscape; thus, in the language of Wheatley, "blending the excellencies of the park and a garden." The fine trees, the distant prospects, and the principal buildings, still remain; but the garden scenery has been long since choked by the growth of the forest trees; and at last the fence was removed, and the whole thrown into the park.

Soon after the improvements of Hamilton and Lyttleton, "the great Pitt," Mr. G. Mason informs us, "turned his mind to the embellishment of rural nature," and exercised his talent at the South Lodge upon Enfield Chace. "The first ground surrounding the enclosure was then wild and woody, and is diversified with hill and dale. He entertained the idea (and admirably realized it) of making the interior correspond with the exterior scenery. His temple of Pan is mentioned in *Observations*. But the singular effort of his genius was a successful imitation of the picturesque appearance of a bye-lane, on the very principles Mr. Price supposes it might be practicable."

The Leasowes were improved about the same time. It was literally a grazing farm, with a walk, in imitation of a common field, conducted through the several enclosures. Much taste and ingenuity was displayed, in forming so many points of view in so confined an extent, and with so few advantages in point of distance. But root-houses, seats, urns, and inscriptions, were too frequent for the whole to be classed with a common, or even an improved or ornamented English farm. It was in fact intended as an emblematical scene, in which constant allusion was made to pastoral poetry; and if we consider it in this light—in that of a sentimental farm,—it was just what it ought to have been. We regret to find that Mr. Repton should attack the taste of this amiable man, from a misconception, as we presume, of his intentions, by blaming him for not "surrounding his house with such a quantity of ornamental lawn or park only, as might be consistent with the size of the mansion, or the extent of the property." We fear that if Shenstone had adopted this mode of improvement, the Leasowes had never been distinguished from places *got up* by the common routine of professorship. Shenstone broke his heart, through the infamous conduct of a Birmingham attorney, in whose hand he had placed the title-deeds of his estate. The farm is now much neglected, though the paths, and many of the urns, seats, and root-houses, still remain.

Persfield was laid out so late as 1750. It is a small park, with an interesting walk, carried along the brow of a romantic rocky bank of the river Wye, perhaps as faultless as the nature of the place admits of. "I cannot recollect," says Mr. G. Mason, writing of this place in 1768, "that any of the scenes on the Wye are the least adulterated by the introduction of any puerile appendage whatever."

As Pope and Kent introduced English gardening, so these are the principal voluntary artists, whose works exhibited and established its character. We shall now enumerate the principal authors.

Pope's *Epistle* to Lord Burlington has been already referred to, as well as Shenstone's *Unconnected Thoughts*; the former published in 1716, the latter in 1764. Mr. George Mason's *Essay on Design in Gardening*, from which we have so frequently quoted, was first published in 1768, and afterwards greatly enlarged in 1795. It is more a historical and critical work than a didactic performance.

The grand fundamental and standard work on English gardening, is the well known "*Observations on Modern Gardening*;" published in 1770, by Wheatley. It is entirely analytical, treating, first, of the materials, then of the scenes, and lastly, of the subjects of gardening. Its style has been pronounced by Ensor, inimitable; and the descriptions with which his investigations are accompanied, have been copied and praised by Mr. Alison in the first edition of his work on taste. The book was soon translated into the continental languages, and is judiciously praised in the *Mercure de France*, *Journal Encyclopedique*, and Wieland's *Journal*. Mr. G Mason alone dissents from the general opinion, enlarging on the very few faults or peculiarities which are to be found in the book. Mr. Wheatley was secretary to Lord Grenville, and published only this work, soon after which he died. After his death, some remarks on Shakespeare, from his pen, were published in a small 12mo. volume.

The English Garden was published in four different books, the first of which appeared in 1772. With the exception of the fourth book, it was received with very great applause. The precepts for planting are particularly instructive. On the whole, the work may be classed with the "*Observations*" of Wheatley; and these two books may be said to exhibit a clear view of the modern style, as first introduced and followed by liberal and cultivated minds; whilst the *Dissertation on Oriental Gardening*," by Sir William Chambers, published in 1772, holds up to ri-

ridicule the absurd imitations of uncultivated amateurs and professors, who had no other qualifications than those acquired in labouring with the spade under some celebrated ground worker.

We shall now proceed to notice the principal *professors* to which the demand for the new style gave rise; and by whom it was, in a short time, extended over the whole country; not indeed in so chaste, varied, and original a taste, as is exhibited in the places and publications we have enumerated, but according to their different degrees of talent for imitating what, with one or two exceptions, it does not appear they understood.

The first of these is *Wright*, who seems to have been in some repute at the time of Kent's death. His birth and education, Mr. G. Mason informs us, " were above plebeian; he understood drawing, and sketched plans of his designs; but never contracted for work, which might occasion his not being applied to by those who consider nothing so much as having trouble taken off their hands." At Becket, the seat of Lord Barrington, he produced an admired effect on a lawn; and at Stoke, near Bristol, he is supposed to have decorated a copse wood with roses, in the manner advised in the fourth book of the *English Garden*. He also designed the terrace walk and river at Oatlands, both deservedly admired; the latter being not unfrequently mistaken for the Thames itself.

The next professor, in the order of time, is the celebrated Mr. Brown. He was bred a kitchen gardener, at a small place near Woodstock, in Oxfordshire; and was afterwards head gardener at Stowe till 1750. He was confined (see *Beauties of England and Wales*, Bucks,) to the kitchen garden by Lord Cobham, who, however, afterwards recommen dedhim to the Duke of Grafton at Wakefield Lodge, Northamptonshire, where he directed the formation of a large lake, which laid the foundation of his fame and fortune. Lord Cobham afterwards procured for him the situation of royal gardener at Hampton Court and Windsor. He now attained the summit of his popularity. The fashion of employing him continued, says Mr. G. Mason, not only to 1768, but to the time of his death, many years afterwards. Mr. Repton has given a list of his principal works, among which Croome and Fisherwick are the two largest new places which he formed, including at Croome the mansion and offices, as well as the grounds. The places he altered are beyond all reckoning. Improvement was the passion of the day; and there was scarcely a country gentleman, who did not, on some occasion or other, consult the royal gardener. Mason, the poet, praises this artist, and Lord Walpole apologises for not praising him. Daines Barrington says, " Kent hath been succeeded by Brown, who hath undoubtedly great merit in laying out pleasure grounds; but I conceive that, in some of his plans, I see rather traces of the kitchen gardener of old Stowe, than of Poussin or Claude Lorrain. I could wish therefore that Gainsborough gave the design, and that Brown executed." The works and memory of Brown have been severely attacked by Mr. Knight and Mr. Price, and strenuously defended by Mr. Repton, who styles him his great self-taught predecessor. " Brown," observes Mr. G. Mason, " always appeared to myself in the light of an egregious mannerist; who, from having acquired a facility in shaping surfaces, grew fond of exhibiting that talent, without due regard to nature, and left marks of his intrusion wherever he went. His new plantations were generally void of genius, taste, and propriety; but I have seen instances of his managing old ones much better. He made a view to Cheney's church, from Latimer, (Bucks) as natural and picturesque as can well be imagined. Yet, at the same place, he had stuffed a very narrow vale, by the side of an artificial river, with those crowded circular clumps of firs alone, that Mr. Price attributes to him. The incongruity of this plan struck most of the neighbouring gentlemen, but was defended by the artist himself, under shelter of the epithet playful—totally misapplied." (*Essay on Design*, p. 130, 2d edit. 1795.)

That Brown must have possessed considerable talents, the extent of his reputation abundantly proves; but that he was imbued with much of that taste for picturesque beauty, which distinguished the works of Kent, Hamilton, and Shenstone, we think, will hardly be asserted by any one who has observed attentively such places as are known to be his creations. Whatever be the extent or character of the surface, they are all surrounded by a narrow belt, and the space within is distinguished by numbers of round or oval clumps, and a reach or two of a tame river on different levels. This description, in short, will apply to almost every place in Britain laid out from the time (about 1740) when the passion commenced for new modelling country seats, to about 1785 or 1790, when it in a great measure ceased. The leading outline of this plan of improvement was easily recollected, and easily applied; the great demand produced abundance of artists; and the general appearance of the country so rapidly changed under their operations, that in 1772, Sir William Chambers declared, that if the mania were not checked, in a few years longer there would not be found three trees in a line from the Land's End to the Tweed. Brown, it is said, never went out of England, but he sent pupils and plans to Scotland and Ireland; and Paulowsky, a seat of the late Emperor Paul, near Petersburgh, is said to be from his design. Potemkin's gardener, Gould, was also one of his pupils. Brown, as far as we have learned, could not draw, but had assistants, who made out plans of what he intended. He generally contracted for the execution of the work.

The immediate successor of Brown, was his nephew, Mr. Holland, who was more employed as an architect than as a landscape gardener; though he generally directed the disposition of the grounds when he was employed in the former capacity. Mr. Holland, we believe, retired from business some years ago.

The next artist that deserves to be mentioned, is Mr. Eames, of whom, however, we know little more than that he is mentioned in terms of respect by Mr. G. Mason.

Mr. Repton, a highly respectable artist, from being an amateur, began his career as professor of landscape gardening about thirty years ago; and, till a sort of decline or inactivity of taste took place ten or twelve years since, he was extensively consulted. Though at first an avowed defender and follower of Brown, he has gradually veered round with the change effected in public opinion by the *Essays on the Picturesque*, so that now, comparing his earlier works of 1795 and 1805, with his *Fragments on Landscape Gardening*, published in 1817, he appears much more a disciple of Price, than a defender of his " great predecessor." Mr. Repton is a beautiful draughtsman, and gives, besides plans and views, his written opinion in a regular form, generally combining the whole in a manuscript volume, which he calls the *red book* of the place. He never, we believe, undertakes the execution of his plans. Mr. Repton has not, as far as we are aware, been employed out of England; but Valleyfield, in Perthshire, was visited by his two sons, and arranged from Mr. Repton's designs. The character of this artist's talent, seems to be cultivation rather than genius, and he seems more anxious to gratify the preconceived wishes of his employers, and improve on the fashion of the day, than to strike out grand and original beauties. This, indeed, is perhaps the most useful description of talent, both for the professor and his employers. Mr. Repton's taste in gothic architecture, and in terraces, and architectural appendages to mansions, is particularly elegant. His published "*Observations*" on this subject are valuable; though we think otherwise of his remarks on landscape gardening, which we look upon as wanting depth, and often at variance with each other. On the whole, however, we have no hesitation in asserting, that both by his splendid volumes, and extensive practice among the first classes, he has supported the credit of this country for taste in laying out grounds.

Though it may be true, that "in all liberal arts, the merit of transcendent genius, not the herd of pretenders, characterizes an era;" yet in an art like that of laying out grounds, whose productions necessarily have such an influence on the general face of a country, it is impossible to judge otherwise of the actual state of the art, than from the effect which is produced. This effect, about forty years ago, when clumps and belts blotted every horizon, could never be mistaken for that intended by such professors as Kent, or such authors as Wheatley and Mason. The truth is, as we have already hinted, such was the rage for improvement, that the demand for artists of genuine taste exceeded the regular supply; and, as it is usual in such cases, a false article was brought to market, and imposed on the public. This false taste, which may be said to have for the time reduced a liberal to a mechanic art, gave a new character to modern improvements, which, from consisting in a display of ease, elegance, and nature, according to the situation, became a system of set forms, indiscriminately applied in every case. This system was in fact more formal, and less varied, than the ancient style to which it succeeded, because it had fewer parts. An ancient garden had avenues, alleys, stars, patés d'oye, pelotons, or platoons, (square clumps,) circular masses, rows double and single, and strips, all from one material, *wood;* but the modern style, as now degraded, had only three forms, a clump, a belt, and a single tree. Place the belt in the circumference, and distribute the clumps and single trees within, and all that respects wood in one of these places is finished. The professor required no further examination of the ground, than what was necessary to take the levels for forming a piece of water, which water uniformly assumed one shape and character, and differed no more in different situations, than did the belt or the clump. So entirely mechanical had the art become, that any one might have guessed what would be the plan given by the professor before he was called in; and Mr. Price actually gives an instance in which this was done. The activity of this false taste was abated in England before our time; but we have seen in Scotland, between the years 1795 and 1805, we believe, above a hundred of such plans, in part formed by local artists, and in part by an English professor, who was in the habit of making annual journies in the north, taking orders for plans, which he got drawn on his return home, not one of which differed from the rest in any thing but magnitude.*

The good sense of the country soon revolted at such monotonous productions; and proprietors were ridiculed for expending immense sums in destroying old avenues and woods, and planting in their room young clumps, for no other reason than that it was the fashion to do so. Partly on this account, and partly because almost every place in England had been metamorphosed, and that lassitude had ensued which always succeeds over exertion, the career of improvement slackened its pace in England about the year 1780. Various causes contributed to diminish its course, till the almost decisive blow given by Mr. Knight and Mr. Price in 1794.

The first symptoms of disapprobation that were ventured to be uttered against the degradation of the new taste appear to be contained in an epistolary novel, entitled *Village Memoirs*, published in 1775, in which the professors of gardening are satirized under the name of Mr. Layout. A better taste, however, than that of Mr. Layout is acknowledged to exist, which the author states "Shenstone and nature to have brought us acquainted with." Most of the large gardens are said to be laid out by some general undertaker, "who introduces the same objects at the same distances in all." P. 143. The translation of Girardin *De la composition des paysages, ou des moyens d'embellir la nature autour des Habitations, en joignant l'agréable a l'utile, &c.* accompanied with an excellent historical preface by Daniel Malthus, Esq. in 1783, must have had considerable influence in purifying the taste of its readers. A poem in Dodsley's collection, entitled *Some Thoughts on Building and Planting*, addressed to Sir James Lowther, Bart. published in the same year, and in which the poet recommends, that

> "Fashion will not the works direct,
> But reason be the architect,"

must have had some effect. But the *Essay on Prints*, and the various picturesque tours of Gilpin, published at different intervals from 1768 to 1790, had the principal influence on persons of taste. The beauties of light and shade, outline, grouping, and other ingredients of picturesque beauty, were never before exhibited to the English public in popular writings. These works were eagerly read, and brought about that general study of drawing and sketching landscape among the then rising generation, which has ever since prevailed; and will do more perhaps than any other class of studies towards forming a taste for the harmony and connection of natural scenery, the only secure antidote to the revival of the distinctness and monotony which characterize that which we have been condemning. The *coup-de-main*, however, has been given to this system by the works of Mr. Knight and Mr. Price, above mentioned. Their effect has been gradual, but certain; for, though at first they were violently opposed by professors and periodical critics, yet they have carried conviction to all men of taste; and even, as we have before stated, have converted Mr. Repton himself. The object of *The Landscape*, a didactic poem, is to teach the art of creating scenery, more congruous and picturesque than what is met with in that "tiresome and monotonous scene called pleasure ground." Mr. Price's *Essay on the Picturesque, and on the use of studying Pictures, with a view to the improvement of real Landscape*, is written with the same intention; but, as might be expected from a prose work, enters on the subject much more at length. In order to discover "whether the present system of improving is founded on any just principles of taste," Mr. Price begins by inquiring, "whether there is any standard, to which, in point of grouping and of general composition, works of this sort can be referred; any authority higher than that of the persons, who have gained the most general and popular reputation by those works, and whose method of conducting them has had the most extensive influence on the general taste?" This standard (which, it will be recollected by the candid reader, is desired only for what relates to grouping and composition, not to utility and convenience, as some have unfairly asserted.) Mr. Price finds in the productions "of those great artists, who have most diligently studied the beauties of nature, both in their grandest and most general effects, and in their minutest detail; who have observed every variety of form and of colour; have been able to select and combine; and then, by the magic of their art, to fix upon the canvass all these various beauties." Mr. Price recommends the study of the principles of painting, "not to the exclusion of nature, but as an assistant in the study of her works." He points out and illustrates two kinds of beauty in landscape; the one the picturesque, characterized by roughness, abruptness, and sudden variation; the other beauty in the more general acceptation, characterized by smoothness, undulations, intermixed with a certain degree of roughness and variation, producing intricacy and variety. Such beauty was made choice of by Claude in his landscapes, and such, he thinks, particularly adapted to the embellishment of artificial scenery. These principles are applied by Mr. Price in a very masterly manner, to wood, water, and buildings.

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* These plans were, in general, mounted on linen, which he regularly purchased in pieces of some hundreds of yards at a time, from a celebrated bleachfield adjoining Perth.

When the works of these gentlemen were published, they were opposed by professors, by a numerous class of mankind who hate innovation, and with whom "whatever is is right," including perhaps some men of taste, who had not a sense of the picturesque, or had mistaken the object of the book.

The first answer to Mr. Price's work, was a letter by Mr. Repton, in which candour obliges us to state, that Mr. R. has misrepresented his antagonist's meaning, by confounding the study of pictures with that of the study of the principles of painting. Mr. Price published an able answer to this production, which, he informs us, was even more read than the original essay.

Two anonymous poems of no merit made their appearance, as satires on *The Landscape*.

The *Review of the Landscape, and of an Essay on the Picturesque*, &c. by Mr. Marshall, was published in 1795. There can scarcely be any thing more violent than this publication. One reason for his not approving of the essay on the picturesque, he has made evident by his remarks on the same subject, and on painting; the fact being, as we have already more than once stated, and wish strongly to impress on the reader's mind, that a taste for the picturesque is not so natural as a taste for what is singular, grand, comic, or affecting, but requires a certain degree of previous study or preparation,—this preparation Mr. Marshall is evidently not furnished with.

Among the second class, or those with whom "whatever is is right," I shall just mention the periodical critics, who, in reviewing these works, brought forward all sorts of reasons against the use of the study of pictures, and deny (with truth perhaps as to themselves) the distinct character of the picturesque. Mr. Price they treat as "a mere visionary amateur," and Mr. Knight as "a Grub-street poet, who has probably no other garden than the pot of mint before his windows."

The vague opinion of a great mass of country gentlemen, tourists, and temporary authors, may be here included, who, taking the word picturesque in its extreme sense, and supposing it intended to regulate what was useful, as well as what was ornamental, concluded that Mr. Price's object was to destroy all comfort and neatness in country seats, and reduce them to mere portions of dingle or jungle scenery. Such opinions we have frequently heard expressed by men, in other respects of good sense. Even continental authors have imbibed and disseminated similar exaggerations. "Egarés par Gilpin, que a cherché par ses voyages en diverses parties de l'Angleterre et de l'Ecosse, a donné des régles, pour y assujeter le genre pittoresque et romantique, ils ont pris l'occasion pour demander que l'art fût totalement banni des jardins. Ils adoptent le pittoresque d'un Salvator Rosa dans les paysages, comme le vrai nature dans l'art de faire des jardins, et on rejetté comme un asservisement á ce même art, toutes les régles qu'un Bridgewater (Bridgeman?) et un Brown avoient publiées dans ce genre." (*Description Pittoresque des Jardins, du gôut le plus moderne*. Leipsig, 1802. See also Tubinger *Taschenbuch, für nature und Gartenfreunde*, 1798, p. 194. Of enlightened and liberal minds, who have in some degree opposed Mr. Price's principles, we can only instance the late Mr. Wyndham, who, in a letter to Mr. Repton, (Mr. Repton was at one period secretary to Mr. Wyndham, when that gentleman was in office.) written after the publication of his defence, combats, not the works of Mr. Price, but the popular objections to the supposed desire of subjecting every thing to the picturesque. "The writers of this school," he observes, "shew evidently that they do not trace with any success the causes of their pleasure. Does the pleasure that we receive from the view of parks and gardens result from their affording, in their several parts, subjects that would appear to advantage in a picture? What is most beautiful in nature, is not always capable of being represented in a painting; as prospects, moving flocks of deer. Many are of a sort which have nothing to do with the purposes of habitation; as the subjects of Salvator Rosa. Are we therefore to live in caves? Gainsborough's *Country Girl* is more picturesque than a child neatly dressed. Are our children to go in rags? No one will stand by this doctrine: nor do they exhibit it in any distinct shape at all, but only take credit for their attachment to general principles, to which every one is attached as well as they. It is contended, that in laying out a place, whatever is most picturesque is most conformable to true taste? If they say so, they must be led to consequences which they can never venture to avow. If they do not say so, the whole is a question of how much, or how little, which, without the instances before you, can never be decided." "Places are not to be laid out with a view to their appearance in a picture, but to their use, and the enjoyment of them in real life; and their conformity to these purposes, is that which constitutes their true beauty. With this view, gravel walks, and neat mown lawns, and in some situations, straight alleys, fountains, terraces; and, for aught I know, parterres, and cut hedges, are in perfect good taste, and infinitely more conformable to the principles which form the basis of our pleasure in those instances, than the docks and thistles, and litter and disorder, that may make a much better figure in a picture." (Letter from Mr. Wyndham, in a note to Mr. Repton's *Observations on the Theory and Practice of Landscape Gardening*.

From the vein of excellent sense which pervades this letter, and particularly the latter part of it, which we have extracted entire, it is impossible to avoid suspecting, either that there is a culpable obscurity in the works referred to, or that Mr. Wyndham had not sufficiently, if at all, perused them. We are inclined to believe that there is some truth in both suppositions. We have no hesitation, however, both from a mature study of *all* the writings of these gentlemen, relating to this subject, as well as a careful inspection of their own residences, in saying, that there is not an opinion in the above extract, to which they would not at once assent. Mr. Knight's directions in regard to congruity and utility, are as distinct as can well be expected in a poem. Mr. Price never entered on that subject. His works say, "Your object is to produce beautiful landscapes; at least this is one great object of your exertions. But you produce very indifferent ones. The beauty of your scenes is not of so high a kind as that of nature. Examine her productions. To aid you in this examination, consult the opinions of those who have gone before you in the same study. Consult the works of painters, and learn the principles which guided them in their combinations of natural and artificial objects. Group your trees on the principles they do. Connect your masses as they do. In short, apply their principles of painting whenever you intend any imitation of nature, for the principles of nature and of painting are the same. Are we to apply them in every case? Are we to neglect regular beauty and utility? Certainly not: that would be inconsistent with common sense."

We next present the opinion of Mr. Stewart on the same subject, as given incidentally in his philosophical disquisition on the beautiful. (*Essays*, 1810, p. 285.) "As to the application of the knowledge thus acquired from the study of paintings to the improvement of natural landscape, I have no doubt, that to a superior understanding and taste, like those of Mr. Price, it may often suggest very useful hints; but if recognised as the standard to which the ultimate appeal is to be made, it would infallibly cover the face of the country with a new and systematical species of affectation, not less remote than that of Brown, from the style of gardening which he wishes to recommend,"—"let painting be allowed its due praise in quickening our attention to the beauties of nature; in multiplying our resources for their farther embellishment, and in holding up a standard, from age to age, to correct the caprices of fashionable innovations; but let our taste for these beauties be *chiefly* formed on the study of nature herself; nor let us ever forget so far what is due to her indisputable and salutary prerogative, as to attempt an encroachment upon it by laws, which derive the whole of their validity from her own sanction," 287.

We shall conclude by remarking, that, however individuals have differed as to the theory of Mr. Price and Mr. Knight, yet all agree in admiring their respective seats; Mr. Knight's entirely, and Mr. Price's in great part, improved by himself, without professional assistance. Nature has certainly done much for each, and especially for that of Mr. Knight; but in both the *genius loci* has been so happily humoured, that the operations of art have greatly heightened the natural expression of each, while a strict attention to convenience and use has not been forgotten in either situation. (See *a Description of these Seats in Mr. Repton on the approaching changes of taste in Landscape Gardening and Architecture.* 8vo. 1810.)

If we have dwelt longer on the writings of these authors, it is because we consider a knowledge of them of the greatest importance, not only to the introduction of a better taste than has hitherto been displayed, even in the comparatively chaste periods of Kent, Shenstone, and Hamilton; but, as Mr. Stewart has expressed, as leading to studies which shall "*hold up a standard from age to age, to correct the caprices of fashionable innovations*"

The general taste for drawing, as already remarked, in the present generation, and the late frequent practice of making tours to the more picturesque parts of the island, have co-operated with Mr. Price's work, in refining the taste of the higher classes. Mr. Knight's learned and comprehensive "*Analytical Enquiry into the Principles of Taste*;" Mr. Alison's beautiful and profound essay on the same subject; and the Philosophical Essays on Beauty by Mr. Stewart, have undoubtedly had considerable influence. The necessity of economising income has enforced the maxim, that "from truth and use all beauties flow;" so that, as Mr. Repton observes, the characteristic of the present improved taste may be said to be "*a just sense of general utility.*"

We confess, however, that this refined taste is by no means of a nature impelling to action; for, partly from a fear of doing mischief, and partly from the great attention, during the last twenty years, to war and agriculture, less has been done in beautifying country seats, or improving their scenery, as scenery, than appears to have been the case for at least two centuries before. Horticulture, and continental travelling, seem now to take the place of war and farming; and so very little has been done since the late political changes in Europe, that Mr. Repton, in his *Fragments*, published in 1817, expresses his doubts whether landscape gardening may not become one of the *artes perditæ*. He observes also, that war, and war taxes, have depressed the spirit of elegant improvement—that the sudden acquisition of riches, by individuals, has divided wealth into new channels; "men are solicitous to increase property, rather than to enjoy it; they endeavour to improve the value, rather than the beauty of their newly purchased estates. The country gentleman, in the last century, took more delight in the sports of the field than in the profits of the farm; his pleasure was to enjoy in peace the venerable home of his ancestors; but the necessity of living in camps, and the habit of living in lodgings at watering places, has of late totally changed his character and pursuits; and, at the same time, perhaps, tended to alienate half the ancient landed property of the country." "The taste of the country has bowed to the shrine which all worship." "It is not therefore to be wondered at, that the art of landscape gardening should have slowly and gradually declined."

In confirmation of these remarks, it is worthy of record, that one of Kent's first and best efforts, Esher,

"Where Kent and nature vie for Pelham's love,"

selected and described as an example of modern gardening, by Mr. Wheatley; and one of Brown's most celebrated creations, Fisherwick, (See Marshall's "*Planting and Rural Ornament*," and Leicestershire, in the "*Beauties of England and Wales*,") have been sold in lots, and the mansions razed to the ground. Let us hope, however, that those who are now engaged in visiting other countries, will shortly return with a renewed love of their own; and that landscape gardening, of which Lord Walpole affirms we have given a true model to the world, may yet flourish, and perpetuate the credit we have obtained.

The celebrated Lord Kames appears to have been the first who introduced the modern style into Scotland, some time between 1740 and 1750, by displaying it on his own residence at Blair Drummond. An irregular ridge, leading from the house, was laid out in walks, commanding a view, over the shrubs on the declivity, of portions of distant prospect. One part of this scene was composed entirely of evergreens, and formed an agreeable winter garden. Lord Kames did not entirely reject the ancient style, either at Blair Drummond, or in his *Essay on Gardening and Architecture*, published in the "*Elements of Criticism.*" In that short but comprehensive essay, he shews an acquaintance with the Chinese style and the practice of Kent, admits both of *absolute* and *relative* beauty as the objects of gardening and architecture, and from this complex destination, accounts for that difference and wavering of taste in these arts, "greater than in any art that has but a single destination." (Vol. ii. p. 431. 4th edit. 1769.)

Lord Kames's example in Scotland, may be compared to that of Hamilton or Shenstone in England; it was not generally followed, because it was not generally understood. That the *Elements of Criticism* tended much to purify the taste of the reading class, there can be no doubt. Every person also admired Blair Drummond; but as every country gentleman could not bestow sufficient time and attention to gardening, to be able to lay out his own place, it became necessary to have recourse to artists; and, as it happened, those who were employed, had acquired only that habit of mechanical imitation, which copies the most obvious forms, without understanding the true merits of the original. In short, they were itinerant pupils of Brown, or professors in his school, who resided in Scotland; and thus it is, that after commencing in the best taste, Scotland continued, till within the last twenty years, to patronise the very worst. As a contrast to the style of Blair Drummond, and a proof of what we have asserted in regard to the style introduced immediately afterwards, we next refer to the grounds at Duddington House, near Edinburgh, laid out about the year 1750. The architect of the house was Sir William Chambers; the rural artist, whose original plans we have examined, was a Mr. Robertson, sent down from London. We know of no example in any country, of so perfect a specimen of Brown's manner, nor of one in which the effect of the whole, and the details of every particular part, are so consistent, and co-operate so well together in producing a sort of tame, spiritless beauty, of which we cannot give a distinct idea. It does not resemble avowed art, nor yet natural scenery; it seems, indeed, as if nature had commenced the work and changed her plan, determining no longer to add to her productions those luxuriant and seemingly superfluous appendages which produce variety and grace. The trees here, all planted at the same time, and of the same age, seem to grow by rule. The clumps remind us of regularly tufted perukes. The waters of the tame river neither dare to sink within, nor to overflow its banks; the clumps keep at a respectful distance; and the serpentine turns of the roads and walks seem to hint that every movement to be made here must correspond.

The extent of this place, we suppose, may exceed 200 acres. The house is placed on an eminence in the centre, from which the grounds descend on three sides, and on the remaining side continue on a level till they reach the boundary belt. This belt completely encircles the whole; it is from 100 to 300 feet wide, with a turf drive in the middle. One part near the house is richly varied by shrubs and flowers, and kept as garden scenery; in the rest the turf is mown, but the ground untouched. A string of wavy canals, on different levels, joined by cascades, enter at one side of the grounds, and taking a circuitous sweep through the park, pass off at the other. This water creates occasion for Chinese bridges, islands, and cascades. The kitchen garden and offices are placed behind the house, and concealed by a mass of plantation. Over the rest of the grounds are distributed numerous oval unconnected clumps, and some single trees. In the drive are several temples and covered seats, placed in situations where are caught views of the house, sometimes seen between two clumps, and at other times between so many as to form a perspective or avenue. There is also a temple on the top of a hill, partly artificial, which forms the object from several of these seats, and from other open glades or vistas left in the inside of the belt. The outer margin of this plantation is every where kept perfectly entire, so that there is not a single view but what is wholly the property of the owner; unless in one instance, where the summit of Arthur's Seat, an adjoining hill, is caught by the eye from one part of the belt, over the tops of the trees, in its opposite periphery.

That this place has, or had, in 1790, great beauties, we do not deny; but they are beauties of a peculiar kind, not of general nature—not the beauties of Blair Drummond, or such as a liberal and enlightened mind would desire to render general; but in great part such as Sir William Chambers holds up to ridicule in his *Dissertation on Oriental Gardening*, (see his *Introduction*, p. vi. to xi.) and Mr. Price, in his *Essays on the Picturesque*. Yet Duddington may be reckoned the model of all future improvements in Scotland, till within the last twenty years. The same artist laid out Livingston, effected some improvements at Hopeton House, Dalkeith, Dalhousie, Niddry, the Whim, Moredun, various other places near Edinburgh, and others in Ayrshire.

One of these places called forth the genius of Mr. James Ramsay, who, from being a mason, became a landscape gardener of considerable repute, and, at least, the best which appeared in Scotland within the period alluded to. He gave ground plans and drawings in perspective, both of the buildings and verdant scenery. *Leith Head*, a small place near Edinburgh, is his entire creation. His style was that of Brown, in his waters and new plantations near the house; but he was less attached to the belt, his clumps were not always regular, and he endeavoured to introduce a portion of *third distance* into all his views. Mr. Ramsay died at Edinburgh in 1794, and some record of his life is due to his memory.

Since Mr. Ramsay's time, no landscape gardener of any note has settled in Scotland. The late Mr. Kyle, gardener at Moredun, Mr. Mawer, gardener at Duddington, and afterwards nurseryman and planner at Dalry, and Mr. Nicol, well known for his horticultural writings, gave plans for *policies*; but it is as designers of kitchen gardens, and hot-houses, that we have to bestow our approbation of these and various other similarly produced *living* professors.

From nearly the first introduction of the new style in Scotland, to the present time, annual journies have been made into Scotland, from the county of Durham, by the late Mr. White, and subsequently by his son. Mr. White, senior, we believe, was a pupil of Brown, of much information on country matters, and generally respected in Scotland. Of his professional talents we have said enough, when we have mentioned their source. Airthrie, near Stirling, and Bargeny in Ayrshire, are the principal productions of this family.

In what respects the talents of Mr. White, junior, differ from those of his father, or whether they differ at all, we are not aware; though we think it highly probable they will partake of the general improvement of the age.

We had before mentioned, that none of the eminent English artists had ever been in Scotland; but that Valleyfield was laid out from Mr. Repton's designs.

Soon after the publication of Mr. Price's Essays, a gentleman of much taste and science, being about to plant extensively, consulted Mr. Nasmyth, an eminent landscape painter in Edinburgh, as to the general effect of the proposed improvement. Mr. Nasmyth has since, we believe, been much employed in the same way by other proprietors, a circumstance which must have contributed in an eminent degree to improve the artificial scenery of Scotland. We recollect to have seen, it 1802, some sketches by this artist for planting part of the range of Pentland Hills, behind Dreghorn, and a part of the Ochil Hills near Airthrie, and Alva, which struck us as in a grand and very superior taste. We believe they have only partially been carried into execution. Scotland has so many facilities for landscape scenery, that under the guidance of such an artist as Mr. Nasmyth, much beauty may be preserved and created.

There is now residing in Scotland, an English gentleman and amateur, who we believe is also employed professionally, Mr. G. Parkyns, author of an "*Essay on the different natural situations of Gardens*," prefixed to the quarto edition of Wheatley's Work, of some designs published in a work on Architecture, by Mr. Soane, in 1798, and of some Plans and Descriptions, published in numbers in Edinburgh, since 1800. These works are, on the whole, of unexceptionable merit; the author appears to be a correct and elegant draughtsman, and a man of general taste. We have not seen any specimen of his practical talents.

The first attempts to introduce the modern style in Ireland are supposed to have been made by Dr. Delany at Delville, near Glassnevin, about the year 1720. Swift has left a poetical description of these scenes. Like Pope, Dr. Delany impressed a vast deal of beauty on a very small spot of ground. As there existed an intimacy between these two characters, it is supposed that Pope may have assisted his Irish friend. This example appears to have had the same sort of influence in Ireland, that the gardening of Lord Kames had in Scotland. It gave rise to a demand for artists of the new school; and the market was supplied by such as came in the way. Much less, however, was done in that country, partly from the abundance of woody and picturesque scenery in many districts, and partly from other obvious causes. Mount Shannon, near Limerick, the seat of the late chancellor Clare, is said to be laid out from his lordship's designs, as are chiefly the recent improvements at Charleville forest, where one of the most comfortable and magnificent castles in Ireland has been executed by Mr. Johnston of Dublin, from designs which were the joint productions of Lord and Lady Charleville.

Mr. Walker of St. Valori, a very beautiful spot near Bray, laid out by the owner, mentions Marino, Castletown, Carton, Curraghmore, the retreat of St. Woolstars, and Moyra, as exhibiting the finest garden scenery in Ireland. Powerscourt, and Mucross, near the lakes, are reckoned the most romantic residences, and are little indebted to art.

We are not aware, that any English artist of eminence has been employed as a landscape gardener in Ireland, the more common practice being to engage a good kitchen gardener from England, and leave every thing to him. A Mr. Sutherland was, in 1810, the native artist of greatest repute. Mr. A. M'Leish has since settled in this country, and, from what we know of this artist, we have little doubt he will contribute, in an eminent degree, to establish and extend a better taste than has yet appeared there. Though landscape gardeners from the capital have not been called to Ireland, yet it has happily become not an unfrequent practice to employ eminent English architects,—a practice certain of being attended with the most salutary effects.

Hirschfield mentions Laugier, as the first French author who espoused the English style of gardening in France, in his *Essay sur l'Architecture*, published in 1755; and next in order is Prevôt, in his *Homme du Goût*, published in 1770. About the same time, the first notable example was preparing at Ermenonville, the seat of Viscount Girardin, about ten leagues from Paris. An account of this place was written by Girardin himself in 1775, and published in 1777. It was soon after translated into English by D. Malthus, Esq. and is well known for its eloquent descriptions of romantic and picturesque scenes. Ermenonville (still in the same family, but now rather neglected,) appears to have been laid out in a chaste and picturesque style, and, in this respect, to have been somewhat different, and superior to cotemporary English places. Useless buildings were avoided, and the picturesque effect of every object carefully considered, not in exclusion of, but in connexion with their utility. There is hardly an unexceptionable principle, or even direction referring to landscape gardening, laid down in the course of the work; and in all that relates to the picturesque, it is remarkable how exactly it corresponds with the ideas of Mr. Price. M. Girardin, high in military rank, had previously visited every part of Europe, and paid particular attention to England; and, before publishing his work, he had the advantage of consulting that of Wheatley, from which he has occasionally borrowed, as well as the writings of Chambers, Shenstone, and Gilpin. He professes, however, that his object is neither to create English gardens, nor Chinese gardens; and less to divide his grounds into pleasure grounds, parks, or ridings, than to produce interesting landscapes, "paysages interessans," &c. He received the professional aid of J. M. Morel, the Kent of France, who afterwards published *Théorie des Jardins*, and probably that of his guest Rousseau, who seems to have composed the advertisement to his book. M. Magellan, in the *Gazette Litteraire de l'Europe* for 1778, in giving some account of the last days of Rousseau, who died at Ermenonville, and was buried in the island of Poplars there, informs us, that M. Girardin kept a band of musicians, who constantly perambulated the grounds, making concerts, sometimes in the woods, and at other times on the waters, and in scenes calculated for particular seasons, so as to draw the attention of visitors to them at the proper time. At night they returned to the house, and performed in a room adjoining the hall of company. Madame Girardin and her daughters were clothed in common brown stuff, *en Amazones*, with black hats, while the young men wore "habillements le plus simple et les plus propres à les faire confondre avec les enfans du campagnards," &c.

The next example of English gardening in France, is of a very different description, and is that of M. Watelet, the author of an *Essai sur les Jardins*, which appeared in 1774. M. Watelet's garden was situated in the suburbs of Paris, and contained about four acres, varied by buildings, grottos, temples, and inscriptions; and was, on the whole, more in the Chinese style than in that of Kent or Shenstone. The author, who professes to take utility for the basis of his art, seems to have felt something wanting in this particular to his temples and altars; and is ridiculed by Hirchfield, (*Sur les Jardins*, tom. i. p. 168,) for proposing occasionally "de faire paroitre aupres des temples, des autels, des arcs de triomphe, &c. une troupe de pantomimes vêtues suivant le costume necessaire——imitant des cérémonies, faisant des sacrifices, allant porter des offrandes," &c. The object of such as attempt English gardening in France, on a small scale, is still more to imitate the garden of M. Watelet, than the "paysages interessans" of Girardin. In much better taste is the *Theorie des Jardins* of J. M. Morel, already mentioned, and published in 1776. It appears from this judicious writer, that very little had been done in France up to the period in which he wrote. One place only is mentioned besides Ermenonville as worthy of attention. Most of the attempts were made on a small scale, near Paris, in Watelet's manner. Soon after this, Delille's celebrated poem, *Les Jardins*, made its appearance, and is perhaps a more unexceptionable performance than *The English Garden* of Mason. The French, indeed, have written much better on gardening and agriculture than they have practised,—a circumstance which may be accounted for, from the general concentration of wealth and talent in the capital, where books are more frequent than examples; and of professional reputation in that country, depending more on what a man has written than on what he has done. It does not appear that English gardening was ever at all noticed by the court of France. The garden of Mousseau, before the revolution, the property of the Duke of Orleans, was laid out in a romantic and irregular style, as were some scenes in that of the Petit Trianon, especially in the lower part of the grounds, now occupied by ruins, water, and a cottage, and in their kind very picturesque. Baratelle, in the Bois de Boulogne, formerly a retreat of Count d'Artois, was laid out in the same taste.

During the consulate, Malmaison, the Residence of Buonaparte, was laid out avowedly in the English manner by a Scotch gardener; and was afterwards stocked with every variety of trees and shrubs from this country. The Grand and Petit Trianon have also been partially subjected to this style, and more especially the latter. The dry arenarious soil of these places, joined to the great heats in summer, is particularly unfavourable to the production of what constitutes one of the finest beauties of English gardening—a velvet turf; which in no country or soil is produced in such perfection as on the strong loams and under the temperate climate of England. This, we learned on the spot, was the chief drawback to Ermenonville when in its greatest perfection, and will probably ever prevent an English garden from exhibiting in any other country that beauty which it does in England. There are a few exceptions, referring to maritime districts, which afford useful hints to any who may think of displaying a British country residence in any of the continental states.

For a more particular account of the present state of gardening, as well as of that of rural architecture, and the general arrangement of country residences in France, we refer our readers to Craft's *Plans du plus beaux Jardins de France et d'Italie, &c.* Paris, fol. 1809—10; Laborde's *Description des Jardins de la France, &c.* 1812—15; the various works in French, *Sur Architecture Rurale;* and Le Grande's *Histoire generale de l'Architecture.*

It was our intention to have collected from these works, the characteristic particulars of the domestic and rural economy of France; but we have already far exceeded the limits of this chapter of our article. We shall only therefore add, that the Grecian style is employed not only in France, but every where on the Continent, to the exclusion of every other manner of building.

The English style appears to have been introduced in Germany about the same period as in France, and, as might be expected, by private individuals rather than royal courts. The first example was a small spot, *Garten der Schwobber,* laid out about the year 1750, with winding walks, seats, and a rich collection of rare plants and shrubs, in the neighbourhood of Pyrmont, in Westphalia. The fine mountains which skirt the valley of Pyrmont, form picturesque distances to venerable exotics of different species, which form now the chief remains of this interesting parent of the new style in Germany. The next instance we shall notice, is a splendid example exhibited by Field Marshal Lacy, at Dornbach, near Vienna, and which would probably originate in the family connections of that warrior in England. It was laid out by the German architect Fischer, and an English gardener Morrison, between the years 1766 and 1770, at an expence of half a million of florins. Its picturesque views and extensive prospects are much and deservedly admired; but on the whole, as an English garden, it owes much more to nature than to art. Lacy's example was soon followed by a number of proprietors near Vienna; and an account of various English gardens is to be found in the guides to that city and its environs. The imperial chateau and gardens of Laxembourg is an extensive example of art applied to the embellishment of grounds in the English manner; but rather in the manner of Brown than of Kent. The Prater, situated in an island on the Danube, in part an artificial grove, and in part an extensive natural forest of venerable oaks and thorns, open to the public, is certainly the most natural and picturesque public park in Europe; as the grounds of Schoenbrunn are the most majestic and extensive example of the ancient style of gardening.

There are now specimens of English gardening, more or less extensive, in the capital towns of every state in Germany; but, with a very few exceptions, they are of a very inferior description, and such as, when the novelty of the style has passed away, are not at all likely to perpetuate this taste in these countries. From the arid soil and limited extent, result bad turf, and an air of constraint; and from too many buildings and walks, a distracting bustle and confusion. They are crowded with winding sanded paths, continually intersecting each other, little clumps, and useless seats or temples, and very frequently resemble more the attempts of mimics or caricaturists, than imitators of our taste. In short, the defects of the English style in every country, are more frequently copied than the beauties; which, we presume, arises from the circumstance of few of those who lay out such gardens having had a proper idea of the end in view in forming them, viz. a painter-like effect in every case, where it does not interfere with utility, or some other preferable beauty; and, in many cases, an entire allusion to natural scenery. It is difficult for a person of limited education and travel to form a distinct idea of what English gardens really are. The foreigner can seldom divest himself of the idea of a very limited and compact space as requisite for this purpose; the reverse of which is the case with all our best scenes, both of ornamental, horticulture, and picturesque beauty. The English gardens in the vicinity of Dresden, Brunswick, Hamburgh, Prague, Toplitz, Leipsic, and other places, have given rise to those remarks, in which even those professedly English in Prussia, might be included. There are some exceptions which might be pointed out at Cassel, Stutgard, (for views of these gardens, see *l'Almanach du Jardinage.*) Weimar, (see *Description du Parc de Weimar, et du Jardin de Tieffurth,* Erfurt, 1797,) the park of Fürstenstein, near Breslaw, and the walk at Munich, laid out by Count Rumford, may be referred to as less obnoxious to our general remark.

The principal examples of the new style in Prussia are the royal gardens at the summer residence of Charlottenburg near Berlin, begun by Frederick the Great, but chiefly laid out during the reign of Frederick William II. They are not extensive, and are situated on a dull sandy flat, washed by the Spree; under which unfavourable circumstances, it would be wonderful if they were very attractive. In one part of these gardens, a Doric mausoleum, of great beauty, contains the ashes of the much lamented queen. A covered avenue of Scotch firs leads to a circle of the same tree, 100 or 150 feet in diameter. Interior circles are formed of cypresses and weeping willows, and within these, a border of white roses and white lilies, (*Lilium candidum*). The form of the mausoleum is oblong, and its end projects from this interior circle directly opposite the covered avenue. A few steps descend from the entrance to a platform, in which, on a sarcophagus, is a reclining figure of the queen: a stair at one side leads to the door of a vault containing her remains.

The garden of the palace of the Heiligen see is avowedly English, and is in much better taste than that at Charlottenburg. The palace is almost entirely marble, of chaste Grecian architecture, and placed close to the lake; a covered way leads to the kitchen, 100 feet distant, disguised under the form of a temple rising from the water. These sumptuous works are the joint production of Mr. Langhans and Mr. Gontard; and it is said that Professor Hirschfield was consulted on the plan for the gardens.

The Germans have no original author on the subject of landscape gardening. Professor Baron Hirschfield, almost their only writer on the subject, published his *Theorie der Gartenkunst*, in 1775, in 12mo.; which contains a succinct outline of the history and principles of gardening, and seems to have been circulated with a view to procure information for his larger work, the first volume of which appeared in Germany, in quarto, under the title of *Ueber der Gartenkunst*, and in Holland under the French title, "*Sur les Jardins*," in 1779, and the last, or fifth volume, in 1783. It contains a valuable assemblage of historical information up to that time, some interesting descriptions, drawn from Whcatley, Girardin, and other authors, and a just and comprehensive view of the principles of gardening. The work is illustrated with many plates, chiefly of buildings.

The following are a few of the principal German works on gardening, besides those above mentioned. *Gallerie der Gartenkunst*, *Wien*, 8vo. 1788. Hirschfield *über der Verwandtschaft der Gartenkunst und der Malercy*. (Gothaish Mag.) *Gärten and Parks*, *&c*. Leipzig, 1808. *Anweisung für ordnung der Gärten in Englischen Geschmack*, Leip. 1794. See a more complete list in Sulfer's *Theorie des beaux Arts*, &c.

The first gardens laid out in the modern style, are those of the imperial residence of Zarskojezelo, begun in 1778, by Mr. Bush, an Englishman, and father of their present superintendant. The gorgeous magnificence of this residence is well known. A natural birch forest, on ground somewhat varied, forms the ground-work of the park and gardens. The gate by which they are approached, is an immense arch, of artificial rock-work, over which is a lofty Chinese watch tower. The first group of objects is a Chinese town, through which the approach leads to the palace; a building, which, with its enclosed entrance, court, offices, baths, conservatories, church, theatre, and other appendages, it would seem like exaggeration to describe. The rest of the garden scenery consists of walks, numerous garden buildings, with bridges of marble and wood, a large lake, and extensive kitchen gardens and hothouses.

The best specimen of the English style, in the neighbourhood of the Russian capital, or indeed in the empire, are the grounds of Paulowsky, begun during the reign of Catherine, in 1780, from a design said to have been furnished by the celebrated Brown, from a description sent him by Gould, and finished afterwards during the reign of Paul. This place possesses considerable variety of surface, and a varied clothing of wood, the Scotch fir and aspen being natural to these grounds, as well as the birch. Near the house, there is a profusion of exotics of every description, including a numerous collection of standard roses, which, with some of the American shrubs, require to be protected with straw and mats during winter. The Chevalier Storch has given a very interesting description of these gardens, in his *Briefe über Paulowsky*, &c. 1802. We pass over several imperial and private English gardens to notice those of Potemkin, one of the most extravagant encouragers of this art that modern times can boast. The most extensive gardens of this prince are in the Ukraine, but the most celebrated were those belonging to the palace of Taurida, now an imperial residence in Petersburgh. The grounds are level, with several winding and straight canals, and walks, adorned with numerous buildings, a rich collection of exotics, and most extensive hothouses of every description. Their grand feature, in Potemkin's time, was the conservatory, or winter garden, attached to the palace. The plan of this part of the building is that of a semicircle, embracing the end of a saloon, nearly 300 feet long. They are lighted by immense windows, between columns, with an opaque ceiling, and heated by common German stoves. They are too gloomy for the growth of plants, but those grown in the glass sheds of the kitchen garden are carried there, sunk in the ground, and gravel-walks, turf, and every article added to render an illusion to some fairy scene in the open air as complete as possible. Their effect was after all, it is said, never satisfactory, but when illuminated. This palace, the original exterior of which was in a very simple style, and the interior most magnificent, is said to have been the entire design of Potemkin, but it was entirely remodelled at his death by Catherine, used as barracks by Paul, and is now very imperfectly restored. (See Storch's *Description*.) The gardens at Potemkin's other residences, as well as many imperial and private gardens in Russia, were laid out by Mr. Gould, a pupil of Mr. Brown. Sir John Carr relates an anecdote on Gould's authority, which was confirmed to us, in 1813, by the present gardener, Mr. Call, his successor, and deserves a place here. In one of the prince's journies to the Ukraine, Mr. Gould attended him with several hundred assistants, destined to assist in laying out the grounds of Potemkin's residence in the Crimea. Wherever the prince halted, if only for a day, his travelling pavilion was erected, and surrounded by a garden in the English taste, composed of trees and shrubs, divided by gravel-walks, and ornamented with seats and statues, all carried forward with the cavalcade. On another occasion, having accidentally discovered the ruins of a castle of Charles XII. of Sweden, he immediately not only caused it to be repaired, but surrounded by gardens, in the English taste.

The most extensive seats laid out in the modern style, in the neighbourhood of Moscow, are those of Gorinka, a seat of Count Alexy Razumowsky, and Petrowsky Razumowsky. The former is remarkable for its botanical riches, and an immense extent of glass. The grounds are of great extent, but the surface flat, and the soil a dry sand. A natural forest of birch and wild cherry clothes the park, and harmonizes the artificial scenes. The mansion, built by an Englishman, is highly elegant; and the attached conservatories, and stoves, and decorated lawn, form a splendid and delightful scene, unequalled in Russia.

Petrowsky Razumowsky contains both an ancient garden, already referred to in our third section, and a large extent of ground, laid out in the modern style, and adorned with designs by Signior Camporezi. There is some variety of surface, abundance of birch and fir woods, with some oaks and aspens interspersed, and a large piece of water. Among the ornamental buildings is a cotton manufactory, in actual use as such. The practice of introducing manufactories as garden buildings, is very general in Russia, and almost peculiar to that country. The palace and gardens of Count Alexy Razumowsky, and of Paschow, in Moscow; of Zaritzina, a singular Turkish palace, built by Potemkin for Catherine; of Astankina Count Chérémetow, Peckra, Prince Galitzin, and various others, would well bear description, but we are necessarily precluded from doing this by our limits, and conclude by observing, that extent, exotics, and magnificent artificial objects, is more the object of the modern style in Russia, than scenes merely of picturesque beauty. We think this may be accounted for, from the general want of refinement of taste in that country, and partly for its inaptitude for that style.

The nobles of Russia, suddenly rendered aware of being distanced in point of civilization by those of most other European countries, are resolved not merely to imitate, but even to surpass them, in the display of wealth. The most obvious marks of these, in the most refined countries, are necessarily first singled out by rude and ambitious nations, and large magnificent houses and gardens are desired, rather than comfortable and elegant apartments, and beautiful or picturesque scenes; since, as every one knows, it is much more easy to display riches than to possess taste.

English gardening was introduced into Poland by the Princess Czartoryska, at Pulhawa. This lady, highly accomplished, of great taste, and much good sense, had been a considerable time in England. She carried to Poland Mr. Savage, a gardener, and with his assistance, and that of Mr Vogel and Mr. Frey, artists of Warsaw, she laid out Pulhawa between 17[illegible] and 1784, and published in Polish, in 1801, a folio work with plates, on English gardening. The situation, like almost every other with which we are acquainted in Poland or Russia, is flat and sandy; but is somewhat relieved by the Vistula. On the brink of this river, on a wooded bank, stands the house, a plain Grecian building, and with the grounds described by Burnet, in his view of Poland. (Chap. xi.) Independent clumps of shrubs are more frequent in these gardens than would be admitted by a good taste in England; but all Poland is a natural forest; and as the grand object of improvement in every country is, to obtain applause by the employment of art and expence, artificial forms, from their rarity, are better calculated for this purpose than such as are more universally beautiful, but so common as to want the charm of novelty, or whose beauties are too refined to be generally understood. Thus clumps in Poland may be as much esteemed as groups are in England, on the same principle, that, in a wild country, game is less esteemed than butcher meat, because it is the common food.

The other eminent examples of the modern style, are those of Count Zamoski at Zamoyst, and Count Potocki at Villaneuve, mentioned in our third section. The first are of limited extent, but the latter, near Warsaw, are very extensive, and were laid out chiefly from the designs of Princess Czartoryska. The gardens of General Benningsen, near Wilna, were in a mixed style, and rich in botany, before they were destroyed by the retreat of the French army in 1812. Those of Colonel Lachanitzski at Poniemonia, on the banks of the Niemen at Grodno, are not extensive, but contain more romantic and picturesque scenery than any we have seen in Poland.

Our remarks, as to the present state of architecture and domestic arrangements of Russia, will nearly apply to Poland; but the *amor patriæ*, from superior education and recent intercourse with every country in Europe, is of a much more active and intelligent nature in the latter country, and will, we are persuaded, within a moderate period, place Poland on a level with any of the continental kingdoms, more especially if her individuality shall be preserved.

The royal gardens at the Haga, near Stockholm, form the earliest and the chief example of the English style in Sweden. They were begun by Gustavus III. with the assistance of Masretier, a Swedish artist, and subsequently varied and extended, so that they now present a mixture of picturesque, with some formal beauty. They are surrounded and interspersed with rocks, covered with Scotch and spruce firs, and abound in winding walks, Chinese, and other buildings. There are some confined spots laid out in the English taste, chiefly by British merchants, in the neighbourhood of Gottenburg, as there are also near Christiansand in Norway; but it may be remarked, that this style is not likely to be generally adopted in either country, because they already possess much greater beauties of the same kind, which it is our aim to create, and with which those created would not bear a comparison.

A distinguished example of the English style exists in Denmark, at Dronningaard, the residence of an eminent Danish merchant, De Conninck, about sixteen miles from Copenhagen. The grounds are situated on an extensive declivity, which descends to a natural lake of great extent, whose circuitous shores are verged with rich woody scenery and country houses. The soil here approaches more to a loam than is general on the continent; the turf is, therefore, happily of a deep tone of green, and close texture. The oak and beech abound in these grounds, as well as firs, and a number of exotics. Buildings are not too frequent; but there are several, and among them a hermitage, to which it is stated one of the family actually retired, on occasion of a matrimonial disappointment, and lived there for several years, till called forth by some military arrangements. There are numbers of small spots round Copenhagen of considerable beauty, in which something of the English style has been imitated; but in none of the gardens of the court has it been avowedly introduced.

We are not aware that the English style has been introduced into Spain, unless on a very small scale, in the neighbourhood of Seville, or other maritime towns, by the British residents, though Mr. Repton mentions one instance, in which he was called on to give a design in the modern style, for a very small spot near Lisbon. These are not countries for change of ideas, or refinement of taste.

Very little more has been done in Italy than in Spain and Portugal as to English gardening, and in a great measure from the same causes—the general stagnation of mind, and the abundance of picturesque scenery. The villa Borghese is universally allowed to be the first of Roman villas. "The gardens," Mr. Eustace informs us, "are laid out with some regard, both for the new and for the old system; for though symmetry prevails in general, and long alleys appear intersecting each other, lined with statues and refreshed by cascades, yet here and there a winding path allures you into a wilderness formed of plants, abandoned to their native luxuriancy, and watered by streamlets murmuring through their own artless channels." Of Italian gardens in general, the same author observes, "howsoever they may differ in extent and magnificence, their principal features are nearly the same; the same with regard to artificial ornaments, as well as natural graces. Some ancient remains are to be found in all, and several in most, and they are all adorned with the same evergreens, and present upon a greater or less scale the same Italian and ancient scenery. They are in general, it is true, much neglected, but for that reason the more rural. The plants, now abandoned to their native forms, cover the walks with a luxuriant shade, break the long straight vistas by their fantastic branches, and turn the alleys and quincunxes into devious paths and tangled thickets." (*Classical Tour*, vol. i. ch. 18.)

The modern Asiatic gardens appear, from the accounts of travellers, to be exactly the same as described in the earliest accounts of gardening in the east. The gardens in Africa partake of the Turkish manner, which has nothing in it differing materially from the Asiatic. Those of the grand Sultan remain the same as in Lady Montague's time.

Small specimens of the English style, we believe, are to be found near almost every great commercial city in the world; and undoubtedly in the chief towns of the British colonies. The governor's gardens at Calcutta are highly spoken of, as are others in Madras, at the Cape of Good Hope, and in Jamaica; and slight efforts have been made in the neighbourhood of Rio de Janeiro and Buenos Ayres. In North America, the late General Washington's *Ferme Ornée*, at Vermont, was perhaps the most elegant country residence in that part of the world; but there are occasional English gardens to be seen near New York, Baltimore, and other elder cities; and Montesquieu mentions several country residences in the interior, in which some attention to ornament was not deemed incompatible with agricultural improvement.

SECT. VI. *Remarks on the different Styles.*

The common practice of almost every author who has written on the modern style, is to condemn indiscriminately every other taste as unnatural and absurd. If by unnatural, an allusion is made to the verdant scenery of uncultivated nature, we allow that this is the case; but we would ask, if, for that reason, it follows, that though now absurd, these gardens were not as natural and reasonable in their day, as any of the manners and customs of these times? Gardening, as a liberal art, is destined to create scenes, in which both beauty and use are combined: admitting, therefore, that both styles are alike convenient, to say that the modern only is beautiful, is to say that there is only one sort of beauty adapted to gardening; or that there is no beauty but that of the picturesque; or that all former ages, and every other country, is in a state of barbarism with respect to this art. If we take the term natural in a more extensive sense, and apply it to the climate, situation, condition, and manners of a people; and if we allow these to be natural, why may not their gardening be natural, as well as their particular customs and dress? The gardening we now condemn so unreservedly, has subsisted, as we have seen, from the earliest ages in warm climates; and still prevails there, as well as in more temperate countries, whose inhabitants are not altogether ignorant of the modern style. It may, therefore, be said to have grown up with mankind, and at all events must be perfectly suited to the wants and wishes of the inhabitants of such countries. In order to judge of the fitness or utility of a style, we must know the purposes to which it is applied; and in order to judge of its beauty relatively to the people who employ it, we ought to know what beauties are already most abundant in their country, as well as something of the degree of their advancement in civilization.

The gardens of the east, we have every reason to believe, were used more as an arbour or a conservatory in this country, than as places of exercise and active enjoyment. The object was repose, indolent recreation, sedentary or luxurious enjoyment. To breathe the fresh air, shaded from a tropical sun; to inhale the odour of flowers; to listen to the murmur of breezes or fountains, to the singing of birds; or to observe the minute beauties of the surrounding foliage, was and still continues to be the ordinary class of beauties desired in an eastern garden. A higher and more voluptuous kind, consisted in using it as a banqueting place, bath, or seraglio, as is still the case in Turkey and Persia; in feasting the eyes with the sight of dancing beauties; in ravishing the ears with concerts of vocal or instrumental music, and in firing every sense with wine. Exercise* was incompatible with that langour of body, which is attendant on a warm climate and a distant prospect; inconsistent with security from wild beasts, and that privacy which selfishness or jealousy might dictate. Add to this, that the natural surface of warm countries is generally so parched with heat,† as to be far less agreeable to look on than the verdure of a limited space, kept luxuriant by water. If to these we subjoin the use of fruit, and, what is common to every exertion of man, a desire of obtaining applause for the employment of wealth and skill, we shall include every object sought in an eastern garden.

An eastern garden, therefore, appears to have been a collection of all those beauties found scattered about in general nature, in order to adapt them to the use and enjoyment of man. Let us now inquire how their plan, as far as we are acquainted with it, was calculated for this end. Moderate extent, and immediate connection with the house, are necessary and obvious ingredients in their design. The square form would be adapted for the enclosure as the simplest; the trees would be ranged in rows, to afford continuity of shade; and the walks would run parallel between them, to admit uninterrupted progress; that walk parallel to, and close under the house, would be a raised platform or terrace, to give elevation and dignity to the house, to give the master a commanding view of the garden, and to serve as a connecting link between art and comparative nature.

By leaving open plots or squares of turf in the areas, formed by intersecting rows of trees, a free circulation of air would be facilitated; and the same object, as Pliny informs us, is promoted by the quincunx, which admits the breeze from every quarter of the compass more readily than any other disposition. A picturesque or natural arrangement would have stagnated the air, and defeated one of the grand purposes in view. The same reasons would guide them in their choice of spreading broad leaved trees; and to thicken their boughs, or deprive them of such branches as were too low, or tended to destroy the balance of the tree, the pruning knife would be occasionally applied. Water in every form suggests the idea of coolness; but agitated in cascades, fountains, or *jets-d'eaux*, it is used to the best advantage, and the heat of the atmosphere is moderated in proportion to the evaporation which takes place. In still ponds or basins, it has another property, that of reflecting the objects around it. Buildings, as arbours, aviaries, covered seats, banqueting houses, baths, and grottos, would become requisite for their respective uses, and would abound in proportion to the wealth or rank of the owner. Fruit trees would be introduced in appropriate situations for the sake of their fruit, and a choice of odoriferous flowers and shrubs would fringe the margin of the walks, to admit of a more easy inspection of their beauties, and nearer contact of their odours with the olfactory nerves; they would also be disposed in greater profusion, in curious knots or parterres near to the house, or in front of the resting places, or banqueting-rooms. In time, even artificial objects of value, as dials, statues, vases, and urns, would be added, in order to create as much variety and interest in a small spot as was consistent with its utility.

Such we have found, (sect. 1.) to be the general arrangement of eastern gardens; and as there seems no more obvious way of attaining the wants of those to whom they belonged, we may pronounce it to be perfectly reasonable and natural.

As to the more extensive paradises or parks in which wild beasts were admitted, and even whole regiments exercised, we have but few authentic particulars respecting them. Those of the east must be regarded as royal ex-

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* "The Persians do not walk in gardens so much as we do, but content themselves with a bare prospect, and breathing the fresh air. For this reason, they set themselves down in some part of the garden at their first coming in, and never move from their seats till they are going out of it." Chardin's *Travels*, ch. vi.

"Nothing surprises the people of the East Indies so much, as to see Europeans take pleasure in exercise. They are astonished to see people walk who might sit still." Kinderley's *Letters from the East Indies*, p. 182.

† "Before the end of May, the whole country round Aleppo puts on so parched and barren an aspect, that one would scarcely think it capable of producing any thing but the very few plants which still have vigour enough to resist the extreme heats." Russel's *Aleppo*, p. 13.

[illegible] ies, calculated to excite astonishment and admiration at their magnitude, and the art and expense employed in their construction; and if any reliance is to be placed in the account given by ancient authors of the hanging gardens of Babylon, their design will be found singularly to unite this object with the minor beauties of the confined garden; to combine the splendour of magnificence with the delights of the justest feeling of nature. They were situated over, or according to some, adjoining to king Nebuchadnezzar's palace, or on a platform raised by lofty pillars, on the banks of the Euphrates, in the middle of the city of Babylon. They are said to have contained groves, fountains, and in short, every object which we have mentioned, as appertaining to the more ordinary description of eastern gardens. Their object was to gratify his Medean queen, by that sort of verdant scenery and distant prospect, to which she had been accustomed in the more romantic country of her birth. The height, then, would give that commanding prospect of the water and shipping of the Euphrates and the city, as well as the gardens within and without its walls, which she particularly desired. The air in that elevated region would be more cool than below; the noise and bustle of the city would cease to be offensive; the whole would be more exposed to breezes and winds; and we cannot help fancying, that so much enjoyment in so singular and elevated a situation, would produce in the mind an impression of sublimity. But a faint idea of these gardens will be excited, by imagining the quadrangle of Somerset House crowned with a portion of Kensington gardens; or of the [illegible] garden of Petersburgh placed over the Kremlin in Moscow.

How and with what propriety the eastern style came afterwards to be adopted in Greece, Italy, France, and finally in England, is our next inquiry. The principle or instinct of imitation, would be the first cause why the more distant nations, whether colonies from the east, or returning travellers or conquerors, adopted this parent style. This is so obvious, as to require no comment beyond what will be furnished by individual inquiry into our earliest tastes, habits, and predilections in dress, amusements, furniture, and other matters of common life. The next principle is that of use or fitness, which would vary in application, proportionally to the distance and different circumstances of the imitating country. Thus it would not exactly apply in Greece or Italy, where the climate was more temperate, active exercise more congenial, and the habits of the wealthy for a long time at least comparatively frugal. Add to this, that verdant landscapes, shade, breezes, rills, waterfalls, and lakes, with their accompaniments of odours, murmurs, singing birds, reflections of objects, were more liberally distributed over the face of general nature. The more active character of man, in such countries, would in time also appropriate to their use from this natural abundance, a greater variety of fruits and legumes.

We know little of the private gardening of the Greeks, but a very slight attention to this difference of circumstances, will enable us to account for the character assumed by the eastern style under the ancient Romans. The necessarily different culture required for perfecting fruits and culinary vegetables would give rise to the orchard and kitchen garden. This would simplify the objects of the ornamental garden, which would thus exhibit less a collection of natural beauties, than the display of art, the convenience of taking exercise, here a pleasure rather than a fatigue, and the gratifications of shade, cool breezes, and aromatic odours. A prospect of the surrounding country was desired, because it was beautiful; and where, from various circumstances, it was interrupted by the garden or its boundary fence, mounds or hills of earth were raised, and in time prospect-towers appended to the houses. Greater extent would be required for more athletic recreations, and would be indulged in also by the wealth and pride of the owner, for obvious reasons. Abridgement of labour would suggest the use of the sheers, rather than the more tardy pruning knife, in thickening a row of trees. A row of low trees so thickened, would suggest the idea of a row of clipt shrubs. Hence at first hedges; and subsequently, when art and expence had exhausted every beauty, and when the taste had become tired of repetition, verdant sculpture would be invented, as affording novel, curious, and fantastic beauty, bordering, as do all extremes, upon absurdity. A more extended and absolute appropriation of territory, than what we may suppose to have taken place in the comparatively sterile country of the east, would lead to agricultural pursuits, and these again would give rise to the various arrangements of a Roman country residence, which we know to have existed, and which it would be superfluous to describe. Various other circumstances might be added; but enough has been stated to shew, that the gardening of the Romans was perfectly natural to them, under the circumstances in which they were placed: it suited their wants, and produced scenes, which they found to be beautiful, and was therefore in the justest taste. To have imitated the scenery of nature, or studied picturesque beauty in a garden, would have been merely adding a drop to the ocean of beauties which surrounded them. Expense incurred for this purpose could never have procured applause to the owner, since the more like nature the production, the less would it excite notice. All that was left for man to do, therefore, was to create those beauties of art, convenience and magnificence, which mark out his dwelling place, and gratify his pride and taste by their contrast with surrounding nature.

The gardening of the Romans was copied in France and Britain, with little variations, beyond those dictated by necessity and the difference of climate. It was found to be perfectly beautiful and agreeable; and would have continued to prevail, had Britain continued in similar circumstances to those in which she was in at the time of its introduction. But such has been the progress of improvement in this country, that the general face of nature became as it were an ancient garden, and every estate was lined out, bounded, and sub-divided, by stripes of wood, rows of trees, canals, ponds, walls, and hedges. The credit or distinction to be obtained here, by continuing to employ the ancient style, could be no greater than what the Romans would have obtained by imitating nature. In their case all the country was one scene of uncultivated, in ours it was one scene of cultivated, beauty. In this state of things the modern style was adopted, not solely from a wish to imitate the gardening of the Chinese, or a high degree of refinement in taste, but from the steady operation of the same motives which produced and continued the ancient style—a desire of distinction. The Chinese style, if introduced, would never have become purified, or ended in our simple style, had England remained an open country like France or Italy, or a thickly wooded one like Poland or America. On this principle it may be affirmed, that the English style cannot please in these countries, otherwise than from its novelty, or as giving rise to certain associations with the people, whose name it bears. What delight or distinction can be produced by the English style in Poland, for example, where the whole country is one forest, and the cultivated spots only so many open glades, with the most irregular and picturesque boundaries? But let a proprietor there dispose of the scenery around his residence in the Roman or French manner; let him display a fruit or kitchen garden, bounded by high stone walls; a farm subdivided by clipped hedges and ditches, and a pleasure ground of avenues, stars, circles, fountains, statues, temples, and prospect towers, and he will gratify every spectator. The view of so much art, industry, and magnificence, amid so much wild and rude scenery, awake so many social ideas of comfort and happiness, and so much admiration at the wealth and skill employed, that a mind of the greatest refinement, and the justest taste, would feel the highest sensation of pleasure, and approve as much of such a country residence in the wilds of Poland or America, as he would of the most natural and picturesque residence of England, amid its highly artificial scenery.

We trust we have said enough to prove, that every style of gardening must be considered relatively to the state of society, and of the country where it is employed; and that the ancient and modern styles, viewed in this light, are each perfectly natural, and equally meriting adoption, according to relative circumstances; less than from any positive beauty, or advantages of either manner. We are consequently of opinion, that the ancient style, divested of some ingredients which relate to warm climates, and purified from the extravagances of extremes in decoration, would be in much better taste in some situations in the Highlands of Scotland, and the south of Ireland, than the modern style; and that this style cannot, for a long series of years, afford any other satisfaction on the continent, than what arises from the temporary interest of novelty and accidental association. It may never be altogether lost sight of, in subsequent arrangements; but whenever the influence of fashion has subsided, the beauties of the ancient style will be desired, as fulfilling better the objects in view, till landed property, in these countries, becomes enclosed, subdivided, and cultivated, as it is in England.

Part of the prevailing antipathy to the ancient style proceeds from a generally entertained idea, that the modern is an improvement on it; but the truth is, the two styles are as essentially and entirely different in principle, as painting and architecture, the one being an imitative, and the other an inventive art.

Landscape gardening agrees with ancient gardening in no other circumstance, than as employing the same materials. It is an imitative art, like painting or poetry, and is governed by the same laws. The ancient style is an inventive and mixed art, like architecture, and governed by the same principles. The beauties which architecture and geometric gardening aimed at, were those of art and utility, in which art was every where avowed. The modern style of gardening, and the arts of poetry and painting, imitate nature; and, in doing so, the art employed is studiously concealed. Those arts, therefore, can never be compared, whose means are so different; and to say that landscape gardening is an improvement on geometric gardening, is a similar misapplication of language, as to say that a lawn is an improvement of a corn-field, because it is substituted in its place. It is absurd, therefore, to despise the ancient style, because it has not the same beauties as the modern, to which it never aspired. It has beauties of a different kind, equally perfect in their kind as those of the modern style. The question therefore is not, whether we shall admit occasional specimens of obsolete gardening, for the sake of antiquity, but whether we shall admit specimens of a different style, from that in general use, but equally perfect in its kind.

If we have extended this chapter to a length that may seem uncalled for in a work of this kind, we are not, as we think, without weighty arguments in our justification. The disgust excited in men of taste, first by the excess of buildings, which distinguished our imitations of the Chinese style, and subsequently by the tame insipidity of that of Brown and his followers, which nothing but their novelty and the overcoming force of fashion could render tolerable, has given rise to a number of critical works on the subject, of great merit and taste. These, especially the writings of Mr. Price, have been very generally circulated; and while they have produced a salutary scepticism in the minds of the patrons of art, have excited, in almost every description of artists, such an indiscriminate and exclusive admiration of the picturesque, as is scarcely compatible with admitting that there is any other species of beauty, or any occasion, in matters of taste, for the assistance of good sense. The retired country gentleman, puzzled with so many different opinions, is thus deterred from improving, lest he expose himself to the critical severities of a picturesque traveller, or to the ridicule of the common sense of his neighbours.

The historical view we have now given, points out the picturesque as only one beauty among a number; and though of a superior class, yet not to be adopted indiscriminately or exclusively. Another *motive* with us has been, to expose and root out, if possible, the strong and most unphilosophical opinions which are entertained of the ancient style, by shewing, that they are founded in prejudice and a limited view of the subject. Proprietors we know to be frequently deterred from the improvement of their seats, because to do so in such a way as to obtain the approbation of the popular taste, the first step would be, to remove certain terraces, avenues, and other remains of the ancient style, which they justly venerate. A *third* reason is, to prevent our forming erroneous expectations of our continental neighbours on the subject of English gardening. It is almost the universal practice at present, to criticise the gardens of the continent, with a reference to general nature, or the English style; and thus to condemn the whole of them as absurd and in bad taste. We have, we think, shewn, that the contrary is true, and that the imitation of the English style, in many parts of the continent, displays a worse taste than the continuation of the ancient system of improvement. A *fourth* reason is, to account for the share of attention which we mean to bestow on the ancient style in the succeeding chapters of this article; convinced, as we are, that it merits occasional adoption in this country. If what we have submitted has the intended effect, the result will be a greater harmony of opinion among artists and professors, greater decision of judgment in matters of taste among country gentlemen, and more liberal views towards our continental neighbours.

CHAP. II.

OF THE OBJECTS OF GARDENING, AND OF THE PRINCIPLES BY WHICH THESE OBJECTS ARE ATTAINED.

From the remarks in the preceding chapter, the reader will be prepared to include under the objects of gardening, as a generic term, all the various purposes, useful as well as ornamental, of a country residence: "Gardens and buildings, (Lord Kames observes,) may be destined for use solely, for beauty solely, or for both. Such variety of destination bestows upon these arts a great command of beauties, complex not less than various. Hence the difficulty of forming an accurate taste in gardening, and architecture; and hence, that difference or wavering of taste in these arts, greater than in any art that has but a single destination." (*Elements of Criticism*, 4th edit. vol. ii. 431.) Not to consider the subject with a view to these different beauties, but to treat it merely as "the art of creating landscapes," would thus embrace only a small part of the art of laying out grounds, and leave incomplete a subject, which contributes to the immediate comfort and happiness of a great body of the enlightened and opulent in this and in every country ;—an art

> ——" Which teaches wealth and pride
> How to obtain their wish—the world's applause."
>
> MASON

The ancient authors on architecture and gardening have rarely attempted to lay down any general principles of composition. Vitruvius hints obscurely, that the different parts of buildings should bear some proportion among themselves, like that which subsists between the different members of the human body; that the quantities constituting the magnitudes of temples should have certain ratios to one another; and he lays down canons for the individual proportions, and collective arrangement of the columns of the different orders. These, however, are not principles, but mechanical rules formed on very limited associations. The same remarks will apply to the directions respecting the walks, walls, hedges, and borders of the ancient style, laid down by D'Argenville, Clarici, and Switzer. It is in the writings of modern authors therefore, and chiefly from the enlightened investigations of Mr. Alison, that we are to draw our information as to the principles by which the artists of the ancient style were instinctively guided in their productions.

With respect to the *modern style*, considered as including what belongs to the conveniencies of a country residence, as well as the art of creating landscapes, Pope has included the principles under, 1. The study and display of natural beauties; 2. The concealment of defects; and 3. Never to lose sight of common sense.

Wheatley concurs in these principles, stating the business of a gardener to be, " to select and to apply whatever is great, elegant, or characteristic," in the scenery of nature or art; " to discover and to show all the advantages of the place upon which he is employed; to supply its defects, to correct its faults, and to improve its beauties." Mr. Repton, whose works on landscape gardening bear on the title page, " written with a view to establish fixed principles in these arts," enumerates congruity, utility, order, symmetry, scale, proportion, and appropriation, " if," as he observes in one place, " there are any principles." Mr. G. Mason places the secret of the art in the " nice distinction between contrast and incongruity ;" Mason, the poet, invokes " simplicity," probably intending that this beauty should distinguish the English from the Chinese style; simplicity is also the ruling principle of Lord Kames; Girardin includes every beauty under " truth and nature," and every rule " under the unity of the whole, and the connection of the parts;" and Shenstone states " landscape, or picturesque gardening," to " consist in pleasing the imagination by scenes of grandeur, beauty, and variety. Convenience merely has no share here, any further than as it pleases the imagination." Congruity, and the principles of painting, are those of Mr. Price and of Mr. Knight. From these different theories, as well as from the general objects or end of gardening, there appear to be two principles which enter into its composition; those which regard it as a mixed art, or an art of design, and which are called the principles of relative beauty; and those which regard it as an imitative art, and are called the principles of natural or universal beauty. The ancient or geometric gardening is guided wholly by the former principles; landscape gardening, as an imitative art, wholly by the latter; but as the art of forming a country residence, its arrangements are influenced by both principles. In conformity with these ideas, and with our plan of including both styles under the generic term gardening, we shall first consider its principles as an inventive or mixed, and secondly, as an imitative art.

SECT. I. *Of the Beauties of Gardening as an inventive and mixed art, and of the principles of their Production.*

Works of art, Mr. Alison observes, may be considered, either in relation to their design or intention—to the nature of their construction for the intended purpose—or to the nature of the end they are destined to serve; and their beauty accordingly will depend, either upon the excellence or wisdom of the design, the fitness or propriety of the construction, or the utility of the end. The considerations of *design*, of *fitness*, and of *utility*, therefore, may be considered as the three great sources of the beauties of works of inventive art. They have been called *relative beauties*, in opposition to those of native and imitative art, which are hence denominated *natural or independent beauties*. There is a third source of beauty common both to arts of invention and imitation, which is that of *accidental beauty*, or such as is produced by local, arbitrary, or temporary associations. The beauties of objects, whether natural, relative, or accidental, are conveyed to the senses by the different qualities of matter, sounds, colours, smells, forms, and motion; but form is the grand characteristic of matter, and constitutes in a great degree its essence to our senses. In our remarks, therefore, on the beauties of inventive art, we shall chiefly consider design, fitness, and utility, in regard to form.

The expression of *design* is displayed by such forms and dispositions, as shall at once point out that they are works of art. Thus regularity and uniformity are recognised in the rudest works of man, and point out his employment of art and expense in their construction. Hence the lines, surfaces, and forms of geometric gardening should be different, and in some degree opposed to those of general nature. Irregular surfaces, lines, or forms, may be equally useful, alike works of art, and, considered with reference to other beauties, may be more agreeable than such as are regular; but, if too prevalent, they might be mistaken for the production of nature, in which case they would lose the beauty of design; " but forms perfectly regular, and divisions completely uniform, immediately excite the belief of design, and, with this belief, all the admiration which follows the employment of skill and expense." Ground in level or regular slopes, or in hills or hollows of symmetrical shapes; woods of right lined boundaries; trees, and especially such as are foreign to the soil, planted equidistantly in masses, in quincunx, or in straight rows; water in architectural basins, regular canals, or fountains; walks, and woods, of uniform width and perfectly straight, straight walls and hedges, are easily distinguished from nature's management of these materials, and are highly expressive of the hand of man.

Another reason why regular forms are satisfactory, Mr. Stewart (*Philosophical Essays*, 238.) derives from the principle of a *sufficient reason*, adopted by Leibnitz, " What is it, that in any thing which is merely ornamental, and which at the same time does not profess to be an imitation of nature, renders irregular forms displeasing? Is it not, at least *in part*, that irregularities are infinite; and that no circumstance can be imagined, which should have decided the choice of the artist in favour of that particular figure which he has selected? The variety of regular figures (it must be acknowledged) is infinite also; but supposing the choice to be once fixed about the *number* of sides, no apparent caprice of the artist, in adjusting their relative proportions, prevents a disagreeable and inexplicable puzzle to the spectator."

In the progress of the arts, the expression of design, though at first difficult, becomes afterwards easy, and renders regularity and uniformity only expressive of common design. Hence, to confer a character of superiority in works of design, variety would be introduced; and as uniformity was the sign of design, so uniformity and variety would become the sign of improved or embellished design. "Considering, therefore, forms in this light as beautiful, merely from their expression of design, the observation of Dr. Hutcheson may perhaps be considered as an axiom with regard to their beauty, viz. That where the uniformity is equal, the beauty of forms is in proportion to their variety; and when their variety is equal, their beauty is in proportion to their uniformity." (Alison's *Essays*. p. 106.)

To this stage, in the progress of design, may be referred the architectural ornaments introduced in garden scenery, such as seats, buildings, statues, urns; and in the later stages of the art, serpentine walks, labyrinths, verdant sculpture, and many other improvements. The variety and embellishment thus conferred on the arts, produced in time many absurdities that we would not wish to see resorted to with a revival of the ancient style, unless in examples considered solely with a view to imitation.* The sculpture of trees, however, might, when first introduced, be greatly admired, even by men of sense, for its novelty, and the discovery of a certain degree of skill in the artist; but as, in our times, they would neither be new or meritorious, they could scarcely be consistently introduced with a view to embellish design.

To prevent variety from degenerating into confusion, and, as Mr. Stewart characteristically expresses it, "puzzle the spectator," unity of intention must never be lost sight of. This, indeed, is necessarily implied in every work of art, since, without it, the slightest attempt at design would only end in a chaos of materials.

Fitness, or the proper adaptation of means to an end, is the second source of the relative beauty of forms. Considered in relation to the parts of a building, it is generally denominated *proportion*, and refers to the adequate strength of certain parts to bear certain weights, &c. In the detail of the ancient, and in scenes of relative beauty in the modern style of gardening, it relates to the magnitude and situations of buildings, and other artificial objects, relative to natural ones—to the extent of the different scenes or constituent parts of a residence, compared to the whole—to the propriety and congruity of certain objects as ornaments—and, in general, to the adequacy of means to an end, whatever these means or that end may be.

Utility is the third source of the relative beauty of forms. None of the other beauties will compensate for the entire want of utility in any scene of architecture or gardening. Objects at first thought beautiful, soon lose this expression when they are found to be of no use; and others, with first impressions the most disagreeable, are felt to become beautiful as they are known to be useful. "This species of beauty," Mr. Alison observes, "is in itself productive of a much weaker emotion than that which arises from the different sources of ornamental beauty; but it is of a more constant and permanent kind, and much more uniformly fitted to excite the admiration of mankind." (*Essays on Taste*, vol. ii. p. 201.) "To unite these different kinds of beauty; to dignify ornamental forms also by use; and to raise merely useful forms into beauty; is the great object of ambition among every class of artists. Wherever both these objects can be attained, the greatest possible beauty that form can receive will be produced. But as this can very seldom be the case, the following rules seem immediately to present themselves for the direction of the artist:

1. That where the utility of forms is equal, that will be the most beautiful to which the most pleasing expression of form is given.

2. That where those expressions are at variance; when the beauty of the form cannot be produced without sacrificing its utility; that form will be most universally and most permanently beautiful, in which the expression of utility is most fully preserved. *Essays*, vol. ii. p. 202.

Some of the various modifications of utility, as applied to country residences, may be here enumerated.

For the purpose of *habitation*, for example, good air and water, a genial climate, fertile soil, cheerful prospect, and suitable neighbourhood, &c. are known requisites.

Convenience must be joined to use, *comforts* to conveniencies, and *luxuries* to comforts. Exercise, whether in the shape of walking, riding, or driving, requires to be provided for; and recreation, whether in the common field sports, athletic games, or in botanical, agricultural, and other useful, elegant, or scientific pursuits, must be kept in view; rural fêtes and amusements might also be enumerated.

Accidental associations form the last class of relative beauties, and are "such associations as, instead of being common to all mankind, are peculiar to the individual." "They take their rise from education, from peculiar habits of thought, from situation, from profession; and the beauty they produce is felt only by those whom similar causes have led to the formation of similar associations." (Stewart's *Essays*.) Among these may be reckoned,

1. *Classical* and *historical associations*. The influence of the former in architecture is well known; the latter often adds charms to a spot, in no respect remarkable to those who are unacquainted with its history. *Classical associations*, Mr. Stewart observes, "have added immensely to our natural resources, but, at the same time, warped our taste in various instances;" acquiring, as Mr. Alison adds, "a superiority over the more permanent principles of beauty, and determining for a time the taste of nations."

2. *National associations* are also frequently at variance with such as are universal, and have perhaps greater influence than any other associations whatever. (Stewart's *Essays*.)

3. *Personal associations*, or such as arise from the accidental style of natural beauties, to which we have been accustomed in our youth. Many particulars come under this head, which it would be tedious to enumerate; but one mode of vanity and selfish feeling deserves particular notice, as intimately connected with the business of the landscape gardener. It is that interest which the attachment to *property* creates in men's minds, "rendering them alive to every trifling recommendation belonging to what is their own, while it blinds them to the most prominent beauties in the property of their neighbours." (Stewart's *Essays*, p. 468.)

This leads to what, in laying out grounds, is called *appropriation*, or such an arrangement as shall, either in reality or appearance, render all, or the greater part of what we see from a country seat, our own. The simplest way of effecting this, is by shutting out all objects which do not corres-

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* As at a cottage and garden in the style of Henry the VIII's time, formed at Woburn by his Grace the Duke of Bedford, in which clipt yews are very properly introduced to complete the illusion.

[illegible] by means of walls or plantations. A [illegible], by harmonizing the scenery; by adopting [illegible] the forms, colours, and arrangements in our own grounds, which appear in those of our neighbours, as seen from the house, or some particular points of view. According to Mr. Wheatley, "one property of a riding is, to extend the idea of a seat, and appropriate a whole country to the mansion." For this purpose, he requires the road of the riding to be different from common roads in form and preservation, and distinguished by accompaniments borrowed from a park or garden, &c. Mr. Knight strongly objects to appropriation, and ridicules attempts of this sort, by placing the family arms on the inns and public-houses of the neighbourhood, and on "stones with distances," as, he says, was recommended by one improver. Girardin also objects to the principle; but Mr. Repton, and, we believe, almost every other professional man, finds it a very principal object of attention. Mr. Repton defines appropriation to be, "that command over the landscape visible from the windows, which denotes it to be private property belonging to the place."—"A view into a square, or into the parks, may be cheerful and beautiful, but it wants *appropriation;* it wants that charm which only belongs to ownership; the exclusive right of enjoyment, with the power of refusing that others should share our pleasure. The most romantic spot, the most picturesque situations, and the most delightful assemblage of nature's choicest materials, will not long engage our interest without some *appropriation;* something we can call our own; and, if not our own property, at least that may be endeared to us by calling it our own home." (*Fragments of Landscape Gardening*, p. 206.)

In concluding the subject of accidental associations, it is proper to observe, that the objections to their use apply with far less force to the art of laying out grounds than to architecture, or any of the other elegant arts. For as a country residence is created for the enjoyment of an individual family, that family have undoubtedly a right to gratify their peculiar tastes; but, in so far as their tastes are refined, in so far must they expect to obtain the sympathy of men of general associations.

The particular application of these principles to the ancient style, and to such parts of modern country residences as are laid out with a view to the beauties of design and utility, will be made in the course of treating of the different materials and subjects of gardening.

Sect. II. *Of the beauties of gardening, considered as an imitative art, and of the principles of their production.*

The chief object of all the imitative arts is the production of natural or universal beauty. Music, poetry, and painting, are the principal imitative arts; to these has been lately added *landscape gardening*, an art which has for its object the production of landscapes by combinations of the actual materials of nature, as landscape painting has for its object their imitation by combinations of colours. Landscape gardening has been said "to realize whatever the fancy of the painter has imagined," (Girardin); and "to create a scenery more pure, more harmonious, and more expressive, than any that is to be found in nature herself," (Alison.) Such are Mr. Alison's ideas of the powers of this art, and such appear, in some degree, to have been those of Mr. Wheatley and M. Girardin. A more correct idea of its capacities, in our opinion, is suggested by the remark of Lord Walpole, when he represents it as "proud of no other art than that of softening nature's harshnesses, and copying her graceful touch." It has also been said, that it is "to poetry and painting, what the reality is to the representation," (Girardin.) But experience proves, that the former (the reality) is always exceeded by the latter, both in respect to natural and picturesque beauty; and this reality is supposed to exceed any representation, if it is a scene of gardening, that is, if it is any given variety of ground, rocks, and distance, as the basis to be furnished with wood, water, and buildings; the rocks shewn, or concealed, as the gardener may wish, or as the genius of the place may require, and every other purpose effected, which is in the power of gardening to perform: When all this is done, it will be a scene greatly inferior in beauty, not only to the imitative creation of a painter from the same ground work and materials, but to a similar scene produced by nature. To put this matter in a clear light, let there be a natural landscape, either of mediocrity or of any given beauty, with every circumstance so arranged, as to be alike suitable for both arts; and let a painter and a gardener, each attempt to copy it according to their art, with or without permission to improve its beauties. Which of the two imitations would be most beautiful, considered in the abstract, and without reference to any selfish or arbitrary association? Decidedly, in our opinion, the production of the painter.

The great source of the beauty of every verdant landscape is wood; and so much of the beauty of all woods depends on accidental circumstances, in their progress from the time of planting till they attain a considerable age, and which circumstances cannot be said practically to be under the controul of the gardener, that however high our aim, however we may study the natural effects of time, and however correctly we may imitate them, at the end of all our labours, any wood of art will always be far inferior to a wood of nature under the same circumstances. For further illustrations we have only to appeal to such painters as have made landscape their particular study, and who certainly must be considered in this case as the best judges.

To what kind or degree of beauty, then, can landscape gardening aspire? To this we answer, that, abstracted from all relations of utility and design, it can seldom succeed in producing any thing higher than picturesque beauty,* or such a harmonious mixture of forms, colours, lights, and shades, as will be grateful to the sight of men in general; and to such, more particularly, as have made this beauty in some degree their study. This harmonious assemblage of objects may be grateful and agreeable, without being accompanied by *any*, or at all events by *much* general expression; for example, of gaiety, melancholy, grandeur, simplicity, or elegance; but it may also combine one or more of these poetic or general beauties in a high degree, and this, too, with or without being picturesque. It may recal many other pleasurable emotions, if we admit the considerations of fitness, novelty, or its contrast to surrounding scenery and utility, or its adaptation to man.

Such is our opinion of the capacities of landscape gardening. If it is lower than that of some authors and artists, we can only say, that it has been formed from the observation and experience of what actually takes place. The artist may and ought to aim at the highest degree of beauty, which his own imagination, the genius of the place, and the views of the owner will admit of; but let him not proceed with, or hold out to the world, mistaken views of what his art can and cannot perform.

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* It is almost unnecessary to remark, that we use this term in a general sense, considering it as a species of the genus *beauty*, containing several varieties. Some of these varieties, we think, can hardly be understood and relished by such as have not had some practice in sketching landscape scenery, which, in truth, may be said to open a new source of beauty to the imagination, independently of its effect in creating a greater relish for natural arrangements of scenery.

From this view of the powers of art, it will be sufficiently obvious, that with Price, Girardin, Knight, and other authors, we consider the principles of painting to be those of landscape gardening, in that view of this term which limits it to "the art of creating landscapes of picturesque beauty;" and in viewing it as adding to picturesque beauty, some other natural expression, as of grandeur, decay, melancholy, &c. we consider it, with Pope, Warton, Gray, and Eustace, as requiring the aid of poetic mind; that is, of a mind conversant in all these different emotions, or pleasures of imagination, which are called up by certain signs of affecting or interesting qualities, furnished by sounds, motion, buildings, and other objects.

If, taking a third view of landscape gardening, as "the art of laying out the grounds of a country residence," then, with popular opinion, we comprehend under the term all the above beauties, with those of *relative beauty*, the principles of which have been the subject of the preceding section.

The principles of landscape gardening then, as an imitative art, we conclude to be derived from nature.

1. As developed by the principles of landscape painting; and,

2. As recognised by poetic mind, or a mind alive to those general beauties or associations universally felt.

We consider this, perhaps to many, a tedious developement of the principles of landscape gardening, called for by the vague and indefinite manner in which they are spoken of by authors, no less than by artists; and, as a proof of this, we refer our readers to the volumes of Mr. Repton, of whose practical taste, in many instances, we highly approve.

We shall attempt, as a proof of our theory, a slight analysis of the principles of a composition expressive of picturesque and natural beauty. For this purpose it is a matter of indifference, as far as respects picturesque beauty, whether we choose a real or painted landscape; but, as we mean also to investigate its poetic, or general beauty, we shall prefer a reality. We choose then a perfect flat, varied by wood, say elms, with a piece of water, and a high wall, forming the angle of a ruined building; it is animated by cows and sheep; its expression is that of melancholy grandeur; and, independently of this beauty, it is picturesque, that is, if painted it would form a tolerable picture.

1. The first obvious principle which pervades this, or any beautiful or expressive view, is a certain degree of *unity* in its expression. No ideas of gaiety or prettiness are excited by this scene. All the parts unite in forming a *whole*, which the eye can comprehend at once, and examine without distraction. "La vue," says M. Girardin, "le plus vagabond de tous lessens, a besoin d'être fixée pour jouir avec plaisir et sans lassitude." Were this principle not prevalent, the groups of trees, the lake, and the building, would only please when considered separately, and the result would be as poor a production as a machine, the wheels of which are accurately finished, and nicely polished, but which do not act in concert so as to effect the intended movement.

2. It is *true* to nature; that is, the objects or materials are what they appear to be. The trees (which are neither very old, nor very young), though in the distance diminished by their remote situation, we discover, by their trunks and contour, to be still trees. They are not shrubs placed near the eye, with a view to produce a false perspective; nor is the fragment of building merely a disguised wall, because it has openings which have once been windows, and is crowned in one part by battlements. The water is natural, its surface being below the level of the adjoining ground, not raised above it, as is often the case in artificial waters. This completes the truth or reality of the scene.

The necessity of adhering to truth is still greater in painting, in which all objects must appear to be natural, not only in forms and colour, but also relatively to the forms and colours around them. Objects, especially those whose forms and dimensions are familiar to us, as men or horses, painted of different heights in the same plane, as for example, in the distance, of the magnitude they appear in the foreground, would, from the acquired habit of measuring unknown by known objects, give a falsehood to the scene, and appear as animals of a different species, or as monsters.

It seems to be from the same principles of being true to nature, that a gradation of scene, or what is called distance, is required, or at least is so satisfactory in landscape. The mind, after being impressed with the effect of a whole, delights in examining its parts in succession; the more simple and obvious the arrangement of these parts, therefore, the more readily does the mind acquiesce in their effect. The eye of the artist, seizing on the nearest and most remote parts of a scene, readily marks an intermediate or middle distance; no given extent seems necessary for this purpose:

> "To make the landscape grateful to the sight,
> Three points of distance always should unite;
> And howsoe'er the view may be confined,
> Three marked divisions we shall always find."
>
> *The Landscape*, by R. P. Knight.

3. Having been pleased with the impression of this landscape, and having satisfied ourselves that its component parts are individually natural, let us, in the next place, observe their *disposition*, or how in this respect they concur in forming a whole. 1. As to *forms*, we find that their disposition is in groups or masses. The largest group, for example, is placed towards one side of the picture in the foreground, another towards the opposite side of the middle distance, including the building and adjoining lake; and the remote, or third distance, consists of a low line of wood, with projecting groups or masses. 2. As to *colours*, we find only different shades of yellow and green on the trees and ground. 3. As to the light, we find one large and principal light near the middle of the view, diverging into shade as it approaches the sides; the clearest part is the water, and the next clearest the building, and the third light spreads over a broad space of ground, near the water. The groups in the foreground are all in a deep shadow. One of these near the water, partakes of the principal light, and those in the third distance are distinguished by a sort of neutralization of light, colour, and shade. Such is the disposition of the groups or parts, in order, in a complex view of the whole, to fix the eye, and prevent it from being distracted by scattered lights, confusion of forms, and inharmonious colours.

4. We shall next remark the *connection* which subsists between these different groups. 1. They are connected in each distance by a real nearness of *situation*; and, 2. In the view as a whole, from the one group coming in part before the other, so as to produce connection by *apparent proximity*. Suppose the reverse to be the case, and that the groups were unconnected either by real or apparent distance of situation, the consequence would be, that each

group being surrounded by light, would become a distinct object. The eye would have no resting place, and the assemblage would compose a whole.

5. What comes next to be examined, is the *relation* which subsists between the parts composing each individual group. 1. In regard to the *form* of the parts of each group, as they are all groups of the same sort of tree, we find one elementary form prevalent, but differing in magnitude, and in combination, by their contrasted disposition, to such a degree, that each group differs in form from the others, without at the same time being of opposite forms.

2. In regard to *colour*, the same kind of colour prevails in each and in all of the groups, but is varied in degree by the same contrasted disposition. In some parts a yellowish green prevails, in others a greenish yellow, in others a russet or red green, and occasionally a bright green, as on that part of the turf where the light strikes with the greatest force.

3. In regard to *light and shade*, those parts of the groups which rise above the horizon, and are backed by the sky, are dark, and generally darker than such as are backed by the ground, or by other adjoining groups. The prominent parts of each group, are lighter than the retiring parts or recesses among the spray and leaves. These prominent and retiring parts, in the near groups, are very numerous; in the distance they are lost in the general ærial shade of the group. It may be observed as a general principle, that trees, from their rough surface, and consequent imperfect reflection of light, are always comparatively darker than water, buildings, or ground. In creating real landscape, they serve in some measure as shades, as the other materials mentioned serve as lights.

We have said nothing of the sky, the cows, and sheep. Suppose, then, in order to complete this sketch, that we represent the sky as merely grey and cloudy, and the cattle and sheep grouped in the middle distance, what will be the expression of the view? We think it would express very little to general observers; but there being nothing glaringly offensive in the arrangement, it would be expressive of some beauty to him who had bestowed some attention to the subject of landscapes; for though it exhibits but little harmony of forms and colours, light or shade, it still possesses enough of these ingredients to render it worth looking at as a picturesque view.

It remains to account for the general or natural expression of melancholy and grandeur. For this purpose let the building be the ruins of an ancient castle, whose lofty quadrangular form may be readily imagined from the walls we mentioned as composing the ruined building.

The character of grandeur, then, is not in this instance communicated to the picture by the picturesque effect of the walls, which have no variety of form, light, or shade, in themselves, but by the mental associations to which they give rise in a cultivated mind.

It will not be supposed from this, that we mean to recommend the introduction of artificial ruins in improved scenes, we have merely made choice of this expression, as very obviously pointing out the distinction between picturesque and poetic or general beauty. We shall add a few other examples.

1. Imagine the cattle and sheep removed, the surface of the ground covered by smoothly mown turf, and the luxuriant branches of some of the fore ground trees nearly reclining on the ground. The first expresion would be that of beautiful, or elegant picturesque; the next that of stillness, and *consecration to man*,—stillness, as being without animals, or moving objects; and consecration to man, from the mown surface, greatly heightened by the circumstance of the branches of trees reclining on the ground, which never can happen where sheep or cattle are admitted, and which forms the leading visible distinction between a group of trees in a park and a group on a mown lawn. It is not from the smoothness of the turf, or any particular mixture of light and shade in the reclining branches, that this expression is produced, but from reflecting on the cause of this appearance.

2 Imagine, instead of the smooth turf, uncouth rough ground, covered in some places with furze, briars, brambles, and tangled thickets; the water fringed with rushes, and partially concealed by aquatic shrubs; and wild horses and deer forming the animated part of the scene. The expression would be eminently picturesque; but there would also be an expression of wildness, not resulting from the picturesque qualities as such, but from mental reflection on the difference between this scene and one of cultivation.

3. Imagine the view deprived of the lake and the building, and consisting only of the wood and ground, with the heads of a straggling row of willow trees appearing in the middle distance, and the sound of a distant waterfall heard through the trees. Here to picturesque beauty we have an idea of water—of an immense body of it in the lake or river which supplies the waterfall—and of the rocks, which oppose their powerful obstruction to a body of water. The reader will here remark, how much of the sublime beauty of this scene depends on sound, which can never be included under picturesque beauty. The leading expression is that of sublimity, accompanied by various associations of dignity produced by the rocks, and of grandeur suggested by the stream, after the waters have renewed their tranquil course, and rolling, as we may imagine, majestically along under the shade of the line of willow trees.

Other examples of a more striking nature might be adduced; but these instances we consider sufficient to shew the difference between a composition merely picturesque, and one expressive of general or natural beauty, and to prove our position, that both poetry and painting enter into the principles of landscape gardening.

They will also shew, how very little the production of natural beauty is within the power of the landscape gardener. He may display it to more advantage. In the first example of expression, for instance, the building, or such parts of it as more obviously show its real character, might be displayed by the removal of some over obtruding branches; and in the second, a garden seat, and some garden trees, as the lime, elder, &c. might add to the idea of consecration to man. In the third, a corn field or a barn in the distance, would aid the effect by contrast; and in the last, a bridge would determine the situation and reality of the river. But to attempt effecting these expressions by building a ruin, placing a garden seat in a paddock, or erecting a bridge where there was no water, would, however common in the infancy of the art, be now justly considered ridiculous.

But much more might be done in improving the picturesque beauty of each of these scenes, provided the trees were already grown to maturity, and too numerous rather than too few; but if these trees are yet to plant, it is evident that only the ground plans of the masses and groups of trees, and of the breadth of the lawn, could be formed by the artist. But in doing this, he will still be guided by the principles laid down. To illustrate the application of which, both in forming infant and improving mature scenes, is the business of our succeeding chapters.

CHAP. III.

OF THE MATERIALS OF GARDENING.

WHATEVER style of gardening we adopt, the materials with which we work, in order to obtain the desired effect, are the same. Those of nature are, ground, wood, water, and rocks; to these, art has added buildings; roads, walks, fences, and animated or moving objects, sounds, &c. may be considered as accompaniments.

SECT. I. *Of Ground.*

The operations of art on this ponderous material are necessarily of a very limited description. The most extensive and costly operations, to restore or create natural surfaces, even when attended with the desired effect, afford less gratification to personal feeling than most other improvements. If a large space, naturally or artificially deformed, has been restored to natural beauty, we are delighted with the effect, whilst we recollect the difference between the present and the former surface; but when this is forgotten, though the beauty remains, the credit for having produced it is lost. In this respect, the operations on ground under the ancient style have a great and striking advantage; for an absolute perfection is to be attained in the formation of geometrical forms, and the beauty created is so entirely artificial, as never to admit a doubt of its origin. Long, therefore, after the improvement is finished, the credit and the beauty remain, to gratify and charm the owner. Improvements on surfaces, whatever be their object, ought to be made in scenes which are near the eye, or intended to be frequently seen; at a distance they are lost, if the effect be on a small scale, and often better effected by wood, if on one of considerable magnitude. All operations on ground may be included under, 1. Those which have for their object the beauty of art or design; and 2. Those where natural beauty is intended to be produced.

1. *Operations with a view to relative or artificial beauty.*—The forms in use for this purpose are few and simple. They originate in and are influenced by those of the house; and are, for the greater part, bounded by right lines; and the surfaces are levels or slopes of different degrees of abruptness. The magnitude as well as form of each of the figures in the ground immediately adjoining a house, or in a detached walled enclosure, should be regulated chiefly by the magnitude of the mansion, or extent and grandeur of the whole place, though they are often obliged to conform, in some degree, to the natural surface. When the ground slopes from the house in all directions, narrow parallelograms will be the prevailing forms both of the levels and slopes, the broadest level, and greatest perpendicular depth of slope, being placed next the house, and the next broadest level, &c. in succession, till, after three or four levels, and as many slopes are obtained, the artificial surface shall finally blend with the natural, unless, as is frequently the case in the geometric style, a kitchen garden, or some similar scene of art, is joined to it. In this case, separation by some architectural or other accompaniment, will, by forming a break in the order of forms, admit of adopting, in continuation of the artificial surface, such levels and slopes as the character of the scene may require, or a due regard to economy dictate. When the mansion, or scene of operations, is on a surface naturally flat, the levels will be of greater dimensions, the slopes smaller, and both forms fewer in number. But though parallelograms are the common figures employed, sections of polygons, trapeziums, circles, and curvilinear figures, are frequently admitted. They are used in architectural elevations, and in fortifications, which are the prototypes of this part of ancient gardening; and, therefore, when apparent in the mansion, should be reflected, as it were, by the grounds.

The forms to be used, however, is a matter easy to determine. The principal difficulty is to arrange them together, so that they may concur in producing a whole or a good effect. In disposing, connecting, relating, and contrasting them for this purpose, the artist will preserve regularity and uniformity in the complex view of the whole, varying and harmonizing the detail according to the degree of beauty and variety he intends to produce. If he has duly prepared his mind by theoretical studies, and practised architectural and landscape drawing, his own feelings will suggest when he has attained the desired effect; for the models of artificial surfaces, which remain of ancient gardens, are poor productions compared to what might be created in this way, through the judicious application of the principles of relative beauty. See *Terrace*, in the succeeding chapter.

2. *Natural beauty of ground.*—As the right lines and geometrical forms of the architect take the lead in grounds of artificial beauty, so the flowing and broken lines, and undefined forms of the landscape painter, take the lead in those of natural beauty. To create them in ground, is generally impracticable and unadvisable; but where they exist concealed by accidental deformities, or incomplete in expression, through dulness in their leading features, art may relieve from the impediments to beauty, even though the situation is some distance from the eye. In recluse scenes immediately under view, art may aspire to create beauty even from a tame flat, but especially from its opposite, a flat abounding with deformities. In effecting all those purposes, the same principles apply. The first thing to fix in the mind is the desired surface, or that style of natural ground which is best to be imitated. The next thing is to examine on what parts, forms, and lines, the natural beauty of this ground chiefly depends; if undulating, whether the concave or the convex prevails; if broken ground, whether horizontal and perpendicular, or curved and inclined lines prevail. These are then to be imitated in the improvement, ever keeping in view the important principle of a whole as the end of connection, and the other principles we have discussed as the means of producing it.

1. *The removal of accidental deformities*, forms one of the commonest operations on ground. Old quarries and other pits, useless cattle ponds, open drains, mounds of earth, marks of ridges, are to be considered of this description. As they have been raised by art, so, in dispersing them, the best general rule is to restore the natural surface; but sometimes the remains of fences are so numerous, that advantage may be taken of the earth to be removed, and some variety given to a surface otherwise dull and featureless. If the fence consists of a great number of turns of different lengths, by removing both the mound and part of the surface on each side of the drain, a small winding hollow or vale may be formed: the effect of which may be heightened, by placing the earth removed on adjoining indications of natural eminences; not so as to form knolls, but so as to connect and harmonize with the prevailing idea of expression. The most simple and obvious improvement of exhausted quarries and dry pits, is to plant them; but this, though it will form a series of pleasing scenes, is not always consistent with the general expression to be created, and such groups as would arise from these spots, might destroy breadth of light and connection, independently of excluding distant objects. In this case, they must be filled up by undergrowths, or by lowering the adjoining surface in such a way, as not to interfere with general effect, or a sufficient descent for the surface water. Where bro-

ken ground enters into the idea of the composition to be effected, open drains, or hollow pits, afford fine sources of picturesque beauty, especially if the ground is dry, or can be readily under-drained. This character, however, can seldom be introduced as an original feature; but in ground naturally leading to abrupt and broken lines, it may be more desirable to improve this expression, than attempt creating a more polished surface.

In cases of this sort, almost every thing depends on the introduction of wood, copse, and verdant roughnesses, to harmonise the broken surface; for mere broken ground, without a character of luxuriance and wildness communicated by wood, is seldom better on a smaller scale than a surface deformed by scars.

2. *Natural bumps or excrescences* are not uncommon in many grounds which have not been subjected to agricultural improvement. When these are not large, the process of fallowing with the plough will remove them; when they are of some magnitude, they may often become sources both of polished and picturesque beauty. If they are numerous, and so distributed as that by the removal of some, and the enlargement through that means of others, they may give an impression of undulation, especially if situated on a naturally irregular surface. If on a declivity, and covering rocks or huge stones, a mixture of flowing lines with abruptnesses may be happily introduced.

3. *A varied but yet dull surface*, may often be improved by a skilful artist. By studying the character indicated by nature, it will generally be found, that the deficiency of expression is owing to the hollows being in part clogged up, either naturally or by long continuation under the plough; and the swells lowered in a corresponding degree by the same process. In this case, the obvious improvement is, to remove earth from the hollows, and place it on the eminences, ever keeping in view the natural expression, and avoiding to end the improvement by leaving the hollows gutters, and the eminences pointed ridges. This sort of improvement is not a very obvious one, though often attended with surprising effects, for every foot of depth taken from a hollow, and laid on an adjoining hill, adds two feet to the height of the latter.

4. *In recluse scenes*, immediately under the eye, art may create a sort of miniature of beautiful ground. Man is but a puny object, compared to those of inanimate nature. He may overlook a distant hill separated by low ground; but a mound of three paces in height, placed near the eye, confines the view, and all other objects being shut out, acquires, if apparently a work of nature, a degree of importance in his imagination. Winding walks, four feet below the surface, will supply earth for accompanying them by wavy hills or swells eight feet high. If these hills or swells are formed and connected, so as to produce a varied and natural-like whole, with every change of position, a very suitable basis will be raised for a picturesque shrubbery, or flower garden. It was to this sort of art that Pope's garden at Twickenham was indebted for so great a variety of beauties in a small space; and the flower garden at Lord Harcourt's, at Nuncham, near Oxford, was laid out under the eye of Mason the poet, on the same principles.

All these observations will be understood as referring to grounds near the house. *Distant scenes* of a park, hills or mountains, are only to be improved by wood; and these remarks, in so far as they extend, will suggest, not what is to be removed, but what must be concealed. Many excellent remarks on this part of the subject are to be found in the picturesque tours of Mr. Gilpin, referring to ranges of hilly scenery in different parts of the country, of much of which he has given views. With respect to ground, as respects garden scenery, almost the only writer who has treated of it at length, is Mr. Wheatley, whose excellent book so frequently referred to by all succeeding writers on gardening, ought to be in the hands of every man of taste. In the chapter on ground in that work, the author concludes with a salutary caution which ought ever to be taken in connection with the wisest rules, "a caution which has more than once been alluded to must always be had in remembrance; never to suffer general considerations to interfere with *extraordinary great effects*, which rise superior to all regulations, and perhaps owe part of their force to their deviation from them. Singularity causes at least surprise, and surprise is allied to astonishment. These effects are not, however, attached merely to objects of enormous size; they frequently are produced by a greatness of style and character, within such an extent as ordinary labour may modify, and the compass of a garden include. The caution therefore may not be useless within these narrow bounds; but nature proceeds still farther, beyond the utmost verge to which art can follow, and in scenes licentiously wild, not content with contrast, forces even contradictions to unite. The grotesque discordant shapes, which are often there confusedly tumbled together, might sufficiently justify the remark. But the caprice does not stop here; to mix with such shapes a form perfectly regular is still more extravagant; and yet the effect is sometimes so wonderful, that we cannot wish the extravagance corrected." *Obs. on Mod. Gard.* p. 23.

SECT. II. *Of Wood.*

Almost all the grand effects in both styles of improvement are produced by wood, which, whether in scattered forests, thickets, or groups, or in compact geometric squares, avenues, or rows, constitutes the greatest charm of every country. A tree in itself is indeed the noblest object of inanimate nature; combines every species of beauty, from its sublime effect as a whole, to the most minute and refined expression of mind in the individual beauty of its leaves; exhibits that majestic uniformity and infinite variety which constitutes the essence of relative beauty, and the natural expressions of individual species, are as various as are their forms and magnitude, their utility to man, and the situations, soils, climates, and other general and accidental circumstances of which they are indications. Previously, therefore, to entering on the subject of wood, we shall endeavour to form some arrangement of this great storehouse of beauty.

The hardy trees of Europe may be classed according to magnitude, form, colour, mode of growth, duration, and expression.

1. *Magnitude.* Trees of great height are, the English elm, ash, larch, Polish and Carolina poplar, &c.; but the laburnum, mountain ash, and evergreen oak, are very low trees. A medium in height may be found in the maple, pine, and birch. Some trees exceed in breadth, as the oak, Spanish chesnut, and Scotch elm; others of different heights are very slender, as the Lombardy poplar, cypress, and bird cherry.

2. *Form.* The oak and Spanish chesnut afford the most irregular and picturesque shapes with round heads; the English elm, and ash, have long narrow forms and round heads; the beech and horse chesnut, compact oval forms, with obtuse heads; the larch, spruce, and fir tribe in general, have conical shapes, and pointed spiry tops, &c.

3. *Colour.* The Scotch fir, yew, and horse chesnut, are dark greens; the larch and elm, a yellow green; the abele, Huntingdon willow, a silvery green, &c.

4. *Mode and time of growth.* The nature of some trees is to lose their lower branches as they increase in height,

as the fir tribe; and others have a tendency to retain them, as the wych elm. In some the branches descend, and often recline on the ground, as the lime tree and platanus. Some are very compact in their foliage, as the horse chesnut; others very open, as the ash and the acacia. Some have drooping spray, as the weeping willow; that of others tends upwards, as in the Lombardy poplar; horizontally, as in the oak; and obliquely, as in the Scotch fir. Some grow with rapidity, as the Carolina and Athenian poplars; others very slowly, as the oak and the stone pine.

5. *Duration.* The most durable of trees is the oak; the least so, some of the poplar and fir tribe. A medium is to be found in the elm and lime.

6. *Expression.* Some trees convey ideas of utility in the arts, and mark the attention and industry of man, as having planted them for this purpose, as the oak, ash, elm, &c. Others are known, or supposed to be of little use, and convey ideas of neglect or of wildness, as the hornbeam, sorb, trembling poplar, &c. Some indicate general improvement and artificial plantations, as the larch and spruce fir; others garden scenery or plantations near a house, as the cedar, stone pine, and platanus. Some indicate rich deep soil, as the oak; and rich thin soil, as the elm; others chalk or gravel, as the beech; rocky ground, as the ash; marshy ground, as the alder; the proximity of water, as the willow.

There are also natural expressions belonging to trees, partly from general, and partly from accidental association; as strength and stability to the oak, ease and elegance to the birch, sweetness to the lime, gloom to the cypress and yew, melancholy to the weeping willow, &c.

Shrubs may be similarly arranged, but we prefer arranging them into magnitude, mode of growth, evergreen, deciduous, native, naturalized, and exotic.

1. *Magnitude.* Some shrubs are high, approaching to the character of trees, as the mespilus and common holly; others very low, as the butcher's broom and dwarf birch.

2. *Mode of growth*, including creepers, as the ivy; climbers, as the virgin's bower; trailers, as the bramble; compact forms, as that of the arbor vitæ; open airy branches, as in the tamarisk; and singular branches, as those of the stagshorn shumach. Some as shrubs soon acquire picturesque shapes, as the thorn, holly, and elder.

3. *Evergreens*, as the holly, laurel yew, laurustinus arbutus, &c.

4. *Deciduous*, as the guelder-rose, lilac, syringa. &c.

5. *Native*, as the holly, privet, hazel, thorn, briar, &c.

6. *Naturalized*, as the rose, syringa, lilac, laburnum, &c.

7. *Exotic*, or foreign, as the accuba, rhododendron, azalea, &c.

The above arrangement refers to the plants as growing detached from other trees, and as nearly full grown. It is less intended to comprehend every characteristic distinction, than to suggest to the artist the principal light in which he ought to view trees and shrubs. Nor could he with confidence attempt planting, with even such a knowledge as could be obtained from the above arrangement, completed by inserting all the names under their proper heads; for unless he has seen the majority of the full grown trees himself, both singly and connected in groups and masses, and is acquainted with the comparative rapidity of their growth in different climates and soils, he cannot well foresee the result of his labours, or look forward "with the prophetic eye of taste" to certain beauty. Of this there are numerous proofs, arising from the unjust preference given to exotics of unknown shapes and duration, in situations where the general form and situation of the tree, or even of one or two trees, is of the utmost consequence to the effect of a whole. How frequently, on a lawn, or in a plantation near a house, do we see acacias, cutleaved elders, variegated sycamores, &c. where the oak, birch, lime, or Spanish chesnut, would have produced a much more impressive general effect!

For the history, character, and culture of trees and shrubs in general use, see *Planting and Rural Ornament*, by Mr. Marshall; Hunter's *Evelyn's Sylva*; and Hanbury's *Complete Body of Planting and Gardening*.

We shall now proceed to consider planting, with a view to relative and natural beauty, or, in other words, the ancient and modern style.

PART I. *Planting in the Geometric or Ancient Style.*

The first consideration is the nature of the *whole* or general design; and here, as in the ground, geometric forms will still prevail, and while the masses reflect forms from the house, or represent squares, triangles, or trapeziums, the more minute parts, characterized by lines rather than forms, such as avenues, rows, clumps and stars, &c. are contained in parallelograms, squares, or circles. In regard to the parts, masses and avenues should extend from the house in all directions, so far as to diffuse around the character of design; and as much farther in particular directions, as the nature of the surface admits of, the distant beauties suggest, and the character of the mansion requires. In disposing these masses, whether on a flat or irregular surface, regard will be had to leave uncovered such a quantity of lawn or turf, as shall at all events admit a free circulation of air, give breadth of light, and display the form of the large masses of wood. Uniformity and variety as a whole, and use as well as beauty in the parts, must be kept constantly in view. Avenues, alleys, and vistas, should serve as much as possible as roads, walks, lines of fences, or screens of shelter or shade; but where this is not the case, they should point to some distant beauties, or near artificial objects, to be seen at or beyond their termination. The outer extremities of artificial plantations may either join natural woods, other artificial scenes, cultivated lands, or barren heaths or commons.

When artificial plantations join natural woods, the avenues, alleys, and circular glades of the former may be continued a certain length in the latter, so that the point where the natural wood begins, and the artificial plantation ends, may not be discoverable. In aid of this effect, the sort of tree which prevails in the natural scenes, should also prevail in the adjoining parts of the artificial wood. When artificial scenes join other artificial scenes, nothing can be easier than, by the reciprocal continuation of avenues, strips, or masses, so far to unite the two seats, as to conceal the boundaries of each, while the two mansions will thus each borrow a splendour from the other.

There are still existing proofs of the attention paid to this subject in former times, an instance of which occurs in the apparent connection by avenues between Blenheim, Ditchley, and Heythrope, though the last mansion is nearly ten miles distant from the first.

When artificial scenes join cultivated lands, if those lands are enclosed, broad strips, hedge-rows, square or round clumps in the angles of the fields, with such reciprocal disposition of lines or forms as the case may suggest, will continue the character of artificial plantation; and where roads are necessary, if utility does not forbid, they should be formed in part as avenues, in continuation of those within the artificial scene.

When artificial plantations are bounded by barren heaths or commons, all that can be done is to advance beyond the boundary of the place, portions of avenues, and rows of trees of different lengths. Sometimes an inequality, crowned by a clump or thicket, may promote the idea. On other [illegible], where the heath or waste may be so black as to convey a disagreeable expression, and therefore is, of course, [illegible] entirely from the improved scene, a sort of connection may be given, by advancing strips or rows from the boundary plantation into the heath. Even single or scattered trees, if they can be protected in that situation, will have a tendency to produce that sort of connection required; and, while it gratifies the proprietor's love of ap[illegible] and please the eye of the traveller, who views [illegible] delights to observe the harmony and beauty of its principal features.

Having disposed of the whole, and of the parts, as far as respects their general effect and connection, what remains to be considered is, the sort of tree, manner of disposing the plants, fences, and future management.

The object in view, the expression of art and design, suggests the propriety of employing *different species* to those which are natural to, or most abound in the surrounding country. In a country of common firs, the spruce and silver fir, and cedar, afford a choice. In a country of oaks or elms, chesnuts, limes, and planes, form suitable contrasts. Where the plantations are extensive, the value of the timber must always be a principal object; and, therefore, the contrasted trees should be chosen accordingly. Some species, however, are so happily adapted for this style, and as ornamental trees in both styles, that they ought seldom to be admitted near the house. Such, for example, as the horse chesnut, lime, Spanish chesnut, plane, lucombe oak, cedar, stone pine, &c. As the four last species mentioned are, in exposed situations, liable to injury from extraordinary severe winters, a few hardier sorts, resembling them in general appearance, should be intermingled in the plantation, to preserve the larger masses in case of accident, but to conform with the general effect in colour and style of foliage, as well as in form. Different species ought not in general to be mixed together in the masses; one, or at most two, conforming varieties is sufficient, more would destroy the breadth of colour of the mass, and the character of its surface. Different masses, avenues, and more minute parts, may, however, be planted with different species of trees; rare sorts may be also introduced in lines, along the front of many of the masses, ranged along stars, *patés-d'oye*, &c. The snow-drop tree, from its beautiful blossoms, and the birch and hazel, for the display of their catkins during winter, are well calculated for walks adapted to that season of the year, and should be planted in front of firs, or other evergreens. Such also is the principal situation for flowering shrubs, and no plants can be more showy than the horse chesnut, common lilac, acacia, guelderrose, Portugal laurel, holly, birdcherry, mespilus, and laburnum, in similar situations, and for general purposes. In distributing the species of tree in general masses, the same general principles of composition must be attended to, which we have pointed out as far as respects form. The colours and character of the heads of the trees must be *connected*, and, at the same time, to a certain degree *contrasted*, in order to produce an artificial and yet harmonious effect.

It may perhaps be asked here, whether the new varieties of American and other shrubs, obtained since the introduction of landscape gardening, are to be admitted under this style of improvement? We answer, certainly. There can be little doubt they would destroy part of the allusion to an ancient place; but we do not contend for the revival of the ancient style, as producing imitations and illusive characters, or on account of its antiquity, but as a distinct mode of gardening. We would therefore not copy its faults, or study its defects, but add to its beauties, from all the resources furnished by the present improved state of the arts of design, as well as by the continued accession to our stock of trees and shrubs.

The manner of *disposing the plants* is influenced by the same principle of avowed art; in rows, equidistant masses, in squares, or in quincunx, and in every case so as never to be mistaken for trees or shrubs sprung up accidentally.

Fences.—Here the ancient style has a grand advantage over the modern, in which, as far as respects the imitation of nature, all fences are to be considered as temporary, and therefore to a certain degree looked on as nuisances to be afterwards removed. Besides, their irregular and circuitous line is displeasing to many who do not understand ground plans, with a view to picturesque beauty, when the trees are grown up. But in geometric gardening, fences are to be considered in many cases as objects, and when not regarded in this light, their directions and limits are so minutely pointed out by the determined outline of the plantations, that the eye acquiesces in their situation and use. Fences of any common and economical description are employed to protect the trees of open avenues, open groves, and single open rows. But the more common kind are walls, which in the prominent parts ought to be well built of shaped stone, and substantially finished by raised or flat copings, bearing some relation to the copings of the simpler parapets of the house. The gates necessary in these walls, as well as in some sorts of permanent verdant fences, supply occasion for such architectural forms and lines, as are advantageous in reflecting those of the mansion, and strengthening the prevailing idea of dignity, art, and design. Every sort of fence belonging to the modern style, may be occasionally employed in the ancient, and besides walls, half sunk walls, and raised mounds with a walk at top, we may enumerate holly, yew, laurel, and other shrubs, either simple or chequered, by alternate deciduous or evergreen species, varied by arcades and standards, shorn into shapes, or in their natural growth. Hedges of flowering shrubs may also be introduced; of creepers on open palisades; and various others of great beauty may be invented, or are to be found in books on this style of gardening.

Management.—In this respect, also, the advantage is greatly in favour of the ancient style; for, as all operations of pruning and thinning in the other should be done under the eye of the landscape gardener, so all these operations here may be performed by any labourer; the object being simply to produce a straight upright smooth stem, to ascertain height according to circumstances, and allow each particular tree to attain its full size. Shearing or clipping is always a mere mechanical operation; plain hedges, and close alleys, require only a line for a guide; and in the case of arcades, or verdant sculpture, there is, or always should be, a frame of trellis work of correct design, to guide the gardener.

From the comparative brevity of this view which we have taken of planting under the ancient style, the reader will perceive, that we are far from supposing it to take the lead of the natural method, to which we now proceed, referring for more particular information to Le Blond, and other French authors; and to Switzer's *Ichnographia Rustica.*

PART II. *Planting under the Modern Style, or with a view to Picturesque or Natural beauty.*

This subject we shall consider as it respects the effect of the whole, the parts, the natural surface, species of tree, manner of planting, fences, and management.

1. The *effect of the whole,* as we have had repeatedly

occasion to observe, is always the first and the grand consideration in every work of art, whether that art has for its end the creation of objects of invention or imitation. All planting, as respects the formation of a country residence, must necessarily be materially influenced by the character and situation of the house, as the capital feature in the composition. To this feature, the leading masses of wood and lawn, answering the end of light and shade in painting, must invite and direct the eye in the general view of the place. Each must embrace it on one or on more sides, and diverge from it in masses suitable to its magnitude and the extent of the grounds, and in forms and characters of woody surface, suitable to the natural situation and the expression to be created. If the mansion is on a declivity, the principal light should embrace the front which looks down, rather than those which look up, or on either side. The views from the windows suggest this arrangement, and will point out in every other situation, whether a flat, a hill, or an irregular surface, on which side or sides, the leading masses are to have their origin. To determine their magnitude, form, and number, would be impossible, without a plan or particular case to refer to. To point out their style is sufficient, which must always be irregular like nature; generally stretch along such rising grounds as the situation affords; and, like her, always combining a certain degree of uniformity or recognizable shape, even amidst the greatest seeming deviations from this quality of figures.

As the house indicates the commencement of the masses, the character of country surrounding the scene of improvement must determine the limits and style of their termination. If the lands are laid out in regular enclosures, bounded by hedges and hedge rows, the same style must prevail in the margin of the park; at least in as many places, and to such a degree, as will produce connection; and, if possible, as much farther as will harmonize the scene within with the country without. If it is entirely or in part surrounded by forest scenery, the termination is easily and completely effected, by attending to the style of wood and species of tree prevailing without, for a moderate distance within the boundary. If bounded by the sea, or a large lake, an abrupt termination will be as natural as it would be formal on the margin of a cultivated surface.

2. The *parts* which enter into the composition of a mass of wood, and compose its varied and intricate boundary by real or apparent connection, are thickets, groups, and single plants. A single plant may either be a single tree, or a single shrub; a group, two or three plants, either of trees or shrubs, or both, connected, yet contrasted in their positions; and as they are generally planted of some size, in order to be speedily out of the reach of cattle, they ought to be contrasted in the inclination of their stems, in order, as far as art can go, to transfer a similar variety to their branches and future growth. A thicket, or, as it is called by Mr. Wheatly, a clump, (though undoubtedly he never had in his mind's eye the round and oval shapes which now pass by that name,) is a small irregular mass, or a cluster of groups, and may contain either trees alone, or trees and shrubs.

Every one of these, though considerably detached, must be considered as belonging to the nearest mass either of wood, of building, or of rocks, or some other object of magnitude which rises boldly into the air. A group, or a single tree, equidistant from every other object, can form no part of any of them; it cannot, therefore, enter into the composition of a whole, and can only be regarded as a spot in the composition, or admired for its particular beauties. Connection, therefore, real or apparent, is the leading consideration in respect to the situation, or position of thickets and groups. As we have before observed, they must be either near, or apparently near, to the masses to which they belong, so as to effect that loose and airy appearance in the boundaries of the mass, which the painter effects by the touches of his pencil in finishing the outline of a tree. For this purpose, groups, thickets, and single trees, may be used at the same time. When a considerable length of unvaried line is to be broken into parts, a thicket may stand detached from it, connected by a few straggling trees in the interval between. This thicket, in its turn, may have its boundary similarly varied by detached groups, and from these may stand out one or two single trees. The next break in the line to be varied, may be effected by two or three groups contrasted in disposition; some attached; others playing easily round them at moderate distances, but still so as to slide easily into a whole. By proceeding in this way along the most formal and monotonous line, it may not only be varied, but changed in character, so as to present every variety of prominence and recess. With respect to the distances which these parts of forms, (speaking of them always with reference to their ground plan,) ought to be from the mass and from each other, almost every thing will depend on the situation. They may be at some distance on a flat, not to be viewed from an eminence considerably above its level; because the effect of vision will, at a moderate distance, in this situation, throw a surface, scattered with single trees, into a mass of wood. But on declivities, viewed from opposite declivities or distant plains, the contiguity must be greater to form a breadth of mass. But here, as in most other instances, the practice of sketching landscape, and especially trees, will afford a more correct idea of the effect and the principle, and a more apt illustration of the practice, than a volume of the justest and most minute instructions.

Thickets may next be considered in regard to their form, that is, the form of their ground plan; and with groups and single trees in regard to the choice of species. Thickets are produced by nature, by the inroads of cattle, or other animals, grazing or cropping the herbage, and with it the young trees in forest scenery. On levels and sheltered situations, we find their form comparatively regular, because there appears no permanent or general reason to occasion their encroachment on one side more than on the other. But on varied surfaces and soils, a preference is given by depasturing animals to certain natural plants, and the side on which they abound is penetrated more deeply than the other. The plan of the thicket therefore varies accordingly. In elevated grounds exposed to a particular wind, the thickets will exceed in length, which will be found generally to be in the direction of the storm. The cause is too obvious to be pointed out; but this effect, and every other observed in the groups and thickets of natural scenery, always merit study, and most frequently deserve imitation in creations of landscape scenery.

The species of tree ought obviously to be those of the part of the mass to which they belong; for thickets, groups, and single trees, ought to resemble disjointed and broken fragments from those masses. But in particular cases, for rendering a prominence still more prominent, or increasing the depth of a recess, a few plants of similar or not discordant growths, but of darker or lighter greens, may at a distance add to the effect of each. By the same process, with more contrasted species, where no other mode can be put in execution, the formality of a single row may in some degree be varied in its situation and contour.

The *surface*, as we have already hinted, must influence in a considerable degree the form and magnitude, both of groups and masses. The beauty of all verdant scenery depends, more than on any other circumstance, on the irregularities of the ground's surface. Wood will always add to this beauty by heightening the eminences. A few trees on the summit of a knoll raise it to the character of a hill. A connected train of groups placed along the back of a ridge produce at once a bolder and more varied outline, and render a feature prominent and beautiful, which was before dull or disagreeable in expression. To plant the hills, and leave bare the vallies, is therefore a good general maxim; though carried to an undue excess, or used without taste or feeling, by Brown and other popular artists. At the first introduction of the modern style of gardening, all the hills were planted, but few of them presented more than a circular clump of a few yards diameter, perched on their summit. The country abounds in examples which ought to serve as beacons to all future improvers, and warn them against an ignorant adoption of any maxim, without duly studying its spirit and meaning. To plant a hill, is not to plant only its summit, but in all cases a part, and in many the greater part of its sides. Their beauty individually requires this; and the idea of a whole, renders their connection with other hills, by clothing more or less not only their sides, but the intermediate vallies or plains, an essential consideration. In extending this practice to mountain scenery, the powerful effect of wood may be nobly displayed by the hand of the master, who, following the idea of the poet, shall

> —— "hill to hill unite,
> With sweeping train of forest and prodigality of shade."
> MASON.

4. The *species of tree*. Were the imitation of natural woods to be the object in all cases, the variety in the plants would be limited to three or four native species, as a greater number are seldom found wild in Great Britain, within the limited extent of forest scenery, which would enter into the composition of a country residence. But if the style of nature be imitated in their arrangement, the variety may be much greater, without interfering with general effects. Nature disseminates her plants by scattering their seeds, and the offspring rise round the parent in masses or breadths, depending on a variety of circumstances, but chiefly on the facility which these seeds afford for being carried to a distance by the wind, the rain, and by birds or other animals. So disseminated, they spring up, different sorts together, affected by various circumstances of soil and situation; and arrive at maturity, contending with other plants and trees, and with the browsing of animals. At last, that species, which had enjoyed a maximum of natural advantages, is found to prevail as far as this maximum extended, stretching along in masses and angular portions of surface, till circumstances changing in favour of some other species, that takes the prevalence in its turn. In this way it will generally be found, that the number of species, and the extent and style of the masses in which they prevail, bear a strict analogy to the changes of soil and surface; and this holds good, not only with respect to trees and shrubs, but to plants, grasses, and even the mossy tribe.

With this principle of distribution, any number of species may be admitted into improved grounds; commencing with the rare sorts near the house, as the centre of art and refinement, and ending with the common trees of the country, at such distances as the extent and style of the whole may suggest. The proportions of such trees as are only ornamental, and such as are valuable as timber, must be in some degree determined by the character of the place, but chiefly by the taste and view of the owner. Beauty alone, without utility, will not long please; and a few single groups and plants of the rarer species, in the grounds more immediately consecrated to man, will generally afford more satisfaction than a lavish display of exotics; the former will always present a more luxuriant and thriving display of scenery than the latter, and sooner attain the maturity of beauty.

In determining the order of the sorts, regard must be had, not only to choose forms and colours, which will accord and form harmonious breadths of woody surface to the eye, but to place every species as much as possible in its natural situation. The more delicate sorts should be placed in sheltered, the more hardy in exposed, surfaces; the resinous tribe on hills and rocky ground, and aquatics in low vallies, banks of rivers, or dells, using caution, however, not to display an expression of moisture or bleakness, when the idea of dryness and shelter would be more desirable. In precarious situations, a thin sprinkling of the best common hardy trees, as of the oak, birch, Scotch fir, &c. should extend over the whole residence, in case of accident to the others. In such cases, it is always best to depend on the native or naturalized trees, for general effect, and confine the introduction of foreign sorts to the shrubbery or some other limited scene. Mr. Price has treated this subject with much ingenuity; and in reprobating the common practice of mixing as many different sorts as can be procured, in order to produce variety, observes, that "variety, of which the true end is to relieve the eye, not to perplex it, does not consist in the diversity of separate objects, but in the diversity of their effects when combined together, in a difference of composition and character. Many think, however, that they have obtained that grand object, when they have exhibited in one body all the hard names of the Linnæan system; but when as many plants as can be well got together are exhibited in every shrubbery, or in every plantation, the result is a sameness of a different kind, but not less truly a sameness than would arise from there being no diversity at all; for there is no having variety of character, without a certain distinctness, without certain marked features on which the eye can dwell."

5. *The manner of planting* is alike suggested by nature; and the plants ought to be inserted in such a way, that if any particular part were separately examined, it might present clusters of groups—not equidistant plants. The effect of this arrangement will not be that composition of low and high, oblique and upright stems, and young and old trees, and low growths, which we find in forest scenery; but it is all that can be done in imitation of it at the first planting; and subsequent thinning, pruning, cutting down, moving, *renversing*, planting, and sowing, must be used from time to time to complete the imitation or allusion, unless the owner will rest satisfied with an inferior degree of beauty.

In plantations of trees alone, to plant thick is, we apprehend, a great error, because it leaves so much to the risk of future management; and even should this be bestowed, the first and second thinnings are of no more use than as faggot wood; but where trees and undergrowths are mixed together, any degree of proximity may be admitted between the plants, because the trees will always overtop the low growths; and if thinning is attended to, the low growths will be of as much value during the first ten years as in the other case. The best general rule is, to put in the trees at such distances, as that, when so far advanced as to require thinning, they will have attained such a magnitude as to be of use, as poles or timber; and to fill up the intervals with under-growths, which may be removed or not at pleasure.

6. *The fences*, in imitative planting, are to be considered as only temporary; and therefore, as a general rule, the cheapest fence the local situation will afford will be the best, regard being had, that they shall endure till the trees, shrubs, and growths shall, in the given soil and exposure, have attained a sufficient age to protect themselves against the injury of sheep and cattle. The present improved state of the manufacture of iron offers a very desirable accommodation in this respect, affording the best guards for single plants and groups; and iron hurdles, or hurdles indeed of any sort for masses, have a light and temporary appearance, highly congenial to the idea of their speedy removal. The lines of the fences conforming to the irregular shapes of the masses will not be disagreeable to the eye, if those of the thickets are arranged with any regard to apparent connection; for any objects, whether lines or forms, however deficient in beauty of themselves, acquire a degree of interest, and even character, when connected and arranged in such a way as to form a whole.

When a plantation is finally to be composed both of trees and under-growths, thorns, sloes, hollies, barberries, and briars, may, in many cases, prevail in the margin, which, when the fence is removed, will form a picturesque phalanx, and protect the whole. Partial inroads, formed by cattle, will only heighten the variety and intricacy of such masses.

7. So much depends on the *future management of plantations*, that we cannot avoid expressing our deep regret that so little attention is generally paid to the subject. To consider that as finished which is only commenced, is a common failing; but in no part of landscape gardening of more unhappy consequences, both in regard to future beauty and use, than in the article of planting. A plantation is too often allowed to grow up like a field of corn, and, like it, at the end of a few years, is fit only to be swept down in a body. The beauty, grandeur, and effect of thick plantations of trees in a neglected state, is reduced inversely as their progress to maturity; for their side branches rot and drop off, the light is seen through a rank of naked stems, whose "inglorious heads," as the poet remarks, serve only to "blot the fair horizon." Thinning and pruning are the obvious means of averting these bad consequences, where the plantation consists of trees alone, or in the greater part; and the planter, from what has been already advanced, will effect this with a joint view to the value of the timber, and the picturesque disposition of the trees. But we consider it greatly preferable not to depend entirely on thinning and pruning, but to follow the suggestion given above, of "mixing a few trees with a great many under-growths." It would be a happy circumstance for both useful and ornamental planting, if this suggestion were considered as a general rule, and with that of "plant the hills and leave bare vallies," the essential part of planting would be included in the two maxims.

Sect. III. *Water.*

This material is of so captivating and interesting a description in the different characters in which it occurs in nature, that no view can be reckoned complete in which it does not compose a feature. It forms a part of every garden in the ancient style, in the various artificial characters which it there assumes of oblong canals, ponds, basins, and *jets-d'eaux*; and in modern improvement, such is the value attached to its effect, that no place is deemed perfect without a river or lake; and such is the indiscriminate desire of obtaining them, that nature has been too frequently disregarded in their form and situation. Of the characters which water assumed under the geometric style, we can only observe, that their names convey, in a great degree, an idea of the forms. Their situations were near the mansion; and their marginal accompaniments of masonry, turf walks, and hedges, were determined by the architectural forms and lines of the capital feature in the scene. The choice, from the most intricate and curious fountains to the plain oblong canal, depended on the splendour of the general design; very little on natural situation. The supply was generally obtained from some concealed reservoir. In landscape gardening, the object is to imitate lakes, rivers, or rills, and their accompaniments; and of each of these natural characters, we shall remark the leading circumstances in the originals and the imitations.

All water is either running or stagnant. Lakes, ponds, and pools, are of the former class; rivers, rivulets, and rills, of the latter description. In certain situations, lakes may be created where their supply is moderate; rivers and rills only when it is abundant. Both characters, when they exist in nature, may be improved by studying the natural characteristics of each species.

The first consideration respecting water, in whatever form it may appear, is its situation relatively to the character of the ground's surface. No situation in which this material may be supposed to exist and expand itself into a body, can be truly natural, that is not to be considered as a vale, flat, or hollow. Mountain streams are out of the question; and small lakes or pools, in hollows or elevated grounds, are more to be considered as accidental than as general nature. Even artificial lakes or rivers, on a considerable scale, to be natural, must either be, or seem to be, situated in the lowest part of the landscape then under the eye. If otherwise, if placed on the side of a declivity over which the eye can range at the same time, it may be attractive to a stranger at first view; but the want of truth or fidelity to the thing to be imitated, will soon bring on an increasing aversion in the mind of genuine taste.

Ponds, in different levels seen in the same view, are very objectionable on this principle. The little beauty they display as spots ill compensates for the want of propriety; and the leading idea which they suggest, is a question between their present situation and their non-existence. The choice, therefore, as to the situation of water, must ever depend more on natural circumstances than proximity to the mansion. Is then all water to be excluded, that is not in the lower grounds? We have no hesitation in answering this question in the affirmative, so far as respects the principal views, and when a lower level than that in which the water is proposed to be placed is seen in the same view. But in respect to recluse scenes, which Addison compares to episodes to the general design, we would admit, and even copy these ponds on the sides or even tops of hills, which we have designated as accidental beauties of nature.

A beautiful lake, or part of a circuitous body of water, considered as a whole, will be found to exhibit a form, characterized by breadth rather than length; by that degree of regularity in its outline as a whole, which confers that, which, in common language, is called shape; and by that irregularity in the parts of this outline, which produces variety and intricacy. Supposing the situation to be fixed on for the imitation of a lake, the artist is to consider the broadest and most circuitous hollow as his principal mass or breadth of water, and which he will extend or diminish, according to the extent of aquatic views the place may re quire. From this he may continue a chain of connected masses of water, or lakes of different magnitudes and shapes, in part suggested by the character of the ground, in part by the facilities of planting near them, and in part by his own views of propriety and beauty. The outline of the plan of the lake is to be varied by the contrasted position of bays, inlets, and smaller indentations, on the same principles which we suggested for varying a mass of wood. To the irregularity of outlines so produced, islands and *aits* may be added, on the same principle and for the same objects as thickets and groups. This will complete the character and beauty of the plan of the water; but the grand effect of this element in landscape depends on wood as its accompaniment. The variety and intricacy of outline, the reflection of forms and colours, the shady recesses and *flickering* lines of light, all depend on trees. These are not to be sparingly or indiscriminately scattered around the margin, but liberally in some places, for the sake of a contrasted mass of grateful colour or shade, to relieve the brilliancy of the water; and with discrimination every where to mark the beauties, and heighten the variety of the outline, without destroying breadth of effect, or a whole, either as respects the water alone, or the entire residence.

The *marginal banks* of water are next to be considered. In nature, they are tame or bold, gravelly or sedgy, stony or rocky, according to the character of the surrounding ground. Art, therefore, must imitate each in its proper place, not always by a studious picturesque arrangement of the marginal accompaniments in each case, but by excavating the ground-work, planting the trees and shrubs, and leaving the rest to the motion of the waves of the water. After the effects of one winter, stones or gravel may be deposited in spots suitable for stony or gravelly shores. But to enter into this, and many other circumstances in the imitation of lakes, would exceed the proper limits. We add two cautions. The first is, in all cases of the beautiful picturesque, so to arrange by puddling and under-draining, that a marshy appearance may not surround the lake; and that rushes, and such aquatic plants, may not extend farther than a few feet or yards from the margin of the water. The other respects islands, which are the greatest ornaments to lakes. But that island which is placed in the centre, or in any situation where it does not connect with other islands, or with the shore, so as to form part of a prominence or recess, is injurious to the effect of the whole inversely as its beauty, when properly placed.

Rivers and rills, we have said, are rather to be improved than created; for we cannot sympathise with that taste, which directs the mimicry of so noble a character as a river, or is satisfied with a nearly stagnated rill. We do not consider the river at Blenheim as an exception, because that piece of water was formed by widening a considerable brook. We allude to those wavy serpentine canals, which are never mistaken for natural scenes, and in almost every case might be advantageously exchanged for a lake.

The two leading ideas which belong to running waters, are progress and impetuosity. The first expression may be heightened by counteracting any tendency to expansion; by removing some of the circuitous and oblong projections of earth or stone in the banks; and sometimes by deepening its bed, or by substituting a more direct line for a circuitous course. The idea of impetuosity is indicated by its effects, in reverberating against high banks, or common banks, on which trees are situated, and may be increased by augmenting the cause or the effect, and thus either digging and undermining the trees, cutting down the high banks on which the water acts, or placing very slight piers as jetties on the opposite shore. Picturesque additions to the marginal accompaniments both of rivers and rills, will readily suggest themselves. Cascades and waterfalls may sometimes be created; and the occasional expansion of natural brooks into pools, affords a fine hint for imitation, when this form of water comes within a scene of improvement.

SECT. IV. *Rocks.*

It forms no part of the geometric style of gardening to imitate rocks, which are a material of the natural style equally unsuitable to be created. But though rocks cannot readily be imitated, their expression may sometimes be heightened when desirable, and concealed when disagreeable.

The character of rocks may be savage, terrific, sublime, picturesque, or fantastic. By attending to the forms of the milder characters, and their connection with ground and trees, we shall discover whether, and to what extent, they may be improved. Savage rocks are too inhospitable to be permanently admitted, in any extent, near the eye. All rocks convey something of this idea that are not accompanied by vegetation; and, therefore, planting among or near them, is in every case an improvement, where trees do not exist. All rocks are expressive of dignity; those eminently so, are not greatly varied by projections from their surface: their beauty is to be augmented, either by increasing their surface in height or depth, or by connecting it if too scattered. The removal of a few feet of earth, or part of the bushes or trees from the bottom of a precipice or ridge, and the implacement of a line of wood along its summit, will increase its real and apparent height; a similar process with respect to the sides, will add to the idea of stability and continuation. If the parts are too much scattered, a few trees placed before, or bushes or creepers planted in the intervals between the parts, will connect them, and give the idea of a whole, partly concealed. But in this case, a considerable breadth of surface is necessary, at least in one place, otherwise dignity must give way to picturesque beauty. But the least indications of rocks that are not very fantastic in their form, even including such whose chief expression is picturesque beauty, are to a certain degree expressive of dignity. The slightest indication of a stratum or ledge appearing above the surface, conveys something of the idea, and ought not to be neglected. When they are discovered by alterations in the ground with a view to the formation of roads, fences, and water, or to the erection of buildings, occasional advantage may be taken of their appearance. A road across a declivity, may be accompanied by a ledge of rocks, instead of a bank of earth. Ground merely broken and picturesque, will display a more sufficient reason for the appearance. The walls of a terrace, evidently in part founded on a rock, will give an idea of dryness, dignity, and security to the house; and the margin of a stream displaying even large stones, increases the idea of impetuosity; or in lakes, of the action of water in washing away the earth. Among imitations of wild scenery, detached stones heighten the illusion, and carry back the mind to the aboriginal state of the country. Loose or detached fragments of rocks may often aid the effect of real or supposed masses. The appearance of a large rude stone near a wooded steep, unless of one evidently rounded by water or art, always leads the mind to the larger mass up the acclivity from which it has been broken and rolled down; if partly sunk in the ground, and concealed by vegetation, the fertility of the imagination considers them as parts of magnitudes which lie buried under the surface. All this, however, can only be successfully accomplished in a country which, by the character of its general surface, does not preclude the idea of rocks. On a flat or a champaign country, the want of truth, or seeming truth, would render them disagreeable; and, indeed, did rocks exist in such a landscape, they should be hidden rather than displayed, unless of such extraordinary magnitude and effect, as to form an exception to general principles.

SECT. V. *Buildings.*

Buildings, as materials of scenery, are entirely under the power of man; and, from that circumstance, were carried to an unwarrantable excess in the decline of the ancient, and the infancy of the modern style. Improvements on ground are forgotten by their effect; that of planting may be accounted too distant or too slow by ordinary minds; but a building is complete the moment it is finished. It affords immediate satisfaction to the owner; and, being known as a costly object, full credit is given to him for the expense incurred. Thus wealth, confiding in its powers, multiplied garden buildings to an excess, which ended in creating a disgust, which still exists, in some degree, at their appearance in improved scenery. Buildings, as independent architectural compositions, are treated of under our article CIVIL ARCHITECTURE. We shall here, therefore, confine ourselves to a consideration of their effect as parts in a composition of verdant scenery, and to their natural expression in scenes of improvement in both styles of gardening.

As parts of a verdant composition. Shenstone observes, that a landscape, to him, is never complete without a building or rocks; and certainly, considering it merely in the light of a picturesque view, a building, in addition to merely verdant scenery, forms a better picture, by giving a desirable feature or resting place for the eye. Considered, however, in the light of natural expression, the meanness of root-houses, and grottos—the absurdity of hermits' cells, heathen temples, and triumphal arches, mock chapels, ruins, Chinese buildings, &c.; and the inutility of all of them, render them positive deformities in scenes of natural or picturesque beauty. The last species break in upon repose, simplicity, and all allusion to natural scenery, by their frequency, and suggest ideas of ostentatious vanity in the owner, rather than of propriety and elegance of taste. But though their excess is so general and so obnoxious, the occasional introduction of some sorts may be made with propriety. Garden seats are necessary for shade or shelter; bridges for communication between the banks of rivers or rills; cottages, gate or entrance lodges, as abodes for labourers; and open sheds, as places of resort for cattle. Even a prospect-tower is a desirable object in a flat country, affording no other means of obtaining a bird's eye view. A temple, after all, is in many cases but a garden-seat; and if beautiful in itself, and judiciously placed, we can see no objection to its introduction in the garden-scene of a princely mansion; certainly none to more than one of them, under the geometric style of planting.

To raise a monument in memory of a great public character, or consecrate an urn to private friendship, or parental memory, can hardly be offensive to any mind. A sundial is both a useful and an agreeable object; and statues and busts, in highly polished scenery, by the contrast in the kind of beauty displayed, recal the mind for a moment from contemplating the wide range of nature, to admire the hand of art concentrated in a single point. In this view, perhaps, there may be other objects of this description admissible in the more polished scenes of gardens, &c. as marble fountains, fragments of antiquity, &c. But when simplicity and natural-like beauty are the prevailing idea, all works of art must interfere more or less with the idea; and unless they can raise up and maintain a more interesting expression, they must be regarded as injurious rather than beautiful.

SECT. VI. *Of the accidental accompaniments to the permanent materials of Landscape.*

Of these, the first are *roads;* and of roads, the principal is the *approach.* This article of beauty, as well as of convenience, ought to display to advantage the beauties of that part of the place it passes through, and as many other beauties as may be displayed without shewing the principal, which are generally those of the garden front. In both styles, it ought to ascend to the house rather than descend, and pass along a flat or hollow rather than over inequalities of surface.

In the geometric style, it was generally a wooded avenue, in one or in several lines. In the modern, it is generally a bold, free, gently waving line; every turn of which is produced either by some gentle variation in the surface, or by the position of a group, or two or three single trees. It may pass through wood only, or through forest-like scenery. The first view obtained of the house ought to be as favourable as possible, and not of any particular front, but rather an angular view, bosomed in trees. The second, or, if there are two or more, the last view, on a nearer approach, should be different, and shew the entrance front, and porch, or portico; the road approaching it at such a distance, obliquely, as that the eye may now readily comprehend the whole. By an optical law, it appears, that objects are seen to most advantage when a line drawn from the centre of the eye to the summit of the building forms, with a horizontal line also drawn from the centre of the eye, an angle of 36°. But as a knowledge of optics and perspective are absolutely necessary both for an architect and landscape gardener, we have not considered it necessary, in this rapid sketch, to apply them in the case of terraces, views from rooms, views of buildings, &c. where they are of the greatest consequence to the full effect.

Walks are the next accompaniment to home scenes, without which they cannot be viewed but in particular states of the weather and the surface. They were straight, angular, or in regular curves, in the geometric style, and are in easy natural like lines in the modern manner. Though avowed objects of art, they ought always to bear a certain analogy to the scenes they pass through; with formal kept edges in highly finished scenery, and edges blending with the gravel in the picturesque manner, recommended by Mr. Price in more wild scenes. Taste must determine their general course, from the range of beauties to be displayed; and their particular turns, from local beauties and accidental circumstances. The principle of a *sufficient reason* ought never to be lost sight of, in laying out walks and roads.

One of the finest descriptions of hill or mountain walks is, where it is carried along the side of an irregular declivity on a perfect level; such were called terrace walks in the ancient style, and two fine specimens exist at Lowther Castle, near Carlisle, and at Craigie-Hall, near Edinburgh.

A walk by a wooded river, retiring from and meeting the stream, is one of the most interesting of valley walks, of which there are fine examples at Downton Castle, near Ludlow, and Dalkeith, near Edinburgh.

Fences are necessary accompaniments in both styles, and have been already considered in some degree, in treating of the permanent materials of scenery.

Animated nature. Deer, wild and tame hares, cattle, sheep, game, singing birds, all belong to a residence, and are necessary to complete its beauty. Pheasants and other game, ranging, undismayed by man, in garden scenes, give a high idea of seclusion and removal from common nature. The cawing of rooks, the shrieking of the owl, the screams of peacocks, the notes of birds, are all desirable circumstances in certain situations, and ought to be attended to, by introducing such trees or plants as are favourable to their increase. The smoke of a cottage, or a farm house; the view of a distant village, or the spire of a church, become interesting in certain views; and, with a thousand other instances of natural expression, in a great measure beyond the reach of art, will be sought for and turned to account by the judicious artist.

CHAP. IV.

OF THE UNION OF THE MATERIALS OF GARDENING, IN FORMING THE CONSTITUENT PARTS OF A COUNTRY RESIDENCE.

Having now applied the principles of natural and relative beauty to the materials of gardening separately, we shall next apply the same principles to the formation of those scenes of use, convenience, or elegance, which form the constituent parts of a country residence.

1. *The Mansion and Offices* first demand attention, as the central feature of art and refinement. What relates to the design of these groups of buildings, belongs to ARCHITECTURE; but the situation, aspect, style, and accompaniments, are within our province.

In determining the *situation*, a great variety of circumstances, some of a general, and others of a local or peculiar nature, require to be taken into consideration. Natural shelter, dry subsoil, the view of the house as seen from a distance, and distant prospect, belong to the former; and removal from the boundary or a public road, suitableness of the adjoining grounds for the garden scenes which accompany mansions, trees already there, or so situated as to aid the effect, &c. belong to the latter.

The *aspect* of the principal rooms deserves particular attention in every case, but more particularly in bleak or exposed situations. The south-east is, most commonly, the best for Britain; and the south, and due east, the next best. The south-west Mr. Repton considers the worst, because from that quarter it rains oftener than from any other; and the windows are dimmed, and the views obstructed, by the slightest shower, which will not be perceptible in the windows facing the south or east. A north aspect is gloomy, because deprived of sunshine; but it deserves to be remarked, that woods and other verdant objects look best when viewed from rooms so placed, because all plants are most luxuriant on the side next the sun. "The aspect due east," Mr. Repton considers "nearly as bad as the north, because there the sun only shines while we are in bed; and the aspect due west is intolerable, from the excess of sun dazzling the eye through the greatest part of the day. From hence we may conclude, that a square house, placed with its front duly opposite to the cardinal points, will have one good and three bad aspects." *Fragments on Landscape Gardening, &c.* p. 108.

A mansion in the country, if a mere square or oblong, will thus be deficient in point of aspect, and certainly in picturesque beauty, or variety of external forms, lights, and shades. An irregular plan, composed with a combined view to the situation, distant views, best aspects to the principal rooms, effect from different distant points, and as forming a whole with the groups of domestic offices, and other masonic appendages or erections, will therefore be the best; and as the genius of the Gothic style of architecture is better adapted for this irregularity than the simplicity of the Grecian, or the regularity of the Roman manners, it has been justly considered that the Gothic is, on the whole, the best style for country residences. Another advantage of an irregular style is, that it readily admits of additions in almost any direction.

Convenience, as well as effect, require that every house ought to have an entrance and a garden front; and, in general cases, neither the latter, nor the views from the principal rooms, should be seen fully and completely, but from the windows and garden scenery. Not to attend to this, is to destroy their contrasted effect, and cloy the appetite by disclosing all, or the greatest part of the beauties at once. The landscape which forms the back ground to a mansion, the trees which group with it, and the architectural terrace which forms its base, are to be considered as its accompaniments, and influenced more or less by its style. The classic pine and cedar should accompany the Greek and Roman architecture, and the hardy fir, the oak, or the lofty ash, the baronial castle.

2. *Terrace, Garden, and Conservatory.* We observed, when treating of ground, and under the ancient style, that the design of the terrace must be jointly influenced by the magnitude and style of the house, the views from its windows, (that is, from the eye of a person seated in the middle of the principal rooms) and the views of the house from a distance. In almost every case, more or less of architectural productions will enter into these compositions. The level or levels will be supported partly by grassy slopes, but chiefly by bevelled walls harmonising with the lines and forms of the house. These, in the Gothic style, may be furnished by battlements, gateways, oriels, pinnacles, &c.; or, on a very great scale, watch towers may form very picturesque, characteristic, and useful additions. The Grecian style may, in like manner, be finished by parapets, balustrades, and other Roman appendages.

The grounds enclosed by the terrace walks are generally laid out in what may be termed terrace gardens, or borders of low select evergreen shrubs, roses, and flowers, and in a convenient place was formerly added a bowling-green. Connected with this scene, and with the library, or some other public room, should be placed the conservatory; which, in the present improved state of horticultural architecture, and chiefly by the invention of a solid iron sash bar, may be formed of any shape, extent, and dimension; and so as thus to admit the full growth of the plants, &c.[*]

3. *Flower Garden and Green-house.* When all the hot-houses, that are not mere forcing-houses, are attached to the conservatory, so as to form one extensive range, which is much the most desirable mode, the green-house may be placed in the flower garden; and both should be at no great distance from the terrace. There are various styles of flower-gardens; from those combining some degree of picturesque beauty, to the Dutch parterre, laid out in parallelograms or oblong beds. See HORTICULTURE.

4. *Winter Garden and Hot-houses.* The name suggests the proper trees, shrubs, and flowering plants of this scene. Where the pine, camelia, rose, exotic and plant stoves are not placed in the kitchen-garden, or arranged in connection with the conservatory *en suite* with the principal rooms, they may be placed in the winter-garden, and connected by a glazed passage with the house. The arrangement of

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[*] See "*Remarks on the Construction of Hot-houses*," &c. 4to, 1817, and "*Sketches for Curvilinear Hot-houses*," 1810; Harding, St. James' Street. The bar, leading to so important an improvement, is manufactured by W. and D. Bailey, 272, Holborn, London.

plants in the stoves and winter-garden may either be natural, that is, in groups of each kind, in imitation of natural scenery, or according to Jussieu's *Systema Naturæ* Almost any arrangement is better than the common mixture, in which the only guide is the height of the plants.

The Kitchen Garden should be placed near to, and connected with the winter-garden, with concealed entrances and roads leading to the domestic offices for culinary purposes, and to the stables and farm buildings for manure. In these, if not otherwise disposed of, may be placed the forcing-houses. For what concerns the design of kitchen-gardens and orchards, see **Horticulture**.

These scenes, in the ancient style, with massy stone walls or ornamented gates, and crossed by immense holly hedges, were at least more grand in effect than the modern gardens.

6. *Orchard*, the situation of this should, all other circumstances being suitable, be near to the garden; and between them may be very properly placed the gardener's house; connected with the furnace, sheds, fruit rooms, &c. An elevated room, commanding a view of both scenes, should be adopted as the bed-chamber of the principal gardener; from this room wires may be conducted to each forcing house, and there attached to *Kewley's alarm thermometer*, one of which should be placed in each house in a state of forcing. This thermometer, on the least, or on any given depression or elevation of the mercury from the desired temperature, will ring the bell, and the master gardener can then, by means of a speaking tube, communicating with the journeymen's room, issue proper instructions as to the particular house requiring an accession of fuel, &c. In like manner, if necessary, wires may be stretched across the orchard in different directions, and about three feet from the ground, which by being pressed against by any intruder, will set off an alarum, or discharge a spring gun in the orchard, and ring a bell in the master gardener's prospect room.

7. The term *lawn* is applied to that breadth of mown turf in front of, or extending in different directions from the garden front of the house; in the geometric style, varied by architectural forms, levels, and slopes; and in the modern, by a picturesque or painter-like disposition of groups, placed so as to connect with the leading masses, and throw the lawn into an agreeable shape or shapes. In very small villas the lawn may embrace the garden or principal front of the house, without the intervention of terrace scenery, and may be separated from the park, or park-like field, by a light wire fence; but in more extensive scenes it should embrace a terrace, or some avowedly artificial architectural basis to the mansion, and a sunk wall, as the distant separation will be more dignified and permanent than any iron fence. The park may come close up to the terrace garden, especially on a flat, or in many cases where the breadth of this scene is considerable.

8. *The shrubbery* is a scene in which the object is to arrange a collection of foreign trees and shrubs in a dry border, generally on the north side of a walk, or in dug groups and patches. In either case there are three leading styles of arrangement, preferable to the common mode of indiscriminate mixture, which we have mentioned under *winter garden*.

Whatever arrangement is adopted, one very principal consideration is, to connect, partly in appearance only, the dug patches. The distinct unconnected obtrusion of such scenes is justly reprobated by Mr. Price, who gives excellent instructions for creating the beautiful picturesque among dug groups, and preserving all the polish and appearance of high keeping with the most delicate culture of the plants.

9. *The pleasure-ground* is a term applied generally to the kept ground and walks of a residence. Sometimes the walk merely passes, in a winding direction, through glades and groups of common scenery, kept polished by the scythe, and from whence cattle, &c. are excluded. At othert imes it includes a part of or all the scenes above mentioned; and may include several others; as episodes, verdant amphitheatres, labyrinths, a Linnean, Jussuian, American, French, or Dutch flower-garden, a garden of native, rock, mountain, or aquatic plants, picturesque flower-garden, or a Chinese garden, exhibiting only plants in flower, inserted in the ground, and removed to make room for others when the blossom begins to fade, &c.

10. *The park* is a space devoted to the growth of timber, pasturage for deer, cattle, and sheep, and for adding grandeur and dignity to the mansion. On its extent and beauty, and on the magnitude and architectural design of the house, chiefly depend the reputation and character of the residence. In the geometric style, the more distant or concealed parts were subdivided into fields, surrounded by broad stripes or double rows, enclosed in walls or hedges, and the nearer parts were chiefly covered with wood, enclosing regular surfaces of pasturage.

In the modern style, the scenery of a park is intended to resemble that of a scattered forest, the more polished glades and regular shapes of lawn being near the house, and the rougher parts towards the extremities.

The paddocks or regular enclosures are generally placed between the family stables and the farm.

11. *The Farm*, or that portion of agricultural surface retained in the hands of the owner for private cultivation, was, in both styles, placed without, but adjoining the park; and when circumstances admitted, near to the paddocks. In some cases, on a moderate scale, part of the park constitutes the whole, or a part of the farm, and is kept in aration. The trees in this cultivated space are arranged in natural-like masses, so as to give the idea of part of a forest scene subjected to the plough. When the park is extensive and truly forest like, the effect of the whole is much improved by the contrast, and recalls to mind those charming scenes in the woody districts of Germany, where cultivation smiles in the glades and recesses of eternal forests.

12. *The Riding*, or drive, is a road indicated rather than formed, which passes through the most interesting and distant parts of a residence not seen in detail from the walks, and as far into the adjoining lands of wildness or cultivation, as the property of the owner extends. It is also frequently conducted as much farther as the disposition of adjoining proprietors permits, or the general face of the country renders desirable.

In Plates CCCXLIII. and CCCXLIV. the whole of these scenes are arranged in the usual manner, and nearly as above described; the one plate representing what may be called a vertical profile of a complete residence of the first rank in the geometric, and the other in the modern style. But though the arrangement exhibited in these plans will be found in general the most convenient in a flat surface, or one gently varied, we are far from recommending their universal adoption. Situations are always fertile in suggesting new ideas, which

> "Start even from difficulties, strike from chance;"

and a mind already stored with a knowledge of every part of the subject works from principles, and natural suggestions, rather than models. We would rather see an original idea attempted than the most beautiful arrangement imitated.

Plate CCCXLV. shews, in two general views, the effect of both styles; and Plate CCCXLVI. to be afterwards described, is the working ground plan of Plate CCCXLIV.

CHAP. V.

Of the Union of the constituent Scenes in forming Residences of particular Characters.

In the preceding chapter we have given a general idea of the parts or scenes, and their connection, which enter into a palace or a complete residence of the first order. We have now to notice their arrangements in different gradations of style, and these we must previously acknowledge are so intimately blended, that we hardly know how to separate them, and give a distinctive character to each; every country gentleman, from the occupier of the mansion to the cottage, adopting such luxuriant scenes as suit his particular taste, without reference to any thing but his own desires; and this happy circumstance contributes, perhaps as much as the difference of situations, to the variety in the beauty and style of country residences. Mansions, villas, ornamented cottages, temporary residences, and public gardens, may be said to include the leading distinctions.

1 *Mansions.* As a specimen of this style, we shall give the arrangement at Michel Grove in Sussex, the residence of R. Walker, Esq. from the works of Mr. Repton.

“ In determining the situation for a large house in the country, there are other circumstances to be considered besides the fences and appendages immediately contiguous. These have so often occurred, that I have established in imagination certain positions for each, which I have never found so capable of being realized as at Michel Grove.

“ I would place the house, with the principal front, towards the south-east.

“ I would place the offices behind the house; but as they occupy much more space, they will of course spread wider than the front. I would place the stables near the offices. I would place the kitchen-garden near the stables. I would put the home farm buildings at rather a greater distance from the house; but these several objects should be so connnected by back roads as to be easily accessible.

“ I would bring the park to the very front of the house.

“ I would keep the farm or land in tillage, whether for use or for experiment, behind the house; I would make the dressed pleasure-grounds to the right and left of the house, in places which would screen the unsightly appendages, and form a natural division between the park and the farm, with walks communicating to the garden and the farm.”

2. *A Villa*, being originally a farm house, we think that the Roman arrangement, in which the farm offices were joined to, or at least so near, as to form with it and the domestic offices one group of buildings, might be adopted as a characteristic distinction of this class of residences. The farm buildings should, in this case, be dignified with more architectural design than when placed at a distance; but still in due subordination to the mansion. Instead of deer, sheep may graze the park on the garden front, separated from the house by an architectural barrier, or in some situations, with a platform of gravel, and walks and knots of flowers. A glacis of turf, with a light fence below the slope, will be sufficient protection from sheep or cattle, and not impede the view of the lawn from the windows. The entrance-front may be approached through grass fields, not separated with common, but with picturesque fences in the modern, and double hedges and slips of planting in the geometric style.

If a corn field is seen from the approach, it will heighten the expression of a villa or gentleman's farm.

All or any part of the other constituent parts of a mansion, such as hot-houses, gardens, orchards, pleasure-grounds, &c. may or may not be added, according to its extent, and the particular taste of the proprietor.

But the great number of villas adjoining large towns cannot have this characteristic distinction of a villa; they may therefore be designated *citizens' villas*, as a variety of the species.

3. *An ornamented Cottage*, we think, might be characterized by the garden front opening into a picturesque orchard; or a lawn, varied by groups of fruit trees, instead of a lawn or park planted with forest trees. It may contain any part of the scenes of the villa, at the will of the owner.

If the situation of the house is elevated, so as to give a view from the principal rooms of a great part of the farm, it will be the more desirable. A desirable foundation for this improvement is an old English farm-house; by adding to which one or two principal rooms, a very interesting group may be formed at little expence.

4. *Temporary residences*, as marine villas, sporting or shooting boxes, seldom contain much land attached. No hot-houses, and but little pleasure-ground, is here required. What land there may be, should be applied to use rather than to beauty. Speaking of hunting boxes, Mr. Marshall observes, “ a suit of paddocks should be seen from the house; and if a view of distant covers can be caught, the back ground will be complete. The stable, the kennel, the leaping-bar, are the appendages, in the construction of which simplicity, substantialness, and conveniency, should prevail.”

5. *Public gardens.* These, with very few exceptions, have been in all ages and countries laid out in the geometric style. The Academus at Athens is an ancient example. The summer garden at Petersburgh, a modern one. Even in China, where irregularity in gardening is so much desired in general, Mr. Ellis (*Journal of the Embassy of* 1816) informs us, that “ the Fatee gardens at Canton, the resort of the fashionables, consist of straight walks;” and however much our gardening has been praised and copied by private persons on the continent of Europe, yet, with the exception of Count Rumford's walk at Munich, and the late Earl of Findlater's at Carlsbad, almost all the others are very properly in straight lines.

The object of public gardens is less to display beautiful scenery, than to afford a free, wholesome air, and an ample uninterrupted promenade, cool and shaded in summer, and warm and sheltered in spring and winter. In a limited extent, these must be attempted in one principal walk, which, for that purpose, should, as much as possible, be laid in a north and south direction. In more extensive scenes, certain covered walks may be devoted to summer, and certain east and west open walks to spring and winter. The broad, open, and narrow covered avenues of the ancient style, are valuable resources on a large scale; these conjoined, and laid out in a south and north direction, give in the centre an opened sheltered sunshine walk in mid-winter; and a close or covered avenue, being lined out along each side of the open central one, will afford shady walks for summer, and occasional places of retreat from casual showers in spring. Oxford and Cambridge afford some fine, open, and covered avenues, though far inferior to many on the continent.

Public squares, of such magnitude as to admit of being laid out in ample walks, open and shady, are almost peculiar to Britain. The grand object is to get as extended a line of uninterrupted promenade as is possible within the given limits. A walk parallel to the boundary fence, and at a short distance within it, evidently indicates the maximum of extent; but if the enclosure is small, the rapid succession of angles and turns becomes extremely disagreeable, and continually breaks in upon the *pas des promeneurs*, the conversation of a party, or individual contemplation. The angles, therefore, must be avoided, by *rounding them off* in a large square; in a small one, by forming the walk into a circle; and a small parallelogram, by adopting an oval form.

Russel Square, laid out from a design of Mr. Repton in 1810, is one of the most complete in these respects in London. It has been objected to as over-planted; but this is only a piece of vulgar injustice, applied indiscriminately to every rural artist, all of whom, as a matter of course, conclude, that when magnitude effects the purposes of number, the superfluous plants will of course be rooted out.

These remarks on public *walks* and squares are also in a great measure applicable to promenades *en cheval*, regard being had to the difference in point of extent. Such promenades are scarcely known in Britain; but are sources of considerable splendour and entertainment on the continent. The Moscow promenade of the first of May, held in a natural birch forest, which formed the burial place of the Germans in Peter the Great's time; a similar one at Bielany, near Warsaw, held in a fir wood on the Banks of the Vistula; and the numerous promenades of the Prater (chap. i. sect. 5.) are eminent examples. Britain has at present only the inferior and ill arranged resource of Hyde Park; but the Regent's Park, begun in 1810, chiefly from the design of the late surveyor of woods, Mr. Fordyce, will enable us to cope with, if not to surpass our continental neighbours. In this design some regard has been had to both styles; for though the leading roads are in geometric lines, part of the trees are in groups, and a piece of artificial water is of an irregular shape. According to our idea, however, the original intention of Mr. Fordyce, and the beauty and use of the whole to the public, will be much injured by certain additions to the plantations, of surrounding streets and interspersed villas, which can only be made from motives of profit, unworthy, one would suppose, of a *park royal*. The recent walks, formed on the Calton Hill at Edinburgh, under the direction of Mr. Jardine and Mr. Stevenson, and certain proposed equestrian promenades in other directions, will add to the elegance of that city, already so richly endowed with local beauties.

CHAP. VI.

Of the Practice of the Art of laying out Grounds.

The question has been agitated by some respectable authorities, whether every proprietor ought not to become his own landscape gardener; to which Mr. Repton replies, "that had the art still continued under the direction of working-gardeners, or nursery-men, the proprietor might supersede the necessity of such landscape gardeners, provided he had previously made this art his study; but not (as it is frequently asserted) because the gentleman who constantly resides at his place, must be a better judge of the means of improving it, than the professor, whose visits are only occasional; for if this reason for a preference were granted, we might with equal truth assert, that the constant companion of a sick man has an advantage over his physician.

"Improvements may be suggested by any one; but the professor only acquires a knowledge of effects before they are produced, and a facility in producing them by various methods, expedients, and resources, the result of study, observation, and experience."

"He knows what can and what cannot be accomplished within certain limits. He ought to know what to adopt, and what to reject; he must endeavour to accommodate his plans to the wishes of the person who consults him, although in some cases they may not strictly accord with his own taste." *Observations on Landscape Gardening*, p. 10.

A more wise plan than that of doubting on the subject, would be, to have the separate opinions of different landscape gardeners and architects, for no opinion need be followed if disapproved of; while the probability is, that there would be something valuable in each, and the proprietor might finally, aided by the artist he preferred, decide for himself, never, however, forgetting the idea of a consistent and beautiful whole. As to the expense, Girardin observes on this subject, "N'allez pas le regarder . . . il vous en coutera bien d'advantage pour des variations, et des retouches continuelles."

The intimate connection between landscape gardening and architecture, and the propriety and advantage of the joint consultations of the landscape gardener and the architect, as to the situation, aspect, and style of the house, together with the almost unavoidable encroachments of the former on the latter, by designing and executing garden buildings, has given rise to an opinion, that the landscape gardener ought to combine the functions of the architect. Mr. Repton justifies the idea, by referring to the many excellent houses built by Brown, with no other knowledge than that acquired by observation of all the best houses; and of Kent, who was at once landscape gardener, architect, and historical painter. We are of opinion, that in the case of garden buildings and small villas, or ornamented cottages, the knowledge both of the theory and practice of architecture, which it is necessary every landscape gardener should possess, will enable him to combine the duties of both professions; but such are the advantages of a division of labour in the fine as well as in the useful arts, that in all more extensive buildings, and indeed even in those we have mentioned, we would recommend the employment of a regular architect, jointly with a landscape gardener, as a surgeon consults with a physician in important cases.

The duties of the landscape gardener resolve themselves into the formation of a plan or design, and the carrying of it into execution.

Sect. I. *Of the Study of the given Situation, and Circumstances, and formation of a Plan of Improvement.*

On whatever occasion the opinion of a landscape gardener is desired, he should be furnished with a written or verbal instruction as to the points to which he should chiefly direct his attention, with a complete map of the estate, an accurate detailed history and description of its localities and peculiarities. From these, and such other particulars he will be able to procure from topographical and county surveys, and similar works, after a residence of a few days or weeks, according to the extent of the subject and season of the year, (spring, before the leaves expand, being [illegible] me.) every requisite information; and [illegible] memory every thing relating to the [illegible]. He is then, and not before, to em- [illegible] the ideas of improvement, directing his attention [illegible] the situation and aspect of the house and offices, the extent of the park, and the emplacement of the kitchen garden; next to the general masses of wood, and then [illegible] to the [illegible] of lawn, the situation and character of water, the pleasure ground, farm, and other details. Before making up his mind on any part of the subject, he will often find it of importance to have sections taken of the grounds in different directions, levels of springs and rills, &c. and most frequently he will have occasion for stakes, for marking out lines on the ground; of flag-staffs or poles, from 6 to 50 feet high, to represent the effect of trees, and other objects; of strips of white sheeting, to shew the effect of water, by forming a white outline on a perfect level; of frames partially covered with boards, to shew the effect of buildings; and he may even require boring irons, or pits dug, in order to inquire into the nature of the subsoil. Being furnished with a plan of the present state of the grounds, such for example as of Plate CCCXLVI. which represents Plate CCCXLIV. in its previous state, he will, as he makes up his mind on particular improvements, mark them down on this map in pencil; and when the whole is finally adjusted, he will put them in red, or in any distinguishing colour, as is done in Plate CCCXLVI. by dotted lines. And on one or more general or panoramic views, as well as on the particular views which he may have taken on different spots, he will also mark in red the outlines that will be made by the improvements adapted to the different situations. In addition to these, he will shew the effect, by geometrical sections taken in different directions across the grounds, several of which, to shew the ground's surface, appear in Plate CCCXLVI. His next operation is to make a vertical profile, such as Plate CCCXLV. shewing the effect of the whole, supposing the alterations to be fifteen or twenty years completed, with such corresponding, panoramic, or general views, as are contained in Plate CCCXLIV. and with particular landscapes. It remains for him to give reasons in writing for all that he proposes; a practice which no employer or artist should ever omit to have done, as such opinions remain as data, to be referred to concerning the management and future effects, as well as in point of present or future justification of the taste, both of the artist and proprietor. This may be done in the following order: 1. Recapitulating the given instructions; 2. The characteristic of features, and other details of the given situation and vicinage; 3. A description of, with the reasons for, the general outline of improvement; 4. The description of, with the reasons for, the detail; 5. An outline of the future management; 6. Directions for the execution; and 7. An estimate of the expense.

In all these discussions, proper references will be made to the maps and sketches. Simple language will of course be employed in describing future effects; but, above all, simple sketches, which shall owe little of their effect to shading, and none to colouring, or finishing, are essentially necessary.

Mr. Girardin seems to have been the first who suggested this mode of obtaining an opinion systematically; and his remarks on the fallacious effect of beautiful drawings, instead of outlines, are well deserving of attention. "Vous tâcherez même que cette esquisse ne soit qu'un simple trait, et ne présente d'abord que les formes principales des objets, et la disposition générale des grandes masses de votre ensemble. Un dessein bien finie ne manquera pas de vous seduire par l'agrément de la touche d'un habile artiste; vous vous determineriez d'après un dessein dont vous ne reussiriez peut-être pas à obtenir l'effet dans la nature, et il faut bien mieux avoir à gagner qu'à perdre dans l'execution."

Mr. Repton has the merit of first employing this system elegantly and extensively in England, and of adopting, instead of one entire lasdscape to shew the previous state, and another to shew the effect of the alterations, a slip of paper of the size and shape of those parts of the landscape which require alteration. This is fixed at one edge of the entire landscape, and lies flat over part of it, so that when lifted up it shews the full effect. It must be confessed, however, that though an elegant mode, it is not perfectly fair, since the view in which the cut paper forms a part can never look so well as the other, even from the mere circumstance of the bounding line of the paper. For some cases, however, it may be used, though in general it will be found, that two entire landscapes afford the most impartial means of judging of the effects of an improvement. The discussion and sketches of the place and improvements being finished, and bound in a book, the ground or working plan, Plate CCCXLIV. is to be put on canvass, or copied on parchment, for the common use of the gardener, or whoever sets out the work; and the profile, Plate CCCXLV. put on rollers, to be preserved along with the *red-book* of the place. These being delivered to the proprietor, he will determine, after mature deliberation, whether or not he will adopt the whole, or any part of the improvements, previously consulting those friends, whose taste or judgment he considers adequate to forming a judicious opinion on the whole, or on any one part of the subject. "Lorsque l'esquisse de votre ensemble sera faite, alors vous réfléchrez, vous concerterez, vous discuterez avec des gens de goût l'ordonnance générale de la disposition qu'elle vous presente."

In this example of forming a plan, we have chosen a dull and nearly flat site where nothing has been done; but it is evident, that the same general principles are applicable to such places as are to be altered, diminished, or enlarged.

Sect. II. *Of carrying a Plan into execution.*

Whether this must be done by contractors, or by the proprietor at his own risk, must depend on circumstances, both respecting the knowledge, taste, and leisure of the proprietor, and the nature and extent of the improvements. Where an entire new house and grounds are to be created, an eminent substantial contractor for the buildings, and another for the ground operations, will be found the most speedy and certain as to expense; the work, in both cases, being liable to be regularly examined at stated periods by a neutral surveyor, accompanied by the original designer of the improvements.

If this mode is not adopted, the whole, or greater part, may be done under the eye of the owner and his steward; various, and as many parts as possible, being let by the job. We shall take a cursory view of the chief objects of alteration or addition, and indicate some things in each, which may in most cases be more profitably done by the job, premising, that whenever the cost or intricacy of any piece of work is considerable, unless a contractor of some respectability is employed, the work is much better done by the labourers of the proprietor.

Buildings. All alterations, or new erections, may be readily estimated and executed by contract, and almost in every case at less expense to the proprietor. The mere difference between the trade price and the gentleman's price of the materials and labour, and between the hours kept and the quantity of work done in a given time by a journeyman to a master tradesman and to a gentleman, will (if the former should, by error in estimating, find no other gain,) afford a certain profit to the tradesman; and thus, suppose a contractor to estimate a piece of work at *L*1000, and which the proprietor, changing his mind, instead of letting to the contractor, executes it himself, and finds the amount *L*1100, the contractor, had he got the job, would have actually had a profit, and the owner been a gainer of *L*100.

The mansion, domestic and farming offices, garden walls, and hot-houses, may all be separately contracted for.

Ground. The removal of ground, fences, or digging, may in every case be let by the job, and with decided advantage to both parties. The extent of particular contracts should, of course, be in proportion to the responsibility of the contracting parties.

Planting. The enclosures and the preparation of the soil may, in all extensive cases, be executed by contract; but the planting, or insertion of the plants, on which so much depends, should uniformly be done by day work; excepting, however, those cases, in which a respectable nurseryman will engage to put in a certain number of plants, of a certain kind, size, and age, and maintain them there for at least three years. In some extensive cases, the land may be prepared by fallowing, which the adjoining tenants will generally undertake at a very moderate price per acre In most cases, the contractor for fences, of whatever description, should undertake to uphold them for a given number of years; and in cases of thorn hedges, or other live fences, until they become sufficient barriers.

Road and Walk making may frequently be contracted for; but in this case, as in every other, much will depend on the skill, activity, and experience of the gardener or general overseer.

SECT. III. *Description of Plates CCCXLIII. CCCXLIV. CCCXLV. and CCCXLVI combining a concentrated view, both of the Geometric and Modern Gardening.*

These plates represent specimens of residences laid out both in the geometric and in the modern style. Plate CCCXLV. Fig. 1. is a profile of a complete residence in the geometric manner, the trees supposed to be of fifteen years growth. The situation, as far as respects natural surface, is dull and uninteresting, being nearly a flat, but with a gentle rise or ridge, running east and west near the centre, and on which the house, hot-houses, and gardens, are placed. The surrounding country is supposed to be in a comparatively uncultivated state, either mountainous or flat, with remains of natural forest scenery. Such situations abound in Ireland and Scotland, and are to be found also in some English districts, as in Yorkshire, between Malton and Whitby.

The object of art is to create a magnificent, and at the same time a comfortable residence; and amidst such wild and uncultivated scenes, we consider this will be better effected by adopting the ancient than the modern style of gardening. For imitations of nature, surrounded by nature itself, will ever be surpassed by the original, and lose half their beauty from the want of contrast; but scenes of bold and avowed art, in such a situation, raise at once a character striking and original, and convey a thousand interesting ideas of human art, industry, and refinement, which would be wanting to the other; and the wild scenery around, while it strengthens these ideas, is itself by contrast, heightened in expression. Even on the plea of the superiority of natural to artificial beauty, it may be said in favour of adopting the ancient style in such cases, that no existing beauty is lost, while much new beauty is created. In such a situation, very few external circumstances can be supposed to influence the arrangement of the component parts of the residence. The house, therefore, is placed near the centre of the park, on the ridge already mentioned, and with a south-east aspect.

No. 1. Plate CCCXLIII. Is the covered entrance, through a Gothic arcade, with the porter's lodge (No. 2., at one end, washed by the waters of the moat, and the entrance hall (No. 3) at the other. No. 4. Is the grand stair-case, of the whole height of the building, and lighted from windows above the general roof. No. 5. Is a chapel, with a billiard room under. No. 6. Is the library, communicating with a conservatory, green-houses, and hot-houses, at No. 7. and by an elegant Gothic cloister (No. 8. under the chapel) with the drawing and dining rooms at Nos. 9, and 10. The rest of the internal arrangement is easily conceived. The whole building is supposed to be roofed flat, and covered with lead. No. 11. Is the kitchen court. No. 12. The domestic stables and coach-houses, &c. No. 13. The farm yard and farm. No. 14. The paddocks. No. 15. The walled orchard, with No. 16. a fruit tree border surrounding it. No. 17. Is the kitchen garden. No. 18. The forcing-houses, with mushroom sheds, gardeners' lodges, furnaces, &c. behind. No. 19. The gardener's house, and watch room over. No. 20. The melon ground, and pits for forcing asparagus, roses, growing young pines, &c. No 21. Heaps of compost. No. 22. Back road for manure and fuel. No. 23. Modern flower garden, covered with wire netting, and serving as an aviary. No. 24. Water-engine house for forcing water to cisterns in the hot-houses. No. 25. Upper terrace garden, with No. 26. a jet d'eau. No. 27. Under terrace, or lawn. No. 28. Descent to the water, with a view to sailing or fishing from a boat, or setting off floating-bait, &c. No. 29. House for fishing tackle, and for fishing from in hot or rainy weather. No. 30. Pleasure ground, consisting of broad gravel walks, accompanied by an equal breadth of turf, and bordered by a phalanx of shrubs, rising in gradation to the highest trees, and arranged in the Linnæan manner. One half of these walks will generally be in shade, and the other fully exposed to the sun, so that a choice may be made according to circumstances. No. 31. French parterre. No. 32. Labyrinth. No. 33. Forester's house, with banquetting room over. No. 34. Natural forest scenery, blended and harmonized with the artificial plantations. No. 35. West entrance. No. 36. Fountain which supplies a jet d'eau in the French parterre, (No 31.) and also in part supplies the large lake. No. 37. Large triangular field, enclosed by fences, in the directions of the bounding strips, and under the trees. No. 38. Unenclosed meadow land beyond the park, harmonized by (No. 39.) rows and scattered trees. No. 40. Open arable lands. No. 41. Public road. No. 42. Principal entrance. No. 43. Park, which may or may not be subdivided by hurdle fences, in the directions of the strips and avenues. No. 44. Embattled avenue. No. 45. Avenue of platoons. No. 46. Walk to the farm. No 47. Winding walks in the natural forest scenery.

Fig. 1. of Plate CCCXLV. represents a general view of this residence.

Plate CCCXLIV. is a profile of a complete residence in the modern style of laying out grounds; the trees, as in the other specimen, being supposed, with the exception of such as were already there, to be of fifteen years growth.

This situation, as far as respects surface, is supposed to be exactly the same as the other, a flat, with a ridge or rise in the middle; but, instead of being situated in a wild country, it is supposed to be surrounded by cultivated fields, enclosed and subdivided by hedges, strips of plantation, walls, and other fences. A magnificent and comfortable residence is, in such a situation, to be created by a more refined display of art and human industry than in the former case; and wild nature, now banished from the general surface of the country by extended cultivation, is to be invited back, as a more elevated and distinguishing description of beauty, partly as being more rare, and calculated to strike by contrast, and partly as being more suitable to the taste and notions of man, after a certain progress in civilization and refinement.

Scarcely any motive but general convenience can here be supposed to influence the situation of the house; the offices and gardens are disposed on the contrary side to the other, merely to afford some difference between the two designs; but their general form, style, and elevations, are nearly the same, in order to exclude any classical associations which a Grecian building might have introduced, and thus have occasioned a partial judgment as to the effect of the new style of gardening, compared with that of the ancients.

No. 1. Is the entrance portico for carriages to drive under, a mode which should never, in our opinion, be omitted eieither in public or private buildings; for what can be more ridiculous and inconsistent with our general attention to comforts and luxuries, than issuing from a warm room, and walking half a dozen yards in the rain or wind to enter a carriage? No. 2. Hall and grand stair-case leading to a cloister on the first floor, extending round the quadrangle, and communicating with No. 3. the family stair. No. 4. Stair for married strangers. No. 5. Stair for single strangers, &c. No. 6. Dining room. No. 7. Library. No. 8. Drawing room. No. 9. Music room. No. 10. Kitchen side. No. 11. Chapel. No. 12. Conservatory. No. 13. Glass varandah, or passage open on both sides, with a glazed roof, under which vines may be trained, leading to No. 14. Aviary, or garden covered by a wire netting, 40 or 50 feet from the ground, so as to include forest trees, in which native and foreign birds may range undisturbed, &c. No. 15 Green-house. No. 16. Flower garden. No. 17. Hot-houses. No. 18. Winter garden., No. 19. Open walk in ditto. No. 20. Covered walk formed entirely of evergreens. No. 21. Group of statuary and rock work for winter and early flowering plants. No. 21. Passage, to No. 22. the kitchen garden. No. 23. Forcing houses of approved curvilineal forms, being segments of spheres. (See note to chap. v.) No. 24 Gardener's house. No. 25. Orchard. No. 26. Melon ground. No. 27. Walk to farm. No. 28. Back road to stables. No. 29. Line of wire fence enclosing the pleasure ground. No. 30. Part of the park fed by sheep. No. 31. Broad gravel walk, with an equal breadth of turf on each side, for such as prefer walking on that material, shade and cover being produced by planting trees in the line of separation between the gravel and turf. No. 32. A similar walk in the park, or forest scenery. No. 33. Permanent sunk fence between the deer park and that part to be grazed by sheep. No. 34. Bridge over the lake. No. 35. Park scenery. No. 36. Cultivated scenes, harmonized by bringing one arable field, No. 37. into the park, and extending trees, No. 38. and grass, No. 39. among the arable lands. No. 40. Situations for furze, briars, ferns, and other low growths. No. 41. Approaches. No. 42. Public road. No. 43. Fields appropriated to the park, the fences of the public road being sunk walls. No. 44. Farm. No. 45. Barn. No. 46. Bailiff's house and garden. No. 47. Straw yards. No. 48. Rick yard. No. 49. Line in which a riding may be taken, or in which carriages may drive round the park, and from thence in any desirable direction, with a view to enjoying the beauties of a riding.

Plate CCCXLV. Fig. 2. is a general view of this residence.

The whole extent of the park is not shewn either in Plate CCCXLIII. or CCCXLIV. partly because it is unnecessary in conveying a general idea of style and arrangement, but principally because the necessarily limited magnitude of plates in a work of this nature, precludes the idea, on so small a scale.

In these plans, a very slight shade is adopted as the aerial tint for the surface of the higher grounds; and the lower levels are darkened in proportion to their depth. The situation of the sun is taken at south-east, and his elevation at 45°; whence it follows, that the shadow of every object measured in that direction, will shew exactly its height. In the case of trees and conical objects, the dimension must, of course, be taken from their centre or highest points.

Plate CCCXLVI. is the working plan to Plate CCCXLIV. The first thing to be observed in this plan, is the original positions and divisions of the fields, and public and private roads, brook, and farm houses: the crosses thus (×,) on certain lines, signifying that they are to be removed; the dotted masses represent the forms of the proposed plantations; and the dotted crosses adjoining these, the situations for single trees; and the small circles (o,) the situations for groups. The kind of tree to be planted is represented by capitals, and the sort of shrub by small letters. These must refer to a prepared list of trees and shrubs. The fences, culture, and other particulars of the plantations, will be contained in the book of improvement, or, as it is termed by Mr. Repton, the *red book* of the place.

No. 1. Is the site and outline of the house and offices, which must be left for separate plans and details, or for the architect. No. 2. Site of the pleasure ground, terrace, gardens, kitchen-garden, hot-houses, &c. which must be explained and executed from separate plans, sections, and particulars, it being sufficient in this general plan to mark out their site, so as to admit of executing the grand masses of plantation. No. 3. Lines of roads and walks, which may be executed independently of the house and pleasure grounds. No. 4. Outline of water. No. 5. Sections of ditto, shewing the difference between the present and former surface, the line *a b* being the level of the water. No. 6. General sections across the residence, the line *a b* being that of the level of the ground on which the house stands. No. 7. Fields to be retained. No. 8. Public road, to be bounded by sunk walls instead of hedges. No. 9. Fields belonging to the proposed farm.

By a general plan of this description, accompanied by others more detailed, of the kitchen garden, pleasure grounds, terrace, &c. and by the explanatory details of the *red book*, any gardener of ordinary intelligence may execute the most intricate design; and if this design has been caarefully formed from inspecting the premises, and proper general views have been minutely taken from different points, the landscape gardener may shew the effect of future improvements with confidence, and leave behind him a book of improvements, or, in other words, such plans, sections, views, and written instructions, as may enable the gardener gradually to produce them, with nearly as much certainty as an architect directs a builder to raise an elevation of masonry. Distantly situated proprietors, ambitious of displaying some refinement of ideas on rural matters, might in this way first procure, and then work to a general plan, instead, as is often the case at present, of working according to their own crude notions, and producing scenes which afford no pleasure to any one but their owner.

Sect. IV. *Of the professional Education of a Landscape Gardener.*

Sir William Chambers complains, that, in his time, the art of laying out grounds was too generally left to kitchen gardeners; and Mr. Repton,(who has died since the former part of this article was written,) in his introduction to *Observations on the Theory and Practice of Landscape Gardening*, and in his *Letter* to Mr Price, states that he stepped forward (in 1790 we believe) under the protection of some of the first characters of the country, and rescued the art from the hands of labourers. Wright, Eames, Hamilton, and some others, according to Mr. G. Mason, must be excepted ; but whether this be the case or not, no blame can be attached to this ingenious and intelligent class of men for their attempts at landscape gardening; since it is just as natural, in the infancy of art, for a kitchen gardener to become a landscape gardener, as for a mason to become an architect ; and experience has shewn, that the one class is not less fit for the assumed profession than the other. There is, indeed, a certain degree of practical knowledge requisite for both architects and landscape gardeners, which no person who has not studied as a carpenter, mason, or gardener, can easily if at all obtain.

Whoever is intended for a landscape gardener should, in our opinion, be sent for at least one year to an eminent nurseryman, or horticulturist, where he may acquire a practical knowledge at once of the names and culture of plants and trees, and the general economy of a garden. If he is to act also occasionally as an architect, he should next be sent for at least one year to an eminent carpenter and builder, during which time he ought to study the theory of carpentry, as well as the mechanical principles, and principles of design in architecture. On the supposition that he has, previously to all this, had a liberal education, he may now be placed under a landscape gardener, where, in addition to the common routine of the profession, he ought to be assiduous in sketching and studying the effect of landscape and buildings, in particular ; and in studying the principles of taste and of the fine arts, in general. He may, during this time, or as soon afterwards as possible, employ great part of his time in visiting the principal gentlemen's seats, and scenes of natural beauty in Great Britain; and, if to this he can add an excursion to Italy, and the south of Germany, he will richly profit from the time and expense so employed.

We may suppose the pupil, after such a course, to have attained the age of 25 years, when he may commence practising the art. Before that period of life, we doubt whether any person, however great his natural sensibility or industry, can have acquired a mature taste and a sufficient stock of theoretical and practical knowledge. Without these combined, and qualified by good sense, he may throw out occasional brilliant ideas of improvement, but cannot be relied on for a general plan, that shall bear, in all its parts, the test of critical examination. But " where theoretical knowledge, and practical skill," Mr. Stewart observes, " are happily combined in the same person, the intellectual power of man appears in its full perfection, and fits him equally to conduct with a masterly hand the details of ordinary business, and to contend successfully with the untried difficulties of new and hazardous situations." *Elements of the Philosophy of the Human Mind*, p. 232. 2d edit.

The following works may be advantageously consulted on the art of gardening and laying out grounds.

1. *Geometric Style.*

1638 *Traité du Jardinage, selon les raisons de la Nature et de l'Art.* 4to.

1673. Boyceau D'Argenville, *Theorie et Pratique du Jardinage ; ou l'on traite à fond des beax Jardins appellés communement les Jardins de plaisir.* 4to.

1702. *Geometrie pratique des Maisons et des Jardins*, par Mallet. 4to.

1719. *Ichnographia rustica.* 8vo. 2 vols.

1726 Carici *del Architettura d'un Giardino* 4to.

1728. Le Blond's *Theory and Practice of Gardening.* 4to.

2 *Modern Style.*

1764. Shenstone's *Unconnected Thoughts on Modern Gardening.* 12mo.

1768. Mason's *Essay on Design.* 8vo.

1770. Wheatley's *Observations on Modern Gardening.* 8vo

1772 Chambers' *Oriental or Chinese Gardening.* 4to.

1776. Morel, *Theorie des Jardins* 8vo.

1777. Girardin *de la Composition des Paysages, ou des moyens d'embellir la nature autour des habitations en joignant l'agréable à l'utile.* 12mo.

1785. Marshall's *Planting and Rural Ornament.* 8vo.

1793. Hirschfield, *Theorie des Jardins*, 5 vols. 4to.

1794. Parkyn's *Essay on the Different Natural Situations of Gardens.* 4to

1795. Repton's *Sketches on Landscape Gardening.* fol.

1797. De Lille, *The Gardens*, a poem. 4to.

1798 Price's *Essays on the Picturesque.* 8vo.

1807 Repton's *Observations on the Theory and Practice of Landscape Gardening.* 4to. (J. C. L)

LANDSCAPE PAINTING. See Painting.

LAND-TAX, is an annual impost, which superseded all the former methods of rating either property, or persons in respect of their property, whether by tenths or fifteenths, subsidies on land, hydages, scutages, or talliages.

In the beginning of the civil wars between Charles I. and his parliament, the latter, having no other sufficient revenue to support themselves and their measures, introduced the practice of laying weekly and monthly assessments of a specific sum upon the several counties of the kingdom, to be levied by a pound-rate on lands and personal estates, which were occasionally continued during the whole usurpation. After the Restoration, the ancient method of granting subsidies was only twice renewed ; for the monthly assessments were now established by custom, they were raised by commissioners named by parliament, and, besides, produced a more certain revenue. These periodical assessments, as well as the subsidies which preceded them, and the more ancient scutage, hydage, and talliage, were, to all intents and purposes, a land-tax, and were sometimes expressly called so. Yet an opinion has prevailed, that the land-tax was first introduced in the reign of king William III. because, in the year 1692, a new assessment, or valuation of estates, was made throughout the kingdom ; and, according to this valuation, the land tax has continued an annual charge upon the subject. The method of raising it, is by charging a particular sum upon each county, according to the valuation given in A. D. 1692 ; and this sum is assessed and raised upon individuals, (their personal estates, as well as real, being liable thereto,) by commissioners appointed in the act, being the principal landholders of the county, and their officers. Blackstone's *Comment.* b. i. ch. 8.

In the year 1799, the land-tax, which, as has been already observed, was formerly an annual tax, was made perpetual, and offered for sale to the proprietors of the land, or to any other persons who chose to purchase it. In the course of the first year, after the passing of this act, upwards of 13,000,000*l.* was purchased ; and, since that period, a great proportion of the land-tax has been redeemed. (*z*)

LANGENTHAL is one of the largest and finest villages in Switzerland. It is situated in the county of Berne, about half a league from the great road between Berne and Arau. It is remarkable for its fine bleach-fields, its dye houses, and its manufacture of linen, and ribbons, one half of which is wool and the other silk. This village is the depot of the cheeses of Emmenthal, and of the cloths which are manufactured in the canton of Berne. It has three fairs, and about 11,000 pieces of cloth are annually sold, and exported to Spain, Portugal, and America. The baths of Langenthal are situated about half a league from the village. Distance from Berne 18 miles N. E.

LANGHOLME, is a market town of Scotland, in the county of Dumfries. It is situated near the river Esk, and the great road from Edinburgh to Carlisle passes through it. The town consists principally of one street, which contains some good houses. Langholme is a burgh of barony, belonging to the Duke of Buccleuch, who is the proprietor of the greater part of the parish. About half a mile from the town is situated the village of New Langholme, at the confluence of the Wauchope and the Esk. It consists of about 100 houses, built upon a plain, on feus granted by the Duke of Buccleuch. A cotton manufacture was established in it, which employed about 100 persons. Langholme has a weekly market, and four fairs, one of which is held on the 26th of July, and is one of the greatest in Scotland for lambs Langholme Lodge, the seat of the Duke of Buccleuch, is situated near the town, in a delightful valley, surrounded with hills covered with wood. The population of Langholme is about 1500, and that of New Langholme 600. The population of the parish, in 1801, was 2039; and, in 1811, 2636.

LANGHORNE, John, D. D. an English poet and miscellaneous writer of some eminence, was born at Kirby-Stephen in Westmoreland; but the precise year of his birth has not been ascertained. Little information has been preserved with regard to the particulars of his life. His father, the Rev. Joseph Langhorne of Winston, died when his son was young; leaving him and his brother William to the care of their mother. The place of his education is not known; his name is not to be found in the list of graduates either of Oxford or Cambridge.

He first appeared as an author in 1758, when several pieces of poetry, written by him, were inserted in the *Grand Magazine*, a periodical work published by Mr. Ralph Griffiths, the proprietor of the *Monthly Review*. His first publication was *The Death of Adonis, a Pastoral Elegy, from Bion*, 4to, 1759; which was followed, in the same year, by *The Tears of Music, a Poem, to the Memory of Mr. Handel, with an Ode to the River Eden*, 4to. Having taken orders, he became tutor to the sons of Robert Crancroft, Esq. of Hacthorne, in Lincolnshire; and, in 1760, he published, at Lincoln, a volume of *Poems on several Occasions*, 4to, for the benefit of a gentleman in distress. Soon after he repaired to London, where he engaged as a writer in in the *Monthly Review*, espoused the interest of Lord Bute, and published various performances in prose and verse. In 1764, he published *Sermons*, in 2 vols. 12mo. In the month of December 1765, he was appointed assistant preacher at Lincoln's Inn, probably through the interest of Warburton, to whom he had dedicated his *Letters of Theodosius and Constantia*. In 1766, he published his *Poetical Works*, in 2 vols. 12mo. About this time, he obtained the valuable rectory of Blagdon in Somersetshire, which he held until his death, and was appointed a prebendary of Wells. In 1767, he married Miss Crancroft, the sister of his former pupils, who soon after died in childbed of a daughter, and was pathetically lamented by her husband, in some verses to her memory. In the year 1770, he published, in conjunction with his brother, *Plutarch's Lives, translated from the original Greek, with Notes critical and explanatory, and a new life of Plutarch*, in six vols. 8vo. He died, after a lingering illness, at Blagdon House, on the 1st of April 1779.

The private character of Langhorne appears to have been amiable and respectable. His works are very numerous; but of his prose writings, none have obtained much popularity, excepting his *Solyman and Almena Theodosius and Constantia*, and his translation of *Plutarch's Lives* As a poet, he exhibited undoubted marks of genius, imagination, and sensibility; and some of his verses hold a respectable rank among the productions of our minor poets. His chief faults appear to be, an occasional redundancy of diction, and an affectation of false and unnecessary ornament. See the *Life of Langhorne*, in Anderson's edition of the Poets; and the *Gen. Biog. Dict.* (z)

LANGRES is a town of France, and the chief place of a district in the department of the Upper Marne. It is situated at a greater height than any town in France, and has a fine appearance at a distance, when approached from the side of Vesoul. Some of the streets are wide, and many of the houses commodious and well built. The church of St. Martin, which has a lofty tower, is a large and handsome building. There is a fine promenade between the two gates, on the road from Vesoul. Langres is famous for its cutlery, and its scissars have long been celebrated. There are also extensive paper works in the town. Population, 7358.

LANGUAGE.

Language, (from the French *Langue*, and that from the Latin *Lingua*, "the tongue,") in its proper sense, means "the expression or enunciation of human thoughts and sentiments, by means of the articulate sounds of the human voice." It has usually, however, been extended to comprehend, in general, "all the means of expressing or announcing thought and feeling by sensible signs." Taken in this extended sense, language may properly be distinguished into *Natural* or *Instinctive*, and *Artificial* or *Conventional*; as the sensible signs, by which the annunciation is made, may be either suggested immediately by nature, or formed by human skill and intention.

The power of communicating the inward thoughts and feelings must be essential to a being destined to live at all in society. Without this power, each individual must for ever remain insulated and solitary, incapable of either imparting or receiving social aid or enjoyment. Nature has accordingly provided means for such communication, sufficient, in all cases, for that degree of social union in which each class of animals is to subsist. The inferior species accomplish it by certain signs and gestures, and, above all, by peculiar sounds or cries, wholly taught by instinct, and understood also, as far as necessary, by immediate instinct, without instruction, and independent of experience. This limited extent of the power of communication is sufficient for the purposes of *their* being; but for *man*, a rational as well as social being, much more was requisite. In common with other animals, indeed, he is furnished by nature with certain powers of employing the limbs or the voice, so as to denote, in a manner recognised instinctively by all his fellow men, many of his inward feelings, emotions, and desires: these, therefore, often serve as natural signs, for imparting to one man what passes in the mind of another. But these natural signs are few, and extremely limited in their application. They may intimate a few of the more simple feelings; but by far the greater part of what passes in the mind, cannot thus be made a subject of exhibition. If men are to hold a communication co-extensive with their faculties as rational beings, a far more extended class of signs must be formed and employed, by the conventional use of which, all the various thoughts, feelings, and emotions of the mind, may be specifically declared. This necessity gives rise to what is termed *Artificial* or *Conventional*, in contradistinction to *Natural Language*.*

Natural Language.

Nature has established a connection between many of the feelings and passions of the human heart, and certain motions or changes in the external appearance, universally known and recognised. The angry countenance, the scowling eye, the indignant frown, mark with precision what is passing within; the placid look, the composed mien, the benignant smile, give universal pleasure. The same is the case with many other feelings. These natural signs are interpreted without reasoning; neither the savage nor the polished citizen are at a loss for their meaning. They are applicable, however, chiefly to the feelings and emotions, though they may occasionally be made to express also the dictates of the understanding.

The *natural signs*, by which the inward thoughts and feelings can thus be externally announced, are of three classes: Modifications of the *features of the face;* variations of the limbs or *gestures of the body;* and *modulations of the voice*. These constitute a primitive and uniform language, to which recourse can be had in every society, when conventional signs are unattainable, or inadequate to the particular occasion.

The expression of mental feelings by the *features of the face* is a matter of general observation. From this expression, it has been justly remarked, much of the excellence of the art of the painter, and not a little of that of the statuary, is derived. A familiar acquaintance too with this class of signs, is of the highest importance to the actor; and, on many occasions, the orator will find his advantage in cultivating it. All this holds true of the expression of feelings and passions. These are often fully exhibited in the features. But not satisfied with this, many have gone farther, and maintain the countenance to be an index, not of passion only but of character. Hence has arisen, what has been termed the science of physiognomy. It is well known how much this has, in all ages, engaged the attention of ingenious men, and to how many discussions and investigations it has given occasion. The examination of these belongs to the article of Physiognomy. It is sufficient to remark at present, that it is evident from universal experience, and even from the speculations, however fanciful, of the physiognomist, that a class of natural signs, indicating many of the emotions of the mind, does unquestionably exist; and this forms one branch of *natural language*. The particular detail of these signs themselves, constitutes the chief part of the physiognomical science.

Besides the features of the face, we have another class of natural signs, indicative of mental emotions, in the *gestures and motions of the body*. The knowledge of these, as well as of the former, must always be indispensable to the historical painter, the statuary, and the actor, and ought never to be neglected by the orator. In sadness and melancholy, the head is apt to sink, and the arms hang down; in joy, the head is elevated; in displaying pride, it is stiff and erect; in contempt and indignation, its motions are quick and irregular; in gaiety and merriment, the corners of the mouth are contracted, and in some degree raised, the cheeks rather drawn inward, and the muscles of the lower part of the countenance in a slight measure convulsed, which gives rise to laughter; in admiration and surprise, the body is thrown back, and fixed seemingly immoveable in one position; in fear, the arms are extended, the eyes opened wide, and the limbs often affected with tremulous and desultory movements. All these, and many other variations of gesture, are the instantaneous and involuntary effects of passion. They may justly be said to be constituted by nature as interpreters of the feelings of the mind. This class of natural signs appears to be more susceptible of extended application than some of the others, and the extension and improvement of them has given rise to the art of *pantomime*. The extent to which this art has often been carried, is very great. In ancient Rome, the exhibition of dramatic action, without the accompaniment of words, was a common amusement, and the audience were never at a loss to follow the action through all its parts. The modern pantomimes, too, often exhibit both character and passion, by the medium of action and gestures alone, with a high degree of accuracy. These exhibitions are unquestionably the productions of skill and art, but they are founded upon the natural signs of the inward feelings, manifested in the gestures and motions of the body. Were there no other means of communication, it is difficult to say to what perfection this class of signs might in time be brought. Savages, ignorant of each other's language, can thus make known their desires and feelings without difficulty; and all of us have often witnessed the readiness with which dumb men can, upon occasion, adapt their gestures to the expression of their inclinations and wishes.

A third class of natural signs, expressive of our inward feelings, is to be found in the *instinctive modulation or tones of the human voice*. These natural cries are uttered involuntarily, even at the earliest period of life; and at every age, when the feelings are strongly excited, they burst forth spontaneously, in spite of all artificial refinements, without design, and without regard to consequences. Joy, grief, suspicion, admiration, despair, exultation, hope, fear, and many other emotions, are thus manifested. These modulations of the voice approach to, but are by no means of the same nature with the articulate sounds which form the materials of artificial or conventional language. They are uttered only under the influence of passion or emotion; they are taught by nature, and require no instruction to explain their meaning. From their near relation to words, however, they have obtained a place in grammar, and are commonly stated as one of the parts of speech, under the denomination of *interjections*. They undoubtedly mingle in all empassioned discourse, and often contribute to the force and effect of eloquence; still they can only be regarded as the natural and instinctive expressions of feeling. Among different nations, the number of those instinctive sounds, which still claim an occasional place amidst the use of conventional words, may vary, either from different intensity of feeling, or from the fuller adaptation of words to the expression of passion; but in all languages they do to a certain extent remain, occasionally employed by the orator. and frequently bursting forth to indicate the strength of the internal feelings.

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* This account of the natural origin of language proceeds upon the idea, that language was formed and invented for the purpose of announcing or communicating thought; and this idea we cannot but consider as just. It has indeed been ingeniously contended of late, that the communication of our thoughts is not in fact the object or purpose of language, but that its real or definite object consists in *the production of thoughts in the minds of others by means of oral signs*. It is readily admitted, that the production of certain thoughts in the mind of another is, and must be, an ultimate object of the use of language; this is implied in the very act of employing it. But this ultimate object is in no respect peculiar to language; it may be equally predicated of every species of mutual or social action. The specific purpose of language is to be sought, not in the ultimate object, which it aims at in common with other processes of human action, but in the peculiar manner in which it is employed for the attainment of that ultimate object. Now it seems evident, that it is solely by the enunciation of the thoughts, feelings, and mental energies of the speaker, that language can serve to produce thoughts in the mind of another. We conceive ourselves therefore fully warranted in holding the communication or annunciation of thoughts, feelings, or mental energies, the direct and specific object of the invention employed.

These various classes of natural signs might undoubtedly have served for carrying on some kind of intercourse in the rudest stages of human society; but it cannot be disputed, that their application is extremely limited, and if man was ever to rise above the condition of mere animal existence, he must have a mean of communication more suited to his situation, and co-extensive with his rational faculties. Hence arises the necessity of employing a different and more enlarged class of signs, indicating not only feelings and passions, but thoughts and ideas, objects, actions, and relations; a class of signs, in short, rising from natural and instinctive, to conventional and artificial language.

Conventional or Artificial Language.

The situation of man as a member of society, and his possession of powers and faculties as a rational being, rendering a much more extended and enlarged mode of communication necessary for him, than could be accomplished by mere natural signs, an obvious question arises, What means the Author of our Being has furnished for the attainment of an object so important to the great ends of human existence? It is by no means inconceivable, that any one of the classes of natural signs, or instinctive expressions of thought, might have been adopted as the ground work of a more enlarged conventional language; the features of the face, or the gestures of the body, might perhaps have been moulded into forms, to each of which, an arbitrary but determinate meaning might have been attached, and these, united with rude inarticulate cries, might have served to carry on some kind of intercourse among men. But how inadequate must all these, even in their most improved state, have been, to answer the ends to which speech is subservient. All the variations of which they are susceptible, could mark only a few emotions, but by much the greater and more important subjects of thought and volition would have been beyond their reach. It became necessary, then, that some other means of communication should be found to effectuate that intercourse upon which so much of human happiness and well being depends. And such a mean of communication had been provided by the Divine Author of our nature. The human voice is so framed and constituted, as to be susceptible of articulate modulations in an almost endless variety, and the power of forming, at least to a certain extent, these modulated sounds, is possessed by all men whose faculties are entire. In these articulate sounds, then, we find materials furnished by nature, and placed within the reach of all, which human ingenuity and industry can easily form, by the aid of experience, into a collection of conventional signs, fit to express every thought of the human mind.

But though the materials of language, as well as the power of employing them, are thus provided by nature, it has been made a question, how mankind were at first induced or impelled to have recourse to this mode of communicating thought by the fabrication and use of articulate sounds. Children, it has been observed, learn to speak by imitation; and it would appear by the examples of one or two solitary savages, found at different times remote from human society, that where the opportunities of such imitation are wanting, the use of articulate speech is nearly unknown. In what way then was the use of speech, or conventional language, first introduced and adopted? According to one class of writers, it was originally revealed, and taught to man by the Author of his Being; according to others, it was entirely the fruit of human invention. The former opinion, its advocates contend, is supported by the authority of Moses, who expressly tells us, that the Creator, after he had formed the beasts of the field, and the fowls of the air, brought them to the first man that he might give them names, and that the names so given, were those by which they were afterwards called; the latter opinion, however, has been held, not only by many of the ancient philosophers, but by a number of the moderns also, who admit fully the authority of Scripture, though they contend, that the Mosaic narrative does not imply any special revelation to direct our first progenitor to the use of articulate sounds. Those who consider a special revelation as necessary for the invention, allow, at the same time, that all the faculties and powers requisite for forming speech, are given as constituent parts of the human constitution, requiring only a specific impulse to bring them into action; and those who most eagerly contend for attributing the whole to human ingenuity, admit, that the invention must have been one of extreme difficulty, which could only have originated with some superior minds, who might first be led to it by the imitation of certain natural sounds with their own voice, and then gradually communicate to the other members of their tribe, the mode of forming and applying similar sounds for the expression of thought.

Much ingenuity and erudition have been expended upon this question. One side has been maintained by Simon, Condillac, Dr. Adam Smith, and above all, by the learned author of the "Origin and Progress of Language;" the other by Delaney, Warburton, Dr. Stanhope Smith, and others; but after all their labours, so much obscurity and uncertainty remain, that we must be content to leave the point undecided, nor in all probability will it ever receive a complete solution. Two material facts, however, we may regard as established by experience; that wherever, from defects in the organs of hearing, or from seclusion in infancy from human society, no opportunity has been given of learning by imitation to form articulate sounds, the faculty of speaking has always been found wanting, except so far as subsequently acquired, with labour and perseverance, by instruction from those who previously practised it; and that in all cases, the actual power of speech is found to be so much limited to the formation of those articulate sounds only which have been learnt in infancy, that it is with the utmost difficulty the pronunciation of any new sounds can be attained at a more advanced age. These two facts appear rather to lead to the conclusion, that besides the mere possession of the organs and faculties of speech, some impulse must have been necessary to call these into action, so as to lead to the formation of language; but to what extent, or in what manner, that impulse may have first been given, it is to no purpose to inquire. On this point, the Sacred Scriptures are silent; history does not go so far back into the earliest periods of society as to furnish any information in regard to it; and neither from reasoning nor experience can we derive satisfactory means of gratifying our curiosity.

In whatever manner articulate speech originated, we may safely conclude, that this primeval language could not be copious. It would undoubtedly extend no farther than the occasions of employing it, and as these, in the infancy of society, could not be numerous, the language in use must have been equally scanty. It was sufficient, if the immediate means of communication were provided, and a foundation laid, upon which the entire superstructure could in the progress of society be reared.

The rudiments of articulate language being once formed, new occasions for communication would quickly occur, these would, of course, require the adoption of new articulate sounds for making the communications required. At all times, men are more disposed to improve, enlarge, and alter, than to invent. The new signs required would, therefore, in general, be formed from the first rudiments of speech by modification and composition; retaining still the original meaning, but with such variations superinduced as might point out the new relations to which it was to be applied, or the new associations into which it was to be brought.

Such may be stated to be the general outline of the formation and progress of language; but it is a curious subject of inquiry, by what particular steps, and in what particular lines the progress was accomplished; what class of words may most properly be regarded as the ground-work of speech; and what was the march of the human mind, so to speak, in this gradual advance from the first elements to all the varieties and forms of words. In such an investigation, we must, it is true, in a great measure rest upon conjecture, but still circumstances may be observed, which will serve to a certain degree to guide our inquiries.

Language, then, it is to be observed, is the application of articulate sounds to denote and to communicate the emotions, feelings, and actings of the mind; now, the only motive for making such communications by the use of language, must at first have been to obtain the gratification of some desire or wish, for which the concurrence of others was deemed in some way necessary. When the first articulate sounds, therefore, were made use of, it is most probable, that the mental emotion or desire, the wish for the concurrence of the person addressed, and the object to which these pointed, would all be included in one significant sound; and of sounds containing this complex power, we may conceive the primeval movements of language to have been formed. Still, however, in these complex sounds, the wish or desire of concurrence, which was the chief impelling motive to the employment of it, would be always viewed as the predominant part, to which the other parts of the complex signification would be regarded as subservient. In the constant intercourse of men, even in the earliest period of society, the necessity of new communications, and of new modes of making them, must soon occur. Similar mental feelings or emotions might often be excited by totally different objects; and, on the other hand, the same object, under different circumstances, might give rise to very dissimilar feelings. For the expression of these variations, appropriate articulate sounds would be required, that the precise point, or the precise object to which it was wished to call attention, might be denoted. The most obvious and easy mode of accomplishing this, would be to retain the radical part of the primitive sound, and by variations or additions, to indicate the precise manner in which it was to be applied.

We have already observed, that in the complex primeval sounds, the wish or desire of concurrence, which was the chief impelling motive of communication, would be viewed as the predominant part. To this, therefore, the radical sound would be specially appropriated, to intimate such desire, along with the determination to have it gratified, if that was in the speaker's power. Now, these are precisely the characteristics of the *imperative* verb. We may therefore consider ourselves as warranted in assuming the *imperative* verb, denoting in general our desire to accomplish an object, either by direct command, if we conceive ourselves possessed of power to compel it, or by request and supplication, if we can only attain it by the permission of another, as constituting the nucleus or radical part of language, from which not only the other branches of the verb. but also the other classes of words, were gradually to be formed

For the accomplishing any object of desire by the concurrence of others, it is absolutely necessary, in the first place, that an *action* of some kind or other should be performed; action is, therefore, always implied in the use of the imperative sign, whether in the way of command or entreaty. When the person addressed is willing to comply and concur for the attainment of the desired object, he will naturally signify this by repeating the sign by which that wish was signified, but by repeating it with such a variation in form, as may at once indicate that he complies with the wish, and that he is willing to concur for accomplishing it. Hence, besides the imperative, another branch of the verb, denoting the willingness to comply, is formed, That intention of compliance may exist in various forms; it may amount to an absolute implied promise or agreement of concurrence, either instant or future; or it may amount only to an engagement, to be regulated by some intervening event. It is easy to conceive that each of these would soon come to be denoted by variations of one species or other upon the primitive imperative sign. As soon as the action was performed, this too would be communicated, and for that communication another variation would be formed, still referring to the first and radical sign.

In this manner, we can easily conceive how all the parts of the verb gradually arose from the simple imperative sign, merely by following out the communications of thought which the necessity of mutual aid must produce in any society.

Although upon these grounds verbs may, and indeed must be, regarded as the real groundwork, or radical part of language, yet there are other classes of words, also, so necessarily connected with them, that the same principles which formed the different parts of the verb must immediately suggest the necessity of some farther variations. The subject of language, as already stated, is *action*. Now, in the conception of every action, it cannot be doubted, that besides the operation itself, there necessarily must be other three component parts—the *agent*, the *subject*, and the *effect* produced; each of these it will soon be requisite to mark by corresponding vocal signs. The *subject* of the action is what first would assume a separate denomination, formed probably at first by taking, as its radical part, the denomination of that particular action, or class of actions, most commonly directed upon it, or most generally exhibited by it. Hence would arise the class of *nouns*, the names at first of external objects chiefly, the usual subjects of action, and as such for the most part exciting the emotions and feelings of the mind, afterwards extended to the mental operations themselves, and to the abstract conceptions suggested by human actions and human conduct.

In regard to any specific action, the *agent* and the *subject* are certainly completely distinct; yet, in the course of human affairs, it continually occurs that they, as it were, change places; so that the agent in one operation becomes the subject in another. From this circumstance, it takes place, that, in language, no separate class of words, in general, has been formed for marking whether an object stands in one relation or the other; yet still the distinction is in most cases attended to, and the relation denoted either by a particular, though minute change in some part of the word, or by such a position in the sentence, as indicates in what relation it is to be held.

To complete the idea of an action, another part still is wanting—*the effect produced*—that is, the change occasioned in the subject. Though this is intimately connected with it, it is by no means to be viewed in the same light with the subject itself. The subject is considered by us as the permanent material, the effect as merely the form which this material is to assume. For the expression of this, then, a class of words must be devised, nearly allied indeed to those which denominate the subject, yet so far differing, that they may be capable of adaptation to many different objects, and easily referred to any one with which, at the time, they happen to be associated. In this manner is formed the class of *attributives*, marking a quality or property only, which may be predicated alike of many individual subjects, and thus exhibiting a marked distinction from what is considered as permanent, and possessed of that *principium individuationis*, which completely separates one object from every other.* Each of these qualities or properties might be named at first from the view of some object in which that quality was first produced by some particular action; and hence the attributive would still retain the radical part of the primeval word, with particular modifications to mark its new application; and each attributive, when formed, would, from the natural principle of association, be applied to designate the same quality occurring in any other subject.

The radical and essential parts of language being formed in the manner described, all the other species or classes of words, as well as all the necessary variations of the radical parts themselves, would gradually follow in the constant use and habit of speaking. These, in fact, are all nothing more than either modifications immediately attached to the radical words, parts of these radical words themselves put into a new position, or abbreviations for the sake of dispatch, easily resolvable into their constituent parts. The manner in which all of them came to be formed and applied, as well as the particular structure and power of each, are subjects which fall properly under the head of GRAMMAR; and, accordingly, under that head they have already been treated at considerable length. A few observations, however, in regard to them, for the completion of the theoretical history of language, may here be proper.

We have viewed the verb as originally imperative, and, as such, always containing the idea of *action*; we have marked also, that in making a return to the command or entreaty conveyed by the imperative, the same term or sound would probably be used, but with such variation of tone, as might imply that the person addressed was willing to concur. This appears to be the first and most obvious extension of the use of language. It is, in fact, the *future* tense of the verb, conveying the idea of the action, combined with the intention of performing it. Instead, however, of barely signifying a readiness to concur, after a command or entreaty had been used, it is easy to see, that in many cases a simultaneous effort might be agreed upon, which would give rise to the *present* tense; and in many cases it might happen, that the action from some other cause had already been done, which would produce such a variation as to form the *past* tenses. All these different meanings, as well as the circumstance of the consent being only conditional and not absolute, or so doubtful as to demand some farther information in regard to it, could easily be marked by the various inflexions of the voice, or by additional sounds annexed to the original radix, and form either the *subjunctive* mood, or the *interrogative* form of the indicative. Hence the various parts of the verb would draw their origin; and it is easy to explain, from the tendency of men to proceed in the track to which they have been accustomed, how the same variations, which were once used to denote these peculiarities in regard to one action, would be uniformly, or at least generally employed, to denote similar variations in every other, and thus a pretty general uniformity in the form of these several modifications would arise.

Nearly connected with the verb, we find what is termed the *participle*. This seems to have taken rise, merely from a wish to designate the action denoted by the verb, as either permanently or occasionally characteristic of some person or object to which the attention is directed. It is easy therefore to conceive, that in a great measure it would retain the radical part of the verb, modified however in such a manner, as to suit it to assume the form and texture of an attributive.

The origin of the *pronoun* has been variously stated by writers on grammar; yet pronouns, in fact, are only, in their real nature, abstract nouns of a peculiar species. It has become fashionable of late, among certain philosophers, to deny that the mind possesses such a faculty as *abstraction*, and the notion of an abstract noun is treated by them as chimerical. Without stickling for terms, we may observe, however, that it cannot surely be denied, that the mind does possess a certain power, when several objects are presented in combination, to fix its attention exclusively on one of them, and for the time to keep out of sight all the rest. That this is a power every day exercised, experience abundantly testifies. In considering any object therefore, any particular quality possessed by it may be made the sole object of attention; in viewing a marble globe, we may direct our thoughts entirely to its roundness, without taking into view its other qualities of whiteness, smoothness, or hardness; or we may think of its hardness independent of its roundness or colour. If, then, we find any particular mode in which objects may be placed sufficiently important, and occurring with sufficient frequency to force much of our attention to that, we shall naturally be led to mark that mode of existence by a peculiar term applicable to such a special relation, independent of any object in which that relation or position occurs. In the employment of speech, one of the most common relations and positions in which persons and objects occur to us, and one which most forcibly arrests our attention, is the situation of the *speaker*, the *person spoken to*, and the *subject spoken of*. These peculiar relations perpetually recurring, would soon fix the attention exclusively upon them, while the constant variations in the subjects would irresistibly detach from the view any specific object with which they could be associated. Hence the relations alone being kept in sight, terms expressive of the relations merely would be formed, possessing all the characteristics of abstract nouns, and in the application they are susceptible of the most general of any. To these, the denomination of *personal pronouns* has been given; a denomination not perhaps in all respects strictly appropriate, but sufficiently descriptive for the purposes of language. How these personal pronouns were originally formed, is a matter of much uncertainty. Some have conceived, that they were derived from a word designating the hand, pointing with the hand being probably first employed before a specific vocal sign, to denote these separate relations, was introduced. This, however ingenious, is perhaps somewhat too remote a derivation. A more obvious one, we should think, may be found. Admitting, what we have endeavoured to prove, that the radical part of all language was the *verb*, and that necessity gradually impelled man to introduce various modifications of that radical sound, by means of accent, emphasis, elongation, or addition, to indicate its various applications, whether for assertion, interrogation, supposition, promise, or desire, it may then be easily conceived, that of these variations, some were uniformly employed to mark also the relations of speaker, person addressed, or subject of discourse. As such peculiar modifications would, from the proneness of man to imitation, be similar through the whole community, it was an easy step to detach altogether from the complete verb, that part which had received the variations, and these detached parts, of course, would form the *personal pronouns*.

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* This is not the place to enter into the metaphysical questions which have been started as to our real notions of what is termed *substance*; whether, as was long held by logicians, we are to understand by this term an unknown *substratum*, in which all conceivable qualities inhere, or whether, in fact, our notions of substance never go beyond merely a collection of *qualities*, commonly perceived by us united in the same object. The investigation of this point belongs to METAPHYSICS. In regard to the formation of *language*, it amounts nearly to the same thing which of the two opinions is well-founded. Whether we really conceive a substratum separate from qualities, or only view qualities themselves conceived as united and forming a whole, it is plain, that our giving a specific name to this substratum, or to this assemblage of qualities, implies a conception that something is regarded as permanent, essential to the existence of the object, and constituting its individuality, in opposition to the idea which enters into all our conceptions of mere *qualities*, that they may equally belong to many objects, and may be varied, without destroying the nature of the object to which they pertain. If, after all, it is only *qualities* which we can conceive, still we shall find that in the formation and use of *substantive nouns*, as distinguished from *attributives*, the idea of permanence is for the time conveyed, and the distinguishing idea of qualities, considered merely as qualities, is for the time kept out of view.

The origin of all the other kinds of pronouns can occasion no difficulty; the *possessives* are merely the personal pronouns in an adjective form; the other pronouns, as well as the *article*, are merely definitive adjectives, marking a particular position or relation, in the same way as adjectives in general denote a quality considered as belonging to an object.

Of the variations of these different classes of words; of verbs by means of words, tenses, and voices; of nouns by means of cases, numbers, and genders; this is not the place to treat; these belong to GRAMMAR, and are particularly detailed under that article.

The real nature and force, as well as the immediate derivation of the other parts of speech, *adverbs*, *prepositions*, and *conjunctions*, have been perspicuously detailed by some late etymological writers; and we may regard it as now universally admitted, that they are in reality only nouns, adjectives, or verbs, in some abbreviated or mutilated form, employed for convenience or dispatch, and easily resolved, by skilful investigation, into their primitive forms. The investigation of this point, forms by far the most valuable and interesting part of Horne Tooke's disquisitions; for his analysis of abstract nouns and adjectives, although certainly ingenious, yet are often unsatisfactory, and many of his derivations altogether chimerical and unfounded. Horne Tooke, indeed, was not the first who struck into that path, similar views having previously been entertained, though probably unknown to him, by the Dutch etymologists, Schultens, Hemsterhuis, and Linnep; but his writings are most generally known, and he is regarded as the founder of the system. The system itself appears now to be so clearly established, that, in tracing the formation of language, it is unnecessary to go into fuller investigation of the origin of adverbs, prepositions, and conjunctions, than just to observe, that the *adverb* is an adjective, with a noun united in an abridged and compendious form; the *preposition* either a noun, or an adjective, with a noun understood; and the *conjunction* may generally be resolved into the form of a mutilated verb.

The foregoing detail exhibits what appears to us a fair and just deduction, from the nature of man, and the circumstances in which he is placed, of the origin and gradual formation of language. It is admitted, that it is what, from the very nature of the subject it must be, in a great measure, theoretical or conjectural. It is evident, that we possess no documents from which we might learn the actual rise and advances of this interesting art. Wherever men have been found in society, there always a language of some kind, more or less perfect, yet always a formed language, has been found to prevail; the earliest rudiments, therefore, or the first efforts at regular speech, are buried in entire oblivion. If all the languages in the world were originally derived from one form of speech, communicated from our first parents, it is easy to see, that however great and numerous variations might take place in it, yet the art itself would never be lost, the mode of communicating thought in articulate signs could never be forgotten. Even if we were to suppose, that language arose untaught in many separate communities, yet still, as the absolute necessity of such a mode of communication must have been powerfully felt even at the very commencement of society, the progress of speech to a certain point would unquestionably be most rapid, and a language, in a great measure completely formed, would very soon be in use. Upon either supposition, then, it ceases to be matter of wonder, that no where has a community been found, who had not advanced beyond the first rudiments of speech, or among whom all the essentials of language were not actually in use.

But though, from these circumstances, it is evident we can have no direct documents in which the earliest stages of language are actually exhibited, yet particular facts occur in many existing tongues, which serve to throw some light upon their origin and primitive organization; and these, so far as they can be traced, tend to give validity to the conjectures now theoretically thrown out, as to the mode in which the various classes of words originated. It is true, as observed by a late writer, that in the more perfect and polished languages, such as the Greek and Latin, and we may perhaps add the Sanscrit and some others, the surface, so to speak, is so highly varnished, and the joints so closely fitted, that it becomes difficult to get sight of the original materials, or discover the size and shape of the pieces thus nicely adjusted; but in languages less refined, such as the Hebrew, the Celtic, and the Gothic, the structure lies more open to inspection. Accordingly it was in these less polished languages, that etymologists first succeeded in discovering the roots; but by degrees, aided by the light, thus thrown upon the origin of words, men of acuteness and penetration have been able in the best adjusted languages, even in the Greek, perhaps the most complete with which we are acquainted, to advance far in unfolding their original form and constitution.

Wherever, then, we have been able fully to develope the primitive roots, we find them ultimately resolvable into *verbs*. In verbs we find, farther, that the *imperative* contains always the radix of the verb, with the least possible addition, and sometimes without any addition at all. It is from verbs that the primitive nouns and attributives are immediately formed, all of them still retaining enough of the root to mark distinctly their origin. Thus in Hebrew, where the roots of the language form an important branch of its grammar, these roots are all either verbs, or plainly resolvable into verbs. In Greek, and its corresponding language Latin, the radical parts of the language have all been traced by the most skilful etymologists to the verb. In other original languages, the same remark will apply; and it is observable, that those very philologists, who assert most strongly that nouns were the parents of language, yet in the analysis of individual words, generally resolve them at last to a verb, as their ultimate source. Farther, in analyzing the parts of the verb, we find that in Hebrew, for instance, the second person of the imperative, and the third person of the preterite, are the same; and it is this part of the verb which all their grammarians and lexicographers unite in fixing upon as the root. In the Greek and Latin verb, the imperative of the present is that part which always approaches nearest to the root. In the Celtic and the Gothic, and the modern languages which have taken their origin from them, the imperative verb uniformly is that which expresses often, without additional terminations or particles, the full action and intention of the word; and where some short termination is added, there is every reason to think that this was not the very earliest form, but a subsequent addition. We seem warranted then in concluding, that the imperative of the verb is really the radical part, to which all the others at first were adjuncts. Afterwards, it is true, new verbs and nouns, as well as other classes of words, would be formed from the primitives; but these are plainly derivatives, having their rise in an advanced state of the language.

The proof of these principles might be extended by examples from many different languages; but such a copious induction, however useful and curious, would run this article into an inconvenient length. Those who wish to go farther will find, upon examination, that in the principle now laid down, of using the radix of the verb as the imperative part of it, there is an agreement in languages nearly universal.

It might be a curious object of inquiry, were it practicable to arrive at any certainty in regard to it, what was the nature of the original radical sounds or words, and from what principles did the application of the different articulate sounds, to contain particular feelings, actions, or objects, at first arise? Here, however, we have so few data to proceed upon, that very little can be discovered; still something may be stated. The conjecture then, we may observe, is not improbable, that the primitive sounds by which men's feelings were announced would be very short, perhaps most of them monosyllabic. It seems evident also, that as the vowel sounds are often uncertain and variable in their enunciation, they would frequently be interchanged in common speech, and no variation in them would affect the expression of the particular idea meant to be conveyed; it would be to the consonant sounds alone, in which the diversity is fixed and obvious, that recourse must have been had, as the radical and uniform signs by which the diversity of ideas or feelings was to be marked. Each consonant sound might therefore have a particular signification annexed to it, which it would always retain, with whichever of the vowel sounds it happened to be united. Farther, there is surely nothing absurd or improbable in supposing, that when men began to give names to what excited their feelings, the same or similar feelings would be expressed by the same, or nearly similar, sounds; that the expressive part of these sounds being what formed the consonants, whenever the desire or necessity of indicating a feeling or idea once signified recurred anew, this would be done by a repetition of the same consonant sound which had first been employed to make it known. Hence each different consonant, when enunciated, would soon come to denote a particular range of ideas, agreeing among themselves in some common quality, and distinct from what were expressed by any of the others. What particular range of ideas each consonant sound was to be applied to express must have been wholly arbitrary, none of them possessing any specific aptitude to render it more applicable to one idea than another. If ever, then, any general principles are to be traced upon which any language has been originally constructed, in regard to the application of particular sounds to particular classes of ideas, this must be done solely by the observation of facts, as actually found to occur in the existing primitive languages. As yet, however, we want the materials for such an inductive investigation. Perhaps farther researches, conducted upon philosophical views, into the real component parts of those languages that merit the appellation of original tongues, as forming their roots within themselves, may in time elucidate some parts of this curious subject. In any such investigation, however, it would be absolutely necessary to examine each language separately, and trace its roots, unmixed with those of any other tongue. When the roots of different languages have thus been investigated, a subsequent comparison of these with one another might enable us to determine whether any, and what degree of affinity exists among the languages to which they belong. A theory founded on such an inductive process would be by no means chimerical. Within the bounds of a particular language, etymology is a pretty safe guide. It is only when rashly applied to various and discordant language that it is ready to bewilder and mislead. Could the various original languages of the globe be brought into such a point of comparison, the much agitated question, whether all are derived from one, might perhaps be satisfactorily resolved. At present, the opinion of their common origin may be allowed to carry with it much probability, strengthened by many curious proofs of actual coincidence; but still satisfactory evidence *a posteriori* is wanting—an evidence such as a radical analysis in the manner now pointed out would alone be capable of furnishing.

Although we cannot attain to any complete discovery of the actual origin and progress of the different languages spoken in various parts of the world, yet some interesting facts, in regard to the transmission, migration, and filiation of languages, are within our reach. A few remarks on that subject may therefore with propriety be here introduced.

From the most ancient and most authentic of all historical records, the Sacred Scriptures, we know the fact, that all mankind were originally descended from a single pair, and that our great progenitor did undoubtedly possess and make use of articulate language. What the particular language was which was then employed we have no means of ascertaining. We are, however, sufficiently warranted to conclude, that this primeval language must have consisted at first of very few and simple sounds, and that it was gradually extended, as the new situations of men in society required new modes of expression. The primitive language, in all probability, continued radically the same, though enlarged by accessions closely related to the parent stock, during the whole antediluvian ages; and there is little reason to doubt, when we take into view the longevity of the patriarchs, affording opportunities to men of different generations to mingle together, that from Adam down to Noah the language first made use of suffered no essential change. When the tremendous event of the deluge reduced the whole population of the earth to a single family, the primitive language, as received and used by the patriarch Noah, would still be preserved in his family, and form the only language then used among men. In this state, we find that language continued till the confusion of tongues at Babel, before which period, we are assured by the sacred historian, "the whole earth was of one language and of one speech." Whether this primitive language was the same with any of the languages of which we have still any remains, has been a subject of much dispute. That the primitive language continued at least till the dispersion of mankind consequent upon the building of Babel, there seems little reason to doubt. When, by an immediate interposition of divine power, the language of men was confounded, we are not informed to what extent this confusion of tongues prevailed. It is unnecessary to suppose, that the former language was completely obliterated, and entire new modes of speech at once introduced. It was quite sufficient, if such changes only were effected, as to render the speech of different companies or different tribes unintelligible to one another, that their mutual co-operation in the mad attempt in which they had all engaged might be no longer practicable. The radical stem of the first language might therefore remain in all, though new dialects were formed, bearing among themselves a similar relation with what we find in the languages of modern Europe, derived from the same parent stem, whether Gothic, Latin, or Sclavonian. In the midst of these changes, it is reasoned to suppose that the primitive language itself, unaltered, would still be preserved in some one at least of the tribes or families of the human race. Now in none of these was the transmission so likely to have taken place, as among that branch of the descendants of Shem, from which the patriarch Abraham proceeded. Upon these grounds, therefore, we may conclude, that the language spoken by Abraham, and by him transmitted to his posterity, was in fact the primitive language, modified indeed and extended in the course of time, but still retaining its essential parts far more completely than any other of the languages of men. If these conclusions are well founded, they warrant the inference, that, in the ancient Hebrew, there are still to be found the traces of the original speech. Whether this ancient Hebrew more nearly resembled the Chaldean, the Syrian, or what is now termed the Hebrew, it is unnecessary here to inquire; these languages, it has never been denied, were originally and radically the same, though, from subsequent modifications, they appear to have assumed somewhat different aspects.

The dispersion of mankind was a necessary effect of the multiplication and increase of the families of the human race; and in this dispersion we shall find the great sources of new and essential changes of language. A change of situation most generally infers a change of climate operating on the organs of speech, and still more extensively affecting the productions of the earth, the nature and number of human wants, and the means of supplying them. Most frequently, too, does the change of situation give rise to new occupations and pursuits, and these to the widest and most essential differences in the state of society and the modes of life, of manners, and of thought. In all these changes, it is almost impossible that language should fail to undergo many alterations; new objects and pursuits require new expressions and new modes of speech; and if the dispersed and migrating colonies be so completely separated by barriers difficult to pass, that little or no communication with them can be had, it is easy to see, that where the languages originally brought with these colonies were scanty and incomplete, the change of language might be so great and so rapid, that the languages would soon appear to be totally different, and much attention would be required to trace out the original affinity. As these colonies diverged still farther, new differences would arise, till the original stem became often nearly imperceptible.

Of the dispersion of mankind after the flood, we have a succinct account in the 10th chapter of Genesis. The three sons of Noah spread their families in different directions; from Shem proceeded the Elamites or Persians, the Assyrians, the Syrians, and Hebrews; from Ham, the Cushites, Egyptians, Ethiopians, and inhabitants of Africa; from Japheth, the inhabitants of Northern Asia, and of the greater part of Europe. The original language carried in each of these directions must have suffered numerous changes, so that in time it is not wonderful, that the traces of mutual analogy should in a great measure disappear; still coincidences are occasionally discovered, which give a high degree of probability to the notion of the common origin of the whole.

When the first migrating colonies had established themselves in a particular territory as a permanent residence, the language which they carried with them would assume a peculiar and distinctive character; and if some ages afterwards elapsed before it was again necessary for any new colony to migrate, the particular language of that territory would be so completely formed, and so firmly rooted among all the members of the community, that much of it would necessarily be carried along with any colonies that should afterwards be sent forth, and thus would form the language of any new settled territory.

It is a fact perfectly well ascertained, that migrations of whole communities, in quest of new settlements, were common in ancient times. Each of these national colonies, then, would bring with them their peculiar speech; so that it is not in the least wonderful, that in many regions over which successive waves of population passed, a language should in process of time arise, composed of several of the preceding ones, blended and amalgamated, as it were, into one common mass, and constructed with peculiar characters and idioms of its own. Thus, it is probable, were formed the languages of ancient Greece and Italy; and thus it is evident also arose all the languages of modern Europe.

Proceeding upon these grounds, we may conceive the original language of the family of Noah spread in various directions; carried by one set of colonies through Armenia, Persia, and the adjacent territories, into all the regions of the east, as far perhaps as Tartary and China, and forming the groundwork of the Armenian, the ancient Persian, the Sanscrit, perhaps too of the original spoken Chinese, as well as of all the languages related to each of them; carried by another set into the regions of Arabia, Egypt, Abyssinia, and the remote parts of Africa, and there giving origin to the old Egyptian, the Coptic, the Æthiopic, and their related tongues; again carried by a third set to Scythia, or the Russian territory, Asia Minor, Ionia, Greece, Italy, and gradually through the farther parts of Europe, and there constituting the radical groundwork of the old Pelasgic, the Gothic, the Celtic, and all their kindred or derivative dialects. Among those families whose migrations were least extensive, this primitive tongue, undergoing fewest changes, would retain most of its original form; and thus it is probable, that in the language of Jacob and his descendants, of the Phœnicians, the Chaldeans, and the communities connected with them, more of the primitive form and character remained, than among the remoter and more widely scattered tribes that spread through Africa and Europe.

If these theoretical views of the filiation of tongues cannot be fully and directly confirmed by the immediate comparison of the different languages, as they now are found to exist, this is not in the least to be wondered at, considering the inevitable changes many of them must have undergone in their progress through different countries; but if we attentively mark the precise manner in which such changes might be expected to operate, and make the necessary allowances on that account, in comparing the apparent ground-work of the languages scattered over the globe, a coincidence will be found, far closer and more striking than could at first be supposed.

Changes in language, let it be observed, may take place upon single words, by a sort of caprice among different tribes, introducing sometimes a transposition of letters, sometimes an insertion of letters, for the sake of a real or fancied euphony: sometimes a contraction or abbreviation of letters, probably for the sake of dispatch; and sometimes a reduplication of particular syllables, perhaps from some ideal emphasis attached to them. Of all these occurring in the same language, we have examples familiar to us, both in our own vernacular tongue, and in others with which we are generally conversant. But changes of this kind are particularly observable in the transplantation of a word from one language into another. Thus, μοϱφη in Greek became *forma* in Latin; from the Latin *granarium* we derive our word *garner;* the Celtic *ros* has become our *horse*, just as, in common Scotch, the English *grass* is changed into *garse*, *thirty* into *thretty*, *cross* into *corse*. Consonants of the same order, too, are often interchanged; *p* is used instead of *b*, *d* instead of *t*, *g* for *k*. An aspirate is very frequently thrown in, by which *p* in one language becomes φ or *f* in another; *d* or *t* becomes *th*, and *g* or *c* the aspirated *gh*. In transplanting words, likewise, it is very common for one people to add, and another to take away, the peculiar terminations which characterize different tongues. The Latin *regnum* became *reign* in English, *cœlum*, *ciel*, in French; *Ultrajectum* was made *Utrecht;* *pondus* became the French *poids;* *sermo*, on the other hand, became *sermon*, *oratio*, *oration*, and so of others.

Nor is it only in regard to sound and form, that variations ensue in transplanting words; alterations slighter at first, but afterwards remarkable, often take place in their meaning and application. A part of a thing comes to be used for the whole; the genus becomes the species; proper names become appellatives; the instrument and cause are substituted for the effect; the sign for the thing signified, and the thing containing for the thing contained. New combinations are often formed from change of circumstances, by which one part of the meaning of a word only is retained, but much of the original idea forgotten.

In these, and many other ways, words may change sometimes their form, and sometimes their application, in passing from one people to another; yet, upon proper attention, their radical identity will be perceptible. In the investigation of radicals, therefore, it would be proper first to begin by throwing off the prepositive particles and idiomatic terminations, retaining only what may be termed the matrix of the word; next, to compare together the corresponding word in different languages, making the distinctive genius of each, and thus gradually to proceed from one to another, as along the links of a continued chain, till the remoter relations become apparent. We are at liberty also to consider letters of the same organ as commutable, labials with labials, gutturals with gutturals, dentals with dentals, and palatines with palatines; all nations have assumed the liberty of such changes in the comparison of tongues; therefore these are invariably to be looked for.

Keeping these general principles in view, it will be obvious that affinities, and close affinities too, may be found, where none could at first have been suspected. That our term *journey* is from the Latin *dies*, might at first seem absurd; but by observing that from *dies* comes *diurnus*, from that the Italian *giorno*, the French *jour* and *journée*, we are at once led to the source of our *journey*. *Bishop* seems little related to *episcopus;* but when we find that the word was anciently *biscop*, and that *p* and *b* are consonants of the same organ, the identity becomes evident.

If, then, we wish to attempt the discovery of the radical identity of languages, we must be prepared to meet with, and to make the necessary allowances for, multiplied changes in the modes we have enumerated; and if these necessary allowances are made, the filiations of language often present a curious and interesting subject of contemplation. The subject, however, is too extensive to be fully taken up in such a work as this; a few remarks only on some of those languages which are best known to us may be introduced.

Of the ancient languages of which any knowledge remains, the *Hebrew* certainly claims the first place, on account of its undoubted antiquity, its peculiar structure, and the strong claims it seems to have to be considered as either the same with, or at least the immediate descendant of the primitive tongue. It is a language much admired by those who understand it, and must ever be of high importance as the original vehicle of the revelation of the divine will to man. In it the cases of nouns are denoted by prepositions prefixed; the tenses of the verbs are three—the past, present, and future, formed by certain additions to the root, and, properly speaking, it has but one conjugation. It is regularly formed from roots within itself, and these roots are for the most part monosyllabic, consisting generally of three letters, sometimes, but rarely, of four.

That this language was in fact the same with the *Phœnician*, and other languages spoken through Palestine and the neighbouring countries, in the earlier times, as far at least as Syria, Mesopotamia, and Chaldea, seems pretty generally admitted. Of the other early languages, the ancient Persian, the Egyptian, and the Scythian, we know so very little, that it would be hazardous to say more, than that their relation to the Hebrew admits of little doubt. In spreading to the westward through Asia Minor into Greece, this ancient language, transplanted by the Phœnicians, became, through the medium of the old *Pelasgic*, the parent of the *Greek*.

The *Greek* language is too well known to require any particular illustration. Its copiousness, elegance, and force, have been the subject of universal panegyric. The Greek language was evidently first brought in a rude state from Phœnicia into Greece and the Grecian islands; its most ancient dialect, the Æolic, the parent of the Doric, exhibits probably the earliest form in which it appeared in its new soil. Transplanted into Ionia, it assumed a softer aspect, suited to the disposition of a poetical and musical people. Carried onwards to Attica, it became the language of business and active life in an enterprising, commercial, and at the same time an intelligent and polished nation. There, accordingly, as we find in the *Attic* dialect, it was subjected to abbreviations and contractions, adapted for dispatch, but, at the same time, regulated on the truest principles of elegance and taste. Though the Greek language is justly regarded as forming its words from roots within itself, and has accordingly been distinctly analyzed into its radical primitives, yet these very primitives exhibit so full a resemblance to corresponding roots in Hebrew, that the identity of origin cannot be doubted. The duration of the Greek language from Homer down to the times of the Lower Empire, exceeds that of most other languages; and even yet, although much corrupted, it holds its place in the countries where it once was fixed.

From the earlier Greek proceeded the *Latin*, which is in fact little else than the Æolic Greek, with a mixture probably of some Etruscan and Sabine, and perhaps some German and Gaulic words, gradually received from the neighbouring countries.

While the languages we have mentioned were thus formed in early times, it is probable that the foundations of the *Gothic* and the *Celtic* were also laid. How far back, however, we are to date the first formation of these languages, and in what order they spread through the northern and western countries of Europe, has been a subject of controversy, agitated with a keenness rather disproportioned to the importance of the subject. Both of them appear evidently to have been brought, at a rémote period, from the regions bordering on the Caspian and Euxine Seas, by colonies passing northward and westward in quest of a settlement. It is not improbable, that at first the two languages were not very dissimilar; and even yet many resemblances in their structure may be traced. The Gothic spread through the north of Europe, and was evidently the parent of the *Danish*, the *Swedish*, the *German*, and the ancient *Saxon*. Of one branch of the Gothic tongue, the *Mæso-Gothic*, we have a valuable fragment in the translation of the Gospels by Ulphilas, written so early as the fourth century; which, although only a fragment, and consequently containing but a small part of its words and phrases, is still highly curious, from its exhibiting the early state of that language, and enabling us to ascertain the near relation of the Saxon, German, Danish, Swedish, Icelandic, and Anglo-Saxon, to the Gothic, as well as the affinity of all of them to the Phœnician, the original Greek, and even the Persian and Sanscrit. The *Celtic* is by no means yet extinct; dialects of it are spoken in the Highlands of Scotland, in Ireland, in Wales, in that part of France named Bretagne, and in the Spanish province of Biscay. Both, in the modes of inflection, resemble the Greek; in the roots from which vast multitudes of their words themselves are formed, the most striking similarity can easily be traced.

Of the original language of our own country, there is some difficulty in fixing the origin. So far as can be conjectured, it rather appears, that the earliest inhabitants spoke the Celtic language, and that, by successive impulses of the tide of population, new races of settlers, spreading in different directions, superinduced certain dialects of the Gothic. Accordingly, we can collect from our venerable Saxon historian Bede, that in his day four languages prevailed in Britain—the *Irish*, the *British* or *Cumraig*, the *Pictish* or *Scandinavian*, and the *Anglo-Saxon*. Of these, it is probable that the relation was not very distant; and if the ascending line were far enough followed up, they would all be found to terminate in one.

The languages of the various other countries of Europe underwent similar revolutions; but it would be tedious to trace them through their separate stages. In the southern states, the Latin tongue had been universally established, under the dominion of the Romans. The incursions and establishment of the northern tribes introduced new modes of speech, which, blending more or less with the native tongues, gave rise to the various modern languages of southern Europe.

Towards the north-east of Europe, the *Sclavonic* tongue, with its affiliated dialects, *Bohemian*, *Polish*, *Hungarian*, *Lusatian*, *Carinthian*, *Dalmatian*, and the widely extended *Russian*, have for many centuries prevailed. The affinity of the Sclavonic through its different dialects to the Macedonic Greek, is apparent in many of its inflections, but above all in its radical terms, when thoroughly analyzed and stripped of the additions and mutations introduced in the channels through which it has passed.

While the primitive tongue appears thus to have been carried in various forms to the north and west, its progress eastward gave rise to a different, though not less remarkable set of languages. Of these the most eminent is the *Sanscrit*, a polished and elegant tongue, and fixed in the writings of its classic authors at a period it is thought prior to the commencement of the Christian era. Both in the roots of verbs and forms of grammar, the Sanscrit is found to bear so close an affinity both to Greek and to Latin, that those philosophical writers who have attended to its structure, do not hesitate in considering it as a branch of that primeval tongue which was gradually transplanted into various climates, becoming *Sanscrit* in India, *Pohlovi* in Persia, and *Greek* on the shores of the Mediterranean.

The Sanscrit, though it has now in a great measure ceased to be a living tongue, is considered in India as the language of science; and it is pretty certain, that it was the immediate parent of the numerous languages still spoken through that vast peninsula as far as the borders of China. Two-and-thirty at least of those more obscure and inferior languages have been recognised and distinguished by the missionaries at Serampore; and it is worthy of notice, that while many of those vary considerably in their inflections, the radical parts of their words exhibit a similarity sufficient to ascertain their common origin.

To the eastward of India we find a language prevailing, totally dissimilar in many respects to those which have already come under notice, the language of *China*, made up in a great measure of monosyllables, and which can hardly be said to have any inflections for distinguishing nouns, verbs, or attributives. Its distinct words are very few, but these are varied in pronunciation by accent, emphasis, and other marks, to fit each of them for expressing many different ideas,—a mode of speech so inconvenient and embarrassing, that recourse must often be had to the written character for indicating the particular meaning. These written characters constitute in fact the substantial part of the language; they are extremely numerous, amounting it is said to no less than eighty thousand, formed from 214 roots, termed keys or elementary characters, each of which is itself significant, and by additions to which, not to the vocal sounds, all the varieties of meaning are conveyed. In this language, from its peculiar structure, as well as in the languages of many remoter tribes and islands, so many changes appear to have taken place, that the traces of the primitive language have almost ceased to be discernible.

Having thus endeavoured to take a general view of the actual progress and filiations of language in the different quarters of the globe, it remains only to notice the circumstances which constitute THE EXCELLENCE AND PERFECTION OF LANGUAGE. These may in general be stated to consist in *perspicuity and adequate copiousness*, affording accurate expressions for all the various conceptions and separate ideas of the human mind; *precision*, having always one definite meaning to each word; *regularity of structure;*

[illegible] in its sounds. No language possesses all of these qualities completely; some, however, approach nearer than others to perfection. Any inquiries, however, into the comparative excellencies of each, and particularly the discussion of the much agitated question, whether those languages are to be deemed most perfect, which, like the ancient Greek or Latin, mark the changes of nouns and verbs by inflections of the words themselves; or those which, as the modern languages of Europe, have recourse to separate particulars and auxiliary words? are subjects which belong more properly to Rhetoric. The same remark applies to the discussions regarding the use of language in composition, and the various modes in which it may be best adapted to the use of the poet, the orator, the historian, and the philosopher.

It may be right here, just to mention the ingenious but visionary attempt of Bishop Wilkins to construct a *philosophical language and real character*, in which the objects of knowledge were to be arranged under certain heads and divisions, and words and characters to be formed with changes corresponding to each. The impracticability of reducing such a system to practice, and bringing into use even among the learned such a language, is too obvious to require discussion.

The writers upon language most deserving attention, are mentioned under the article Grammar; to those taken notice of there may be added, Townsend *On the Character of Moses*, vol. iii.; Jenisch *Comparison of European Language;* and Dr. Dewar's *Dissertation on Language*, in the 7th volume of the *Edinburgh Philosophical Transactions;* Bryant's *Mythology;* Pezron's *Antiquities.* (δ)

LANGUEDOC. See France.

LANTERN, Magic. See Optics.

LAOCOON, in fabulous history, the son, it is said, of Priam and Hecuba, and priest of Apollo. He opposed the design of the Trojans, to admit within their besieged city the wooden horse, containing the crafty Ulysses and the other Greeks; and even dared to lance a dart at this fatal machine. But the artifice of Sinon, aided by the infatuation of the Trojans, prevailed. At the very moment, when this insidious machine was about to be introduced within the walls of Troy, and while Laocoon was in the act of sacrificing to Neptune, two enormous serpents issued from the sea, and attacked his two sons, who stood next to the altar. Having attempted to defend his sons, the serpents coiled themselves round him and his children, squeezed them in their complicated wreaths, and occasioned them all to expire in the greatest agonies.

The art of antiquity has conferred immortality upon this fabulous event, by one of the noblest monuments of Grecian sculpture, executed in marble by Agisander, Polydorus, and Athenodorus, the three famous artists of Rhodes. This monument was found at Rome, in the ruins of the palace of Titus, in the beginning of the 16th century, under the pontificate of Julius II. and afterwards deposited in the Farnese palace. When Italy was overrun by the French during the late revolution, this wonderful monument of ancient art was, with many others, removed from the Vatican, and placed in the Museum of Arts at Paris. Since their more recent reverses, however, it has been restored to its former owners.

Of the fact which has been so nobly represented by the efforts of the sculptor, Virgil has given us the following poetical description:

> Serpens amplexus uterque
> Implicat, et miseros morsu depascitur artus
> Corripiunt, spirisque ligant ingentibus, et jam
> Bis medium amplexi, bis collo squamea circum
> Terga dati, superant capite et cervicibus altis
> Æn. b. ii. v. 199, *et seq*

The statue, which has been generally esteemed as one of the finest remains of antiquity, exhibits the most astonishing dignity and tranquility of mind, in the midst of the most excruciating torments. Of this group, Pliny says, (lib. 36, § 5.) "that which has been injurious to the fame of certain individuals, in spite of the excellence of their productions, is the circumstance of their having worked together on the same piece; since one alone cannot merit the honour of the whole, and we do not choose the trouble of naming them all. Such is the case respecting the Laocoon, in the palace of the Emperor Titus, which must be preferred to all the efforts of the painter's and of the statuary's art. Agisander, Polydorus, and Athenodorus, celebrated sculptors of Rhodes, united their joint abilities, in forming out of a single block the group of the father and his sons, bound together by the beautiful folds of the serpents." The Laocoon, according to Dr. Gillies, may be regarded as the triumph of Grecian sculpture; since bodily pain, the grossest and most ungovernable of all our passions, and that pain united with anguish and torture of mind, are yet expressed with such propriety and dignity, as afford lessons of fortitude superior to any taught in the schools of philosophy. The horrible shriek which Virgil's Laocoon emits is a proper circumstance for poetry, which speaks to the fancy by images and ideas borrowed from all the senses, and has a thousand ways of ennobling its object; but the expression of the shriek would have totally degraded the statue. It is softened, therefore, into a patient sigh, with the eyes turned to heaven in search of relief. The intolerable agony of suffering nature is represented in the lower parts, and particularly in the extremities of the body; but the manly breast struggles against calamity. The contention is still more plainly perceived in his furrowed forehead; and his languishing paternal eye demands assistance, less for himself than for his miserable children, who look up to him for help.

A variety of critical disquisitions have been written, for the purpose of ascertaining to what period of the arts this *chef d'oeuvre* belongs. Winklemann and Visconti ascribed it to the most brilliant period of the Greeks; while Lessing, on the other hand, referred it to the times of the first Roman emperors. Visconti has since gone over to the opinion of Lessing, though he proceeds upon different grounds. Pliny says, the group was sculptured out of a single block; Raphael, however, discovered three; Mengs counted five; and it appears in reality to consist of six, including the plinth on which the altar rests, and to which the other pieces of the block are attached. The right arm of the father, and two of the arms of the children, are wanting. These deficiencies have been supplied by arms, moulded on the group in plaster of Paris. See Gillies' *Hist. of Greece*, ii. 177; Winkelmann's *Inedited Monuments;* Lessing's *Laocoon;* the *Description of the Ancient Monuments in the Museum Napoleon*, published at Paris in 1805; and Plate CCXXXIV. Fig. 1. of this work. (z)

LAON, the *Laodunum* of the Romans, is a town of France, and the chief place of a district in the department of the Aisne. It is beautifully situated on the summit of a hill with very precipitous flanks, and is seen on all sides at the distance of seven or eight leagues. The town covers the greater part of the level summit. An old castle occupies another part of it; and on one place, the top branches out into two arms on the side towards Soisson, from which it got the name of *Bibrax*. On one of these arms are the ruins of an ancient abbey, the outer walls of which still remain; and the hollow between them is covered with vines. The walls of Laon are not in good repair. There is a fine mall without the walls, and a delightful walk around them, from which there is a most extensive view. There is also a mall with young trees stretching across the summit, and separating the town from the old castle.

The streets of Laon are narrow and dirty, and the houses appear poor and gloomy. The principal ornament of the town is the cathedral, which is a large and splendid building, with five very lofty towers. The open buttresses, and the long open windows in the square towers, give a peculiar air of lightness to the building when seen from a short distance. But at a considerable distance, and particularly in the night, they give it the appearance of a scaffolding, the light coming through in every direction. The great portal is not unlike that of Rheims; but it is less elegant in the sculptures. There is a small spire on the south tower of the cathedral. The interior of the cathedral is very fine. In the nave are ten circular pillars on each side, with capitals; two of them on each side having four small columns round it. Above the choir, is a most magnificent circular window of painted glass. There is another fine circular window in the nave, above an excellent organ, and at each end of the transept. On the north side of the nave in a small aisle, are deposited the remains of General St. Priest, who died at Laon of the wounds he received in the campaign of 1814. A small and simple marble monument has been erected to his memory. The theatre of Laon is a neat building, with an end front finely sculptured. The public hospital is situated out of the town, on the road to La Fere. Population 6691. For the preceding article, we have been indebted to the MS. journal of a gentleman who recently visited the town.

LAOS-LAO, or **Muong-Lao**, a country of Asia, is situated in the peninsula of India, beyond the Ganges, between the 12th and 18th degrees of North Latitude. It is bounded on the south by Cambodia; by Cochinchina and Tonquin on the east; by Tonquin and Lac-tho on the north; and on the west by the kingdom of Siam; and extends about 400 miles from north to south, and between 100 and 150 from west to east. It is almost entirely enclosed by lofty mountains covered with forests. In the interior are also several mountains of considerable height, which divide it into rich and fertile vallies. Many of these mountains are so peaked, that the ascent is very difficult, and even dangerous; and the tops of some of them cannot be approached without taking a winding and circuitous direction. There are very few rivers, and no canals in this country, which forms an almost insurmountable obstacle to the exportation of its productions, and its communications with the neighbouring states. The principal river is the Mecen, which is of difficult access, owing to its channel being so much impeded by rocks and cataracts. This river, which has been supposed by some to be a branch of the Ganges, takes its rise in the mountains of Tartary, and, directing its course southward, discharges itself into the sea in Lat. 10° north. This country yields a great abundance of rice, and timber of the finest quality, both for building and joiners' work. It produces also aloes wood, and other precious woods, and a tree, from which is extracted a varnish not inferior to that of Japan; but as the inhabitants are entirely ignorant of the art of preparing it, it is all carried to China. Scarcely a tenth part of the land here is under cultivation, and that is employed chiefly in the production of rice, which is preferred to that of other oriental countries. The mountains of Laos contain several rich mines of copper, iron, tin, and lead; and the precious metals are explored in the sands of the rivers. There are also mines of rubies and beautiful emeralds. No country furnishes ivory in such quantities, and of such a superior quality; and this, with gum-lac, opium, and medicinal plants, form its principal articles of commerce. It exports also elephants, wax, a great variety of bamboos, and some cotton stuffs.

This country was formerly an independent kingdom; but it now forms a part of the empire of Tonquin. The manners and customs of its civilized inhabitants are in many respects similar to those of Tonquin, for which see that article; but the more barbarous part of the population live entirely secluded from strangers, and are scarcely removed from the most savage tribes. They are formed into wandering hordes, which have very little communication with each other; so much so, indeed, that the language of one horde is scarcely intelligible to another. They are entirely unacquainted with commerce, or the cultivation of the soil. They live upon the natural produce of the earth, and engage in no kind of labours but what is absolutely necessary for the supply of their most indispensable wants. There are whole families in this country, who, for several generations, have been employed in the capacity of beasts of burden. They carry bales of merchandize from Laos to Tonquin, and sometimes from Tonquin to Laos. Men, women, and children, as soon as they are able to endure the fatigue of the journey, are engaged in this work. They form a distinct class of the community, and there is scarcely an instance of any of the children renouncing the profession of their parents.

The capital of this country, which is called by the Chinese Mohangheng, stands on both sides of the *Mecen*, and is a large city enclosed with palisades. See *Exposé Statistique du Tunkin, &c.* London, 1811. (*p.*)

LAPLAND.

Lapland, the most northerly country of Europe, extends from north to south about 500 English miles, and about 300 from west to east. Its limits are not very precisely ascertained; but it may be said to be included between the 64° of North Latitude and the Northern Ocean, and between the North Cape and the White Sea. It consists of three distinct divisions, Russian, Norwegian, and Swedish Lapland. Russian Lapland comprehends all that part of the country, which is situated to the east of the river Torneo, (which falls into the Gulf of Bothnia, about 65° 40′ North Latitude, after holding a course nearly due south); and is subdivided into three districts, one stretching along the north coast, another bordering on the White Sea, and a third inland, adjoining to the lake Enarak. Norwegian Lapland, the smallest division, is a narrow strip along the west and north coast, divided into three portions, named Norland, West Finmark, and East Finmark. Swedish Lapland, which is the largest and most southerly division, occupies the interior part of the country, on the west of the river Torneo: and is divided into four provinces, namely, Umea Lapmark, to the south; Pitea Lapmark, in the centre; Lulea Lapmark, and Torneo Lapmark, towards the north. The city of Torneo was doubtless originally reckoned within the boundaries of Lapland; but as the Laplanders have been gradually driven northward. Merononiska, a town about 110 miles distant from Torneo, is now generally considered as the boundary between Westrobothnia, and Lapland properly so called. Lapland has been divided by Wahlenberg into five zones, concentric with the Gulf of Bothnia, and differing from each other in climate and productions. The first, extending obliquely round the Gulf of Bothnia, from North Latitude 64° to nearly 69°, and forming a zone generally 80 miles in breadth, is covered with forests of the spruce and Scotch fir, and named woody Lapland. The second, higher and colder than the first, extending from latitude 65° to nearly 70°, and generally only 6 or 8 miles in breadth, contains the Scotch fir, and is denominated subwoody Lapland. The third, higher than any of the preceding, stretches, like the second, from 65° to 70° of North Latitude, generally about 12 miles in breadth, except to the north-east of Enontekis, where it is about 40°, produces the birch, but none of the pines, and is called the subalpine region. The fourth, immediately behind the third, and nearly of the same breadth, and still higher than any of the preceding, produces only the *Salix glauca*, a species of willow peculiar to very cold climates, and is named the lower alpine region. The fifth, the farthest from the Gulf of Bothnia, extending along the north side of Lapland, and varying in breadth according as it is indented by the sea, is the most elevated tract of the whole, the greater part of it being above the line of perpetual congelation, and covered with eternal snows, produces no trees, and scarcely any vegetation whatever, except a few hardy plants where the snow has been melted, is denominated the higher alpine region. The whole of woody Lapland is so level, that scarcely one of the mountains rises higher than 213 feet above the neighbouring plains; and in none of the three first zones is the height above the level of the sea considerable. In those lower districts, however, are several mountains considerably elevated; and one particularly named Quickjock, in latitude 67°, is 1140 feet above the level of the sea. The church of Enontekis is 1429 feet above the level of the sea, and thence to the top of the Lapland Alps the ground rises constantly, but so gradually, that it is practicable to go in a boat to the lake Kielesjarvi, which is in so elevated a situation, that the birch tree is scarcely to be found in its neighbourhood. The Lapland Alps, passing through the southern part of the country as high as the lake of Torneo, retain nearly the same elevation through the whole of their extent, and no part is considered to be lower than 2132 feet above the level of the sea; but the most elevated mountains occur in the southern parts of Lulea Lapmark; and one of them named Sulitelma, which is the highest mountain of Lapland, is 4903, and, at its northern point, 6178 feet above the level of the sea. This immense glacier is situated in 67° North Latitude, and 16½° East Longitude from Greenwich. Another named Olmajalos, a little to the north of Sulitelma, is 5543 feet in height; and Tulpajegna, a very extensive glacier, is 4050 feet. These mountains are more than 2700 feet above the line of perpetual congelation, and are the coldest regions of Lapland. Those of Getsetjack, Pernitjack, and Ridatjack, lying to the north of the last mentioned, are supposed to be little inferior in height; but, from 68⅓° of North Latitude, the alpine range, which continues with little interruption till it terminates at the North Cape, in the Frozen Ocean, diminishes in height; and, though covered with snow, is free from glaciers. Of the maritime Alps, which occupy the western and northern part of Lapland, the principal chain, extending from the insular promontory of Lofoden, and the western side of the gulf of Alten, contains many mountains, which rise above the line of perpetual congelation, and bear glaciers immediately over the sea. The highest of these are the Alps of Lyngen, which rise to an elevation of 4264 feet. The rest of the coast of Lapland is very rocky; but, excepting the promontory of Kunnen, scarcely contains any high mountains. The promontories of eastern Finmark do not exceed an elevation of 2132 feet above the level of the sea; and those on its north coast are only 1279 feet in height.

"It is extremely entertaining," says Baron Von Buch, "to climb great and rapidly ascending heights in these climates." "The vegetation, with which we are familiar in the vallies, gradually disappears under our feet. The Scotch fir soon leaves us; then the birches become shrivelled; now they wholly disappear; and between the bushes of mountain willows, and dwarf birches, the innumerable clusters of berry-bearing herbs have room to spread, blae-berries on the dry heights, and mountain brambles on the marshy ground. We at last rise above them; the blae-berries no longer bear; they appear singly, with few leaves, and no longer in a bushy form. At last they disappear, and they are soon followed by the mountain willows. The dwarf birch alone braves the height and the cold; but at last it also yields before reaching the limit of perpetual snow; and there is a broad border before reaching this limit, on which, besides mosses, a few plants only subsist with great difficulty. Even the reindeer moss, which rises in the woods with the blae-berry in luxuriance of growth, is very unfrequent on such heights. On the top of the mountains, which is almost a table-land, there is no ice, it is true, nor glaciers; but the snow never leaves these heights; and a few single points and spots above the level are alone clear of snow for a few weeks." "It is a melancholy prospect; nothing in life is any longer to be seen, except perhaps occasionally an eagle in his flight over the mountains from one fiord to another." On Akka Solki, one of these mountains on the western coast, which is about 3392 English feet in height, the following limits of the different productions were accurately marked:

	Eng. Feet.
Limit of snow in latitude 70°, ...	3514
Betula nana, or dwarf birch, ...	2742
Salix myrsinitis, or whortle-leaved willow, . .	2150
Salix lanata, or downy willow, rises above the *Betula nana*, and approaches the perpetual limit of snow.	
Vaccinium myrtillus, or blae-berry, ...	2031
Betula alba, or birch-tree, ...	1579

Of the mineralogical structure of the mountains of Lapland, little accurate information has yet been collected; but the following facts are enumerated by Professor Jameson, as the most important of those which have been ascertained by the observations of recent travellers. 1. The mountains of Norway and Lapland are principally composed of primitive and transition rocks; flœtz rocks occur very rarely; and alluvial rocks are uncommon. 2. Granite, contrary to the general belief of mineralogists, is a rare rock in Norway and Lapland; it even occurs but seldom in Sweden, and is to be considered as one of the least frequent of the primitive rocks in Scandinavia. 3. The granite frequently alternates with gneiss. 4. A newer granite sometimes occurs resting on mica slate, as at Forvig; or connected with clay slate and diallage rock, as in the island of Mageroe. 5. Besides the gneiss, which is associated with the oldest granite, there is another of newer formation, which rests upon mica slate. 6. Gneiss appears to be by far the most frequent and abundant rock in Scandinavia, all the other primitive rocks appearing in some degree subordinate to it. 7. In the island of Mageroe, and in other quarters of Norway, there appears a species of simple aggregated mountain rock, composed of compound felspar and diallage. This rock is the gabbro of the Italians, and appears in Norway to be connected with clay slate. 8. All the magnetic iron-stone of Scandinavia occurs in beds of gneiss, and not in veins, as has often been maintained by mineralogists. 9. The class of transition rocks in Norway contains, besides grey wacke, alum slate, clay slate, limestone, and other rocks, well known to mineralogists as members of that class; as granite, which sometimes contains hornblende; syenite, which contains Labradore felspar, and numerous crystals of zircon; porphyry; amygdaloid; basalt; sandstone. 10. The transition limestone of Norway, sometimes granular foliated, like that which occurs in primitive countries, and contains much tremolite. The country abounds in mines of iron; and furnishes several also of copper. Lead, zinc, and arsenic, are not uncommon; and native gold has been found at Svappawara, in Torneo-Lapmark. But the rich iron ores form the chief treasures of the country, and might assist to introduce cultivation in those desert regions. The ore is found in thick beds in the gneiss, and, when the surrounding substance is worn down, appears in many places above the surface like mountains of iron. The bed of Junos Siwando, on the boundary between Western Bothnia and Lapland, is from fourteen to fifteen fathoms in thickness. At Luossovara and Svappawara, several miles lower on the banks of the Torneo river, are beds of the extraordinary thickness of 34 and 38 fathoms. But even this is still exceeded by the iron hill of Kerunaoara, about eleven English miles to the west of Jukasjerfivi, where the pure ore has been seen to the extent of 800 Paris feet. All these treasures, however, have hitherto been turned to little account, as the ore must be conveyed by a land carriage of 46 English miles with reindeer, and in small Laplandish pulkers; and the furnaces cannot be erected nearer the mines, in consequence of the want of wood. The ore itself, though exceeding in richness that of Sweden, is very difficultly fusible, and yields an iron which becomes brittle when cold, unless it has been smelted with some of the better sorts of ore from Uto or Dannemora.

The principal rivers of the country are, the Tana, which rises in the distant mountains of Lapland, and, after running through East Finmark in a north-east direction, empties itself into a bay, or rather sound, of the same name, in the North Sea; the Alten, which runs through West Finmark in a north-west direction, and empties itself into a bay, or rather sound, of the same name, which opens into the ocean; the Pitea, which rises in the Lapland Alps towards the west, about 67° North Latitude, and running in a south-easterly direction, falls into the sea at Pitea, near the 65° of North Latitude; the Lulea, which proceeds from a long succession of lakes in the Lapland Alps, and running nearly parallel to the Pitea, falls into the sea at Lulea, in 65½° North Latitude; the Tornea, which is formed by a number of streams uniting in one channel, and running nearly due south through a long course, falls into the northern extremity of the Bothnian Gulf at Torneo. Most of the rivers in Lapland are of small size during winter; but, when the snows melt in summer, they swell to an extraordinary height, and frequently inundate large tracts of country.

The lakes of Lapland are very numerous, and many of them of great extent. The most worthy of notice are Virih-jaur and Vastinjaur, to which no others within the alpine range can be compared, either in breadth or height, which amounts to 1862 feet. Hence these lakes may be considered as the centre of the alpine country of Lapland.

The climate of Lapland is singular, especially as it affects vegetation. The temperature of the air is regulated, not as in other parts of the world by the latitude of the place, but by the height above the level of the sea, and the distance from the Gulf of Bothnia. Hence the temperature is remarkably similar through the whole extent of country between the Bothnian gulf and the alpine ridge of mountains, about 69° of North Latitude. But in those parts which lie between the Lapland Alps and the Northern Ocean, the heat, excepting in some of the vallies, is almost entirely regulated by the latitude. In point of temperature, therefore, Lapland may be divided into two regions, the inland and the maritime. In the former, the winter is very severe, and the summer very hot; in the latter, the winter is comparatively mild, and the summer cold; the one being influenced by the temperature of the Frozen Ocean, and the other screened from its action by the alpine ridge forming a circle round it. The following Table furnishes a comparative view of the mean temperature in both regions, by Fahrenheit's thermometer.

	At Enontekis, about 68½ degrees, 1429 feet above the level of the Sea.	At Mageroe, North Cape.
January	0° 41′	22° 08′
February . . .	0 55	23 16
March	11 41	24 71
April	26 02	30 02
May	36 56	34 07
June	49 49	40 14
July	59 63	46 42
August	55 89	43 70
September . .	41 78	37 62
October . . .	27 44	32 00
November . . .	12 20	25 75
December . . .	1 01	25 74
	26 85	32 13

Though the mean temperature at Enontekis is nearly 6° lower than at the North Cape, yet is the former place better calculated for vegetation than the latter, and even brings to maturity certain kinds of corn, which is quite out of the question at the Cape. The reason is, that the mean temperature, during the summer months, is much higher at Enontekis than at the Cape; and the power of vegetation is regulated more by the heat of summer, than the cold of winter. In those countries, also, where the ground is long covered with snow, the temperature of the earth is considerably higher than that of the air, and this preserves it in a proper state for vegetation, in spite of the intense winter-cold of the atmosphere. Thus, at Enontekis the ground is constantly covered with snow, from the beginning of October to the beginning of May; while at the Cape, in consequence of the vicinity of the sea, it is more frequently exposed to thaws. Sometimes it happens in the Lapland Alps, that, when a colder summer than usual occurs, the snow lies during the whole year, and all kinds of vegetables are completely destroyed, except a few lichens, polytricha, and peltidea crocea. This is an event which occurs more frequently in Norwegian Lapland, where there are greater rains during summer, which reduce the temperature of the air, and prevent the dissolution of the snow, or even convert it into ice. The progress of the seasons may be readily perceived from the following Table of Observations, made at Utsjocki, upon the river Tana, in 69° 53′ North Latitude.

1797.	
Jan. 21.	The sun's half disk seen above the horizon.
May 5.	First rain fell.
June 5.	The ice disappeared upon the river Tana.

June 2[illegible]	The lakes were free from ice
Aug. [illegible]5	Night-frosts began.
Oct. 1[illegible]	The rivers froze.
Oct. 25	The lakes froze.
Nov. 3	The ground covered with snow
Nov. 2[illegible].	The sun under the horizon.

During the winter solstice, when the sun continues lasting seven weeks together below the horizon, instead of a clear day-light there is only a twilight of a few hours. It is not so dark however, but that a person might see to write, or do any ordinary business, from 10 o'clock in the forenoon to 1 o'clock in the afternoon; while the superior brightness of the moon and stars at this season, with the aid of the aurora borealis, and the reflection of the snow, supply in a great measure, the absence of the sun. The cold at this time of the year, is frequently so intense as to freeze brandy and spirits of wine. The lakes and rivers are covered with ice of extraordinary thickness; and the whole face of the country buried under snow to the depth at least of four or five feet. In the alpine regions, the lakes have been known to be frozen to the depth of a fathom on the 9th of July; and the whole range of these mountains utterly impassable in winter, on account of the extreme cold, the total want of subsistence for the reindeer, and the violent gusts of wind which overturn both men and sledges. The drifting of the snow, when newly fallen, renders it impossible to go abroad till a partial thaw has taken place, when a hard crust is formed on the surface by frost, and enables the natives to travel on their sledges with the utmost celerity. During a thaw the atmosphere is surcharged with vapours; but when the north wind blows, the air is clear and the sky beautifully serene. Thunder storms are not uncommon even in the depth of winter. At the summer solstice, the sun is as many weeks continually above the horizon as below it in winter; but his light during the night is paler, and less brilliant than during the day. The heat is then extremely oppressive, especially in the vallies; and the air is darkened by clouds of troublesome insects, which the natives have no possibility of avoiding, except by covering their heads with a cloth, or smearing their faces with tar, or involving themselves in the smoke of a fire. "The degree of heat," says Acerbi, "was twenty-nine (on the thermometer of Celsius) in the shade, and forty-five in the sun. The ground burned under our feet; and the few shrubs we met with in our way afforded us little or no shelter. We were almost suffocated with heat; and, to add to our sufferings, we were under the necessity of wearing a dress of thick woollen cloth as a security from the insects, and to cover our faces with a veil, which in a great measure prevented our drawing breath." In many parts of Lapland, the days in summer are bright, serene, and warm, and the season, though short, remarkably healthy and delightful. At Altengaard, as observed by Baron Von Buch, in 70° North Lat. the thermometer generally stood at 70° or 72° in July; and the mean temperature of the month was nearly 63°.

The soil of Lapland is generally sterile. The greater part of the country is covered with rocks, or moss, or gravelly plains, or a kind of turf composed of mosses decayed by the frost, and impregnated with standing water. There are a few tracts of tolerable soil, especially in the more southern districts.

The vegetable productions are not numerous, but more various than generally imagined. Wahlenberg's edition of the *Flora Lapponica* describes 1087 species of plants found in Lapland, more than double the number observed by Linnæus. Of this number only 496 are perfect plants; the remaining 591 are cryptogamous. Of grasses there are 102 species; of algæ, 55; of fungi, 94; of musci, [illegible]; and of lichens, 207. Of the perfect plants, the snowy Alps contain 96 species; the subalpine region, 125; and the woody region, about 313. Of trees (reckoning the salices) there are 26 kinds; consisting of the Scotch fir, spruce fir, birch, alder, poplar, mountain ash, bird cherry, and nineteen species of willows. There are no fruit trees in the country, but a variety of berries are spontaneously produced: such as black-currants, rasp-berries, craw-berries, juniper-berries, bil-berries, and the Norwegian mulberry, which grows upon a creeping plant, and is greatly esteemed as an antiscorbutic.* In the gardens towards the south, are raised cresses, spinach, onions, leeks, chives, orache, red cabbage, radishes, mustard; currants, barberries, elder-berry; wild-rose, columbines, rose campion, carnations, sweet-williams; potatoes about the size of poppy-heads; French-beans, broad-beans; and tobacco, when carefully managed; but neither white cabbage nor pease come to any perfection; and apples, pears, plums, and cherries, scarcely grow at all, though cultivated with the greatest attention. The most abundant native vegetables are sorrel, which is of great service on account of its antiscorbutic properties; angelica, which is highly relished as an article of food; and the lichen rangiferinus, which furnishes the chief subsistence of the reindeer during winter, and which the Laplanders frequently boil in broth for their own use. Of the indigenous fruits, the most delicious is the berry of the rubus arcticus; which, when sufficiently ripened, is said to be superior in fragrance and flavour to the finest raspberries or strawberries. A small plateful fills an apartment with a more exquisite scent than the finest perfumes; and it is preserved in Sweden as one of the finest sweetmeats.

Except in a few sheltered vallies, and on the banks of the rivers in the Southern districts, there are no agricultural labourers in Lapland. In some places a plough of a peculiar construction, suited to ground full of large stones, is employed in preparing the field for the seed; but in general the earth is dug by the labourer. The grain, which grows best, and is chiefly sown in Lapland, is barley, or rather big; but in the lower regions rye is occasionally cultivated; and oats have been raised even in the high level of Enontekis. It is found, that grain will not ripen in any district where the mean temperature of the three summer months does not reach to 47⅓°. Its progress to maturity is extremely rapid; and the corn sown in the end of May is commonly cut down in the end of July. From the commencement of the seed time to the end of harvest, seldom more than sixty days elapse. As an instance of the rapidity of vegetation during the summer season of Lapland, Acerbi has affirmed, that, at Enontekis, a tobacco plant generally increases more than an inch in circumference during the interval of 24 hours. The Finnish colonists in Lapland sow considerable quantities of turnip seed, which frequently succeeds; and of this root the native Laplanders are so fond, that they will often give a cheese, says Linnæus, in exchange for a turnip. The Finns have introduced the cultivation of grain even into the country of Alten; and theirs may be considered as the most northern agriculture of the world.

The domestic animals of the Laplanders, are cows, sheep, dogs, goats, and rein-deer. The cows are fed during winter on hay from the meadows, or on the moss used by the rein-deer. The sheep and goats subsist on similar food; and, notwithstanding the rigour of the climate, are remarkably prolific. The she goats constantly produce two kids, and sometimes three at a birth; and the ewes often bring forth twins twice a year. The dogs are chiefly kept for collecting the herds of rein-deer, and are trained to obey the slightest signal from their masters. The rein-deer are the most valuable part of a Laplander's possessions, and the principal object of his attention. These animals have a considerable resemblance to stags; and their whole body is of a grey colour, which becomes whiter before the hair falls off. They cast their horns every year; the males immediately after the rutting season, in the end of November; and the females in May, after having brought forth their young. The new horns are at first flexible, and so tender as to occasion pain to the animal when roughly handled. Those of the male are often two feet and a half in length, and their points are as far distant from each other. The height of the animal, from the fore foot to the top of the back, is generally four feet; and the length, from the shoulder to the tail, two feet. The hoofs are constructed in such a manner, that, when the foot is pressed on the ground, their points are separated from each other, and striking together every time the foot is raised, occasion a crackling noise as the animal walks along. The rein-deer eat grass during summer, and feed with avidity on the great water horse-tail, even in a dry state; but they will not eat hay; and subsist during the greater part of the year entirely upon the lichen rangiferinus, or rein-deer moss, which grows every where in great abundance, and which the animal easily contrives to reach under the deep covering of snow, where it is protected from the frost. They are said also to feed on frogs, snakes, and lemnings, or mountain rats; and to be particularly fond of human urine, which they greedily lick up wherever it has fallen. Of these useful creatures a wealthy Laplander often possesses a thousand, or more; a person of the middle class from 300 to 700; and the poorer people from 50 to 200. The herds are commonly tended by the children and females of the family; and are driven home, morning and evening, to be milked. For this purpose they are tied, by a rope put round their horns, to a small pole stuck in the ground; and all hands, master and mistress, men and maids, are busily employed in milking. When the milk does not come easily, they beat the udder with their hands to cause a greater flow; and each female generally yields about the same quantity as a she-goat. When the young males are about a year and a half old, the Laplander proceeds to castrate them, by bruising the contents of the scrotum with his teeth, yet so as not to break the skin, which would generally prove fatal. These, if not put to work, become larger, fatter, and tamer than such as are left in their natural state; and are counted of so great value to their owner, that the worth of any article is commonly expressed by equalling it to a gelt rein-deer; and it is considered as one of the highest compliments to a friend, to tell him, that he is as estimable as a rein-deer gelding. During summer, the gelt rein-deer and the hinds are commonly suffered to range the woods without any attendance; and every person is able to know his own deer by a particular mark or incision, made in the animal's ear. After seven years of age, the males are apt to die, of the weakness and emaciation which succeed the casting of the hair and horns: but the gelding lives to the age of 12 or 14 years. They are subject also to various diseases; such as ulcers near the upper edges of the hoof, which often render them completely lame, and unable to keep up with the herd: a vertigo, or giddiness, causing them to run round continually, generally incurable, but sometimes removed by cutting the ears, so as to produce a free discharge of blood: ulcerations in the flesh, an epidemic disorder, supposed to prove fatal by the animal licking and swallowing the corrosive matter from his own skin, or from others of the herd: an affection of the spleen, which is accounted incurable, and so infectious, that those which are attacked are immediately killed. They are much tormented in summer by a species of gad-fly (*œstrus tarandi*) which deposits its eggs in the skin, and produce ulcerations which frequently prove destructive to the fawns.

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* The plants on the western part of Lapland, towards the sea, are analogous to those of Scotland and Iceland; while the most abundant productions of Swedish Lapland more nearly resemble those of Siberia.

Wild rein-deer abound in Norwegian Lapland: but few are found in Swedish Lapland, except between Granoen and Lycksele. They are considerably larger than the tame deer. Hares are plentiful, and in the winter season become entirely white. Three kinds of martens are found, especially in Norwegian Lapland, which are distinguished, according to the places which they frequent, by the names of stone-marten, birch-marten, and fir-marten. The glutton is common in the country, and its skin is of great value for making muffs and gloves. The beaver is also found in some parts of Lapland, and in some rare instances are of a white colour. Otters of different kinds—ermines, a species of white weasel—squirrels, which are shot with blunt arrows to preserve the beauty of their skins—*mus lemnus*, a species of marmot peculiar to Lapland—and field-mice in immense numbers, are all natives of those high latitudes. Foxes also are extremely numerous, some of which are white, with black ears and feet—some red, or red with a black cross—some black, or black with long hairs on the back of a silver colour at their extremities: the skins of which, known by the name of silver-haired, are highly valued in the north of Europe. Wolves, generally of a tawny hue, but sometimes of a whitish colour, are also numerous, and extremely destructive to the tame rein-deer. Bears are common in Lapland, and, though subsisting principally on berries and herbs, frequently prey upon the cows, sheep, or goats: but are not able to overtake the rein-deer—and, unless provoked, would rather avoid than attack a man.

Many birds are found in Lapland, which have not yet been discovered in other countries: particularly the Lapland wood-cock, which has its beak turned up at the end: the Swedish mock-bird, remarkable for the variety of its notes, as well as the beauty of its plumage, and called by the natives the bird of a "hundred tongues:" the Lapland owl, a very rare bird: a species of magpie, called the Lapland crow: the three-toed woodpecker: the great dark coloured wood-cock, with a very long beak, of which the lower half is red, &c. The only birds which remain during winter, are partridges, crows, owls, and ptarmigans: but great multitudes resort, in summer, to the lakes and marshes for the purpose of breeding: and are well supplied with food from the berries and insects which abound at that season. Among these are observed the eagle and falcon tribe, some of which are entirely white: owls, one species of which is of a large size and whitish colour: crows in prodigious numbers, which become extremely tame during winter: ravens, which are frequently so bold and voracious as to seize the fish hung up to dry, and to pluck out the eyes of the sheep: partridges, which become white in winter: large bustards, about the size of a full grown turkey: magpies, pigeons, plovers, thrushes, woodcocks, snipes, snow-birds, gold-finches, cuckoos, water-wagtails, ruff and reeves, swallows, wheat-ears, buntings, black grous, ptarmigans, swans, wild geese, eider ducks, cranes, gulls, goosanders, razor-bills, little eared grebes, pelicans, cormorants, &c.

The only amphibious animals are the common frogs, and lizards. The rivers abound in excellent salmon; and the lakes in pike, perch, trout, eels, and charr. Whales appear upon the coasts in astonishing numbers, especially about Candlemas; and the sword-fish, shark, and porpoise, are sufficiently common. Holibut, skate, turbot, and flounders, are taken in vast quantities in the northern ocean; and, when dried, are exported to the neighbouring countries in the north of Europe. Cod, tusk, and ling, are found on the coasts of Lapland during the whole year; and herrings appear in immense shoals; but from want of nets these last are taken only in small quantities, and used chiefly as bait for other fish. The seas around Lapland furnish also sturgeon, lamprey, soles, [illegible] grayling, gwiniard, lobsters, crabs, prawns, &c.

The insects of Lapland are more numerous than had long been suspected by naturalists; and have been particularly described by Dr. Quenzel. The most curious and unaccountable circumstance noticed by this traveller is, that phalænæ, which in other countries appear only towards evening, and during the night time, follow an entirely opposite course in Lapland, flying about during the day, and disappearing when the sun is near the horizon. No venomous animal whatever is found in the whole country of Lapland.

The natives of Lapland are wholly ignorant of their origin as a people; but there can be little doubt of their having been the first inhabitants of the country which they now occupy. Their descent has been deduced by some authors from the Scythians, and by others from the ancient Hebrews; but the most probable opinion is, that their more immediate ancestors were the ancient Finns. The description at least of the Finni, by Ptolemy and Tacitus, is strikingly applicable to the mountain Laplanders of the present day. They are supposed to have been the people designated by Herodotus, under the epithets Cynocephali, Troglodytes, and Pigmies. They disclaim the appellation of Laplanders, which is understood to be a term of reproach, and to have been given to them by the Swedes upon the first subjugation of the country; but etymologists are not agreed about its precise import and derivation. It is deduced by some from the Latin *lippus*, blear-eyed; by others from the Swedish *lappa*, a patch, in reference to their garment; and some interpret the word, a bat, denoting their ugliness; and by others from the Finnish *lappi*, exiles or runaways, supposing them to have migrated, or to have been banished from Finland.* The Lapland language is represented as having a considerable analogy to that of the Finns, and as distinguished by certain peculiarities, resembling the idiom of the Hebrew. It is described as possessing an elegant brevity, expressing by one word what in most languages would require several. It abounds in diminutives, but is barren in proverbs. It may be noticed as one of its singularities, that the names of fluids, metals, minerals, grains, herbs, and fruits, are all expressed only in the plural number.

The names of the first ten numerals are,

Auft	1	Gut	6
Gouft	2	Zhieezhia	7
Golm	3	Kautze	8
Nielja	4	Autze	9
Vit	5	Laage	10

The conversion of the Laplanders to Christianity cannot be dated much earlier than the middle of the 17th century; and it is still so very imperfect as to consist in little more than their receiving baptism, bearing Christian names, and attending, in a manner by compulsion, on a few festivals of the church. They are said to have still retained their ancient religion almost unmixed with any of those additions, which half-converted nations generally make from Christianity. They, in general, acknowledge the king of Sweden as their lawful sovereign; and conform to the Swedish courts of judicature established in different parts of their country. A small number are tributary to Denmark and Russia. They are not a numerous people; and are calculated not to exceed 60,000, scattered over an extent of 150,000 square miles. Even of this number, Baron Von Buch considers, that one sixth part only is composed of the real Laplanders, and that the rest are properly Finnish colonists, by whose gradual influx the the population of Swedish Lapland is said to have doubled, in the course of thirty years. The Laplanders have a swarthy complexion, black short hair, a wide mouth, hollow cheeks, and a chin somewhat long and pointed. Their eyes are weak and watery, in consequence, it is supposed, of their smoky habitations, or the driving and glaring snows of winter, which often have the effect of depriving the natives of sight for several days after returning from a hunting excursion. They possess great strength of body, and are capable of undergoing extraordinary degrees of labour. They are not less remarkable for swiftness of foot and bodily agility; and are inured from their infancy to every kind of activity and exertion. They are rather of diminutive stature, a circumstance which has generally been ascribed to the severity of their climate, and the scantiness of their diet. Their slouching gait and want of artificial heels give them, however, the appearance of being lower than they are in reality; and, as the boys have often the air of maturer years, and are employed in driving the sledges, it is not unlikely that they may have been mistaken by many travellers for men. The smallest person observed among them by Maupertius, was a well proportioned woman, who measured four feet, two inches, and five lines; and Hogsbröm frequently met with natives of the different provinces, whose height was between five and six feet. Even their swarthy complexion is more the effect of the smoke in which they are doomed to pass so great a portion of their existence, than a natural hue of their skin; for Linnæus affirms, that "the fairness of the bodies of these dark-faced people rivalled that of any lady whatever"

The dress of the Laplanders consists of a conical cap in the form of a sugar loaf, and of a greyish colour, made with eight seams, which are covered with stripes of brown cloth, with a tassel of various coloured shreds on the top, and a border of fur round the lower part: sometimes the colour of the cap is red, and the stripes yellow. While engaged in hunting or in tending the reindeer, they wear also a kind of riding-hood, which covers the whole head, breast, and shoulders, having only a small opening in front to look through. The men rarely wear any covering about their necks, which are exposed naked to the weather, with no other protection but what is derived from the thick collars of their coats. The coat, which serves at once as shirt and outer garment, is generally made of sheep-skin, with the wool upon it turned next the skin, and reaches below the knees, when not tied up with a girdle. It is open in front half way down the bosom, below which it is fastened with hooks, as far as the lower part of the stomach. The collar is high and thick, quilted with cloth, frequently ornamented with different coloured threads, and extending a little way down the bosom on each side. Instead of pockets, they carry a little bag hanging over the breast, divided into two compartments, and containing their tobacco pipe, tinder-box, tobacco, and spoon. The great coat made of kersey or rein-deer skin, with the hairy side outwards, is, like the jacket, open only at the breast, and provided with an upright stiffened collar, with a running string to draw it close about the neck. The collar, the opening at the breast, the shoulder-band, the cuffs of the sleeve, and the bottom of the coat and jacket, are commonly bordered with cloth or furs of different colours, and worked with threads of various hues. The mountain Laplanders also wear around their necks when they travel, the skin of a fox's cub. They sometimes wear gloves of tanned leather; but more commonly made of the skins of the fawn of the rein-deer, with the hair turned outwards, and a lining of Cyprus-grass. A finer sort is made of the skin of the black fox or of the rein-deer's foot; and the upper part, which reaches above the wrist, is formed of cloth curiously worked with tinsel wire, and trimmed with otter's skin. They use no stockings, but wear a kind of pantaloons of coarse cloth or tanned leather, or the skin of the rein-deer's legs, fitted close to the limbs. Their shoes are made from the skin of the reindeer, the soles being taken from the forehead, and the upper leather from the legs of the animal. The hair of the sole is generally singed, to render it less slippery in walking; and the inside is carefully lined with a kind of soft hay, chiefly of the *carx sylvatica*. Sometimes they buy leather from their neighbours for boots; and a finer sort is made for sale with the legs of coarse cloth neatly worked with tinsel wire, and the toe prolonged to a sharp point. They wear leather belts ornamented with tin, and with thongs of leather, to which are attached tin balls, keys, &c. hanging down behind. The women wear caps of woollen or linen cloth, with stripes and borders of yellow cloth and ribbands of gold or silver tinsel, and use riding-hoods, when abroad, like those of the men. Their jackets and great coats resemble those of the men, except that the former is gathered into plaits before and behind, and is rather shorter than that of the other sex, while the latter is longer. The other parts of their dress are little different from those of the men; but their gloves and shoes are generally of white skins, and their girdles more ornamented. They wear also kerchiefs, or mantles of Russian linen or cotton, and narrow aprons of the same stuffs, always furnished with a fringe or border. All their articles of dress are made by the women.

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* The Laplanders, Samoyedes, Esquimaux, and Greenlanders, all found in the same northern latitude, appear to have been originally the same people. The Laplanders are supposed to have descended from the White Sea towards Norway and Sweden, while the Finns, on the other hand, ascended from Esthonia through Finland. In the north of Norway, the Laplanders are called Finns; and the Finns, who have [illegible] into the country, are denominated Quans.

The mountain Laplanders, or those who inhabit the alpine country, have no fixed habitations, but live in tents, which they move from place to place, in quest of food for their rein-deer. These tents are usually nine feet in height, and about 12 feet in length. They are constructed by means of six poles or beams of wood, nearly meeting at the top, and in winter fixed at the lower extremities in a wall of snow raised around the enclosed space. The tent is covered with walmal cloth, generally in two pieces, fastened together with wooden skewers; and the door is simply a flap of cloth left between two of the main beams, but sometimes extended on a wooden frame in the form of a pyramid, with a thong of leather tying the top or point of the door to the upper part of the opening, by way of hinge, while the side to windward is carefully kept close, and entrance allowed only in the opposite direction. The fire place, which consists of a square enclosure of low stones, is always in the centre of the tent, and above it is left a hole in the roof to let out the smoke, and a small beam crossing the top of the principal poles to support the iron hook by which the kettle is suspended. The summer tent is covered with canvas cloth; and a small one of the same materials is carried by the Laplander in his hunting excursions at all seasons. The huts of the maritime Laplanders, and of those who inhabit the woody region, nearly resemble the tents now described, in their whole form and structure, except that instead of a cloth covering, the roof is formed of the bark of the birch tree and sods of earth. The internal arrangement is the same in both. The space between the fire-place and the door is used as a receptacle for fire-wood, and that behind the fire for the kettles and other utensils. The spaces on each side of the fire-place are divided by logs of wood, into three apartments, which may be styled the bed-chambers; of these the space farthest from the door, accounted the most honourable, is occupied by the husband and wife; that in the middle by the children; and the outer one by the servants. It not unfrequently happens that two families dwell with the utmost harmony in the same habitation, each occupying one side, and using the fire-place, with its front and back spaces, in common. The whole floor of the huts and tents is covered with the small branches of trees, and above these are usually spread the skins of rein-deer, upon which the family sit or recline, as, except in the centre, where the fire is situated, no part is sufficiently high to admit of their standing upright. A thicker covering of skins is laid in the lateral spaces, which are used as bed-chambers; and, however intense may be the cold, the mountain Laplander always strips himself naked when he goes to sleep. His outer coat serves as a pillow, and a sheep's skin, with the woolly side inward, as a blanket, above which, if necessary, is laid a woollen rug. During summer, a canvas quilt is commonly used as the upper covering, which the Laplander draws completely over his head as a protection from the musquitoes, and keeps it raised in the middle by a leather thong tied to the poles of the tent, so as to allow a freer respiration in his hiding place

At all seasons these dwellings are constantly filled with smoke, which is considered as the best protection from the gnats in summer, and from the cold in winter; but in consequence of the wetness of the wood which they are obliged to employ as fuel, this smoke is so pitchy and dense, as to render it inconceivable how human beings should be able to exist, or, at least, to preserve their eye-sight in such a situation. In the huts there is usually a stall near the door, for the sheep and cattle, which enter by the same door, and pass the night under the same roof with the family. Both the maritime and mountain Laplanders have sheds and hovels around their dwellings, as receptacles for provisions, and other household stuffs, which are not in immediate request; and generally one of these is an empty space under their hay-stack, which is built on a frame of posts. Frequently, also, the mountaineers dig holes in the ground and pave them with stones, as store-places for the flesh of the rein-deer.

The household furniture of the Laplanders consists of horn spoons, pots and kettles, made of brass or copper, sometimes of stone; wooden bowls of birch wood, capable of holding about 12 quarts; a basket for holding cheese; and a barrel for their oil, and other liquids. A few of the richer natives possess two or three pewter dishes, and silver spoons. The maritime Laplanders use a lamp made of a sea-shell, with a rush wick; but the moun-

[illegible] any other light than what the fire affords. [illegible] filled with milk for winter use, are suspended from the roof; and one or two racks for cheese placed along the upper part of the house. Oval fir boxes, capable of containing a few articles, and covered by a lacing of cords, are used as panniers in transporting their goods; and two of them weighing above two pounds each, are carried by a rein deer. The most ornamental piece of furniture in the house of a Laplander, is the cradle; which is a piece of wood properly shaped and hollowed, with a recess for the head of the child. Cords are so fixed as to pass round it, and fasten it to the mother's back when she travels; and a ring of beads is suspended from the upper part, to amuse the infant as it lies on its back with its hands at liberty. In this case of wood the infants are rocked or swung, and sometimes fed with unboiled milk through a horn. In four months they are generally able to stand on their feet; but many of them are supposed to die from improper management, and especially from an early exposure to cold.

The diet of the Laplanders consists almost wholly of animal food. Those who reside on the coast subsist chiefly on fish, with a little beef and mutton occasionally. They are fond of the cod-fish roasted as soon as caught; and consider its liver, bruised and mixed with cranberries, as a very savoury dish. Salmon is split and dried, and in that state is eaten without any farther cooking or preparation, except dipping each piece in train oil before putting it in their mouths. When their stock of dried fish is exhausted or falling short, they collect the heads and bones, roast them before the fire, stew them in a kettle along with slices of seal-blubber, and eat the mess with a seasoning of train oil. The mountain Laplanders subsist principally on the milk and flesh of the rein-deer. Its milk is used in a great variety of ways; fresh or boiled, or boiled and coagulated with sorrel; or coagulated in a sour state, and so solid as to be capable of being cut into slices; or coagulated together with its cream; or boiled down, when quite fresh, to the consistence of gruel, in which state it is called sweet cheese; or coagulated with rennet, and boiled with meal; or drained in a napkin, when just beginning to ferment, and when sufficiently firm, eaten with sweet cream. In winter the new milk freezes as soon as drawn from the animal; and in this state is kept in small vessels of birchwood, as an extraordinary delicacy, to be eaten with a spoon as it thaws before the fire. In autumn it is collected in casks, or other vessels, in which it speedily sours; and, as the cold weather comes on, freezes hard. It is frequently mixed also with cranberries, and put into a clean paunch of the rein-deer, when it soon congeals, and, togewith the paunch, is cut into slices for use in winter. They make butter of the whole milk of the rein-deer, which the women accomplish by stirring it about with their fingers, till it acquires the desired consistency. On making cheese it is necessary, on account of the extraordinary richness of the milk, to mix it with water; and the cheese, which is still remarkably fat, is used cold, boiled, or roasted. The whey, boiled with meal, forms another preparation; and sometimes it is kept for a long time merely in a viscid state. Besides the calf's rennet, the Laplanders produce a similar preparation by infusing the saind of the cod-fish, or the intestines of the rein-deer, in a quantity of buttermilk. They use a great proportion of venison in their daily fare. From the time that the dried fish is consumed, a family of four persons uses at least one rein-deer every week; and three of these animals are accounted equivalent to an ox. This venison, slaughtered as required, is cut into small pieces and boiled, which are dipped, as they are eaten, into the fat previously scummed from the pot, and washed down by a ladle full of the broth taken occasionally during the repast. The legs are boiled for the sake of the marrow, which forms one of the greatest delicacies; and the entrails are cooked for food, though never along with the meat. Even the bones are most economically broken down, and stewed as long as any oil can be procured from them. The lights only are reserved for the dogs. The flesh of the rein-deer is frequently prepared also, by roasting on wooden spits, stuck in the ground, and placed before the fire; and occasionally parts of it are smoked by hanging in the upper part of the tent. It is killed only in winter, and always used fresh. The blood is preserved in bladders, kegs, &c. and mixed with a kind of gruel. Both the maritime and mountain Laplanders eat the flesh of bears, beavers, wolves, foxes, seals, otters, gluttons, squirrels, martens, and almost all quadrupeds that they can contrive to catch or kill.* The Laplanders make use of very little bread, except a little barley-cake, baked with water, or milk, or whey, upon the hearth. The poorer people grind the chaff, and even some of the straw, along with the corn. Sometimes the inner bark of the fir and pine tree, collected when the sap is rising, dried in the sun or over a slow fire, is ground into meal and mixed with the barley flour. Another kind of bread is prepared from the *Calla palustris*, or water dragon, the roots of which are taken up in spring before the leaves shoot out, dried, pounded, ground, boiled, till it becomes thick like flummery, and, after standing in this state three or four days to lose its bitterness, is mixed for use with the meal of bark or barley. In times of great scarcity, bread is sometimes made from the ground seeds of the *Spergula arvensis*, or spurrey. The Laplanders are exceedingly fond of the *Angelica Sylvestris*, which grows abundantly in every part of woody Lapland, and which they eat, either fresh or dried, or boiled in milk, with great avidity, as at once a delicious sallad, and an antiscorbutic medicine. They use, in like manner, the *Sonchus alpinus*, a kind of small sow thistle, which has a milky stem of a very bitter taste. Among their dainties may be enumerated the inner bark of the firtree, fresh, smoked, or steeped in train oil; the different berries found upon the melting of the snow, thoroughly ripened in this winter repository; and, above all, tobacco, which they chew or smoke, as the highest luxury, and when they can procure no more, will even masticate slips of the bag or chips of the cask in which it has been kept. They are greatly delighted with pepper, ginger, and other spices; and peculiarly gratified by a present of ardent spirits, of which they prepare none themselves, but procure a little brandy from Sweden or Norway. Before swallowing the liquor, they rub a little of it upon their foreheads or bosoms, in the persuasion that it will thus be prevented from injuring their head or breast. Their sole beverage, in ordinary use, is water, procured in winter by dissolving the snow; and for this purpose a quantity is kept always standing in a copper vessel in their huts. All the cookery is performed by the men, and in the dirtiest manner possible. The dishes and spoons are seldom washed, or, at most, only by squirting water upon them from their mouths, and rubbing them with their fingers.

The Laplanders are said to live to a great age; and it has even been affirmed, that some of them have completed a century and a half. But, as they are little skilled in the exact computation of time, much dependence cannot be placed on their own testimony; and their premature looks of old age, and general wretched tenor of life, are not very consistent with such accounts of their longevity. Their long endurance of intense cold—their coarse and precarious food—their close and smoky habitations, and their neglect of personal cleanliness—are not likely to prove conducive to vigorous health and long life. But, on the other hand, their roaming disposition—their employment in hunting, fishing, and tending the rein-deer, which habituate them to air and exercise—their partiality to various preparations of milk as an article of subsistence—their warm clothing and careful precautions against damp or cold feet—not to mention their exemption from the dissipations of more refined states of society—are doubtless favourable to the prevention of disease, and give credibility to the statements of their being a healthy race. At the same time, as in the case of most savage tribes, it is highly probable that the great proportion of vigorous constitutions among them may be ascribed to the circumstance of those who are of a weakly habit dying in infancy. Fevers, agues, and dropsies, are rare; chilblains, not more common than in other countries; the stone, gout, and jaundice, entirely unknown. Even coughs and colds, notwithstanding the severity of the climate, are very uncommon; though a few cases of consumption now and then occur. Swelled necks, or goitres, similar to those in Switzerland—sore, or blear eyes, frequently inducing total blindness as old age advances—a swelling or falling down of the uvula, cured by cutting off the affected part—colics, and other disorders of the stomach and bowels; pleurisies, and cases of hoarseness in spring and autumn—lumbago and rheumatic pains, epilepsy and head-aches, scurvy and St. Anthony's fire, deafness and asthma among old people, are the most frequent diseases in Lapland. The great remedy employed in most of their diseases, especially for all aches and pains, head-ache, tooth-ache, pleurisy, lumbago, &c. is the actual cautery, which they apply by burning a piece of fine fungus, about the size of a pea, on the place affected, and thus producing a sore by way of issue, which is allowed to remain open till it heals spontaneously. In hard imposthumes, &c. they apply a kind of plaster made from the loose scaly bark of the birch, scorched, chewed, mixed with fresh turpentine from the spruce fir, and kneaded by the hands into an uniform paste, which brings forward the suppuration, and promotes its discharge without much pain. As an ointment for burns, they boil fresh cream to a thick consistence. Most of their other medicines are mere nostrums, or charms. They pretend to cure inward complaints by swallowing the blood of the seal, or the rein-deer, as warm as possible. They touch a diseased tooth with a splinter from a tree which has been struck by lightning; and in order to rub off the speck in a commencing cataract of the eye, they introduce a common louse within the eye-lids. Before reducing a dislocated or fractured bone, they cause the patient to swallow, in a drink, a little powdered silver or brass. As a remedy for sprained ancles, or other sprains, they bind the suffering part with the sinew of the rein-deer's fore legs; but, at the same time, reckon it essential to the cure, that a female patient must use the sinews of the buck, and a male those of the doe.

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* Some discrepancies occur in the accounts of travellers on this point. Acerbi, who chiefly follows the Danish missionary Leanis, says, that they eat all animals but swine, pork being to a Laplander an abomination; but Thomson, who takes Linnæus as the guide, affirms, that almost the only Lapland quadrupeds upon which the natives do not feed are the fox and wolf, and speaks of their fattening swine with meal made from the inner bark of the pine tree.

During the winter time, and especially from the beginning of December to the end of January, a sort of apathy, congenial to the season, creeps over the natives, and they spend in sleep more than one half of the 24 hours. Their principal care is to keep themselves warm; and little employment of any kind is carried on.

The maritime Laplanders change their habitations only twice in the year, namely in spring, and autumn; and in this case they leave their hutsstanding until their return. Those, also, who inhabit the woody region, are more stationary. But the mountain or wandering Laplanders are continually moving from place to place to procure food for their rein-deer. About the middle of summer they move with their families and herds towards the sea-coast, seldom travelling above four English miles a day. They spend great part of the summer in fishing; and as the rivers abound in fish, they find no difficulty in catching as many as they desire, which they hang up and dry for future use. In this employment they are often attended on the lakes by large flocks of sea swallows, which direct them to the places where the shoals of fish are most abundant; and are rewarded with the small fishes, which are cast on the shore, or left for them in the boats. They come duly at the same hour in the morning, as if to inform the fishermen that it is time to begin their work, and set off with the boats as guides, ready by their cries and plunging into the water to point out the most proper places for casting the nets. On the approach of autumn they return to the mountains, where they move about, as occasion requires, from one wood or hill to another. On their way from the coast in autumn, as the rein-deer are particularly fat in that season, they generally kill a sufficient number of them, which they deposit by the way in a kind of hovel or storehouse, to remain there during winter, and serve as a supply for their families in the following spring, on their progress to the coast. In spring and autumn, when the earth is free from its covering of snow, the natives travel on foot, and convey their tents and baggage on the backs of the rein-deer; but, in the winter excursions, sledges are used for transporting themselves and their furniture. The sledge is made of birch wood, and formed like a boat with a flat stern. The ends of the side planks are fastened with wooden pegs to the roundish board, which forms the back, and their points, brought together at the front, are bound fast with a rope. The sledges are caulked within, and frequently pitched also on the outside, to keep out the water. The kind most commonly used for travelling is so light, as to be easily carried in the arms, and is no larger than to admit the legs and thighs of the Laplander. It is open from head to stern; but has occasionally a seal skin fixed to the head, which covers the legs and knees of the passenger, to which is joined a rug, spreading over his lap, and fastened by leather loops to the side, to defend him from the snow. The larger sledges, employed for conveying provisions and baggage, have generally a convex deck from head to stern, with a hatch behind, which is raised by a projecting bolt, when any thing is to be drawn out, or stowed under the deck. The sledges are drawn by the female, or by gelt rein-deer; and it requires great perseverance to break these animals to the harness. In yoking them to the sledge, a broad collar of untanned deer skin is put over the neck, from which a rope made of thongs, cut from seal skin or the hide of an ox, passes under the belly between the fore and hind legs, and is fastened to the sledge by a hole in the fore part of the keel. Another collar of kersey cloth, and embellished with tinsel, is occasionally put on by way of ornament. A broad girth is sometimes brought round the body of the deer, with an opening below the belly to let the rope pass through, and to keep it steady in pulling the vehicle. A rein, or throng like a halter, is fastened to the head of the deer, and, while the animal is standing still, hangs on the left side. The Laplander, when placed in the sledge, ties the end of the halter about the thumb of his right hand, and then shaking it with violence from side to side, the animal springs forward at great speed, but in an irregular and serpentine course. When the driver wishes to keep to either hand, he pulls the rein to that side. When going down hill, he regulates the sliding of the sledge by the movement of his body; or, if the descent is very steep, he ties a rein-deer by the horns to the back of the sledge, which the animal is trained to keep steady by drawing backwards. When he wishes to urge the rein-deer to its utmost speed, which is at the rate of ten miles an hour, he places himself on his knees, and encourages him by certain sounds and movements; and when he is desirous to stop, he shifts the rein from the right side to the left, upon which the animal immediately stands still. In transporting baggage or provisions, a train of four or five sledges may be conducted by one man, who seats himself in the foremost, while the rein of each deer is attached to the stern of the preceding sledge; and one deer tied to the back of the hindmost, to act as a check upon their velocity in descending the declivities. The sledges, when not in use, are frequently lodged under a wooden shed; but, in general, they are merely turned up on the snow, with the keel upwards, and in this position they serve the purpose of repositories for venison, &c. For travelling on foot in winter, the Laplanders employ snow shoes, which are about six feet long, and six inches broad in the middle, tapering to a point at both extremities. The upper part of the shoe is flattish, the edge on each side sharp, the under part convex, and furrowed lengthwise; and in the middle of the broad surface is a place for the foot, with a band to fasten it firmly about the ancle. Many of the families in removing from one station to another, follow the sledges on foot, driving the herds of deer. In this way, they frequently travel by night as well as by day over an entire surface of snow, without the slightest vestige of a track to guide their way, and with the snow drifting in all directions; yet, by observing the stars, or the course of the wind, they rarely happen to miss their route. In these cases, they fix bells to the collars of the rein-deer, in order to keep together by the sound, when they can no longer see one another. They are always provided with a steel, flint, and matches, to light their pipes, or kindle a fire if requisite; and when obliged to stop, in consequence of the severity of the weather, or the length of the way, speedily erect a small travelling tent, and take their repose as occasion or necessity may demand.

The principal employment of the Laplander, especially in the winter season, is hunting, in which he makes much use of traps and other snares, some of which are sufficiently ingenious. In order to take partridges and ptarmigans, they form a low hedge or fence of brushwood in the thickets, with small openings about a fathom from each other, just large enough to let the birds pass through them. In these, they place a forked birch twig, in such a manner as to form a sort of arch, with the cleft stuck in the snow, and in this arch is suspended a noose of packthread, or horse hair, by which the birds are taken as they come running along, and attempt to pass through the open spaces. They frequently catch the pelicans, cormorants, and other sea fowl, on the rocks, by means of baited hooks fastened to ropes. They take also in snares, foxes, hares, ermines, martens, &c.; and even the wild rein-deer are often caught by nooses suspended in the narrow passes, or by driving them into enclosed alleys. When the snow has fallen in large quantities, and the wild rein-deer, by sinking deep, are unable to run fast, the natives pursue them on foot in their snow shoes, and knock them on the head with clubs. But, in hunting, the Laplander makes much use also of the rifle gun; with which, and the assistance of his dog, he rouses and shoots the wild deer even in the summer and autumn seasons. The hunting of the deer is attended with excessive fatigue, on account of the animal's acute perception and extreme shyness; and the hunter, upon perceiving one at half a mile's distance, takes a circuit to leeward, creeping on his hands and feet till he comes within gunshot. In this way, a single hunter frequently assails the bear in open day, especially in the autumn, when the animal is more fearless, and is continually prowling about in quest of the berries which abound at that season. The Laplander, taking his dog, with a chord tied around its jaws to prevent it barking, and holding the other end in his hand, advances to the retreat of the bear, and endeavours to keep on the leeward side, that the animal may not discover his approach by the scent. Should he miss his aim, or only wound the bear, his life is exposed to no small danger from the enraged animal. In his flight, however, he generally contrives to drop his knapsack, which the wild beast commonly seizes, and tears in pieces; so that the hunter either makes his escape in the mean time, or takes the opportunity to fire a second shot, which usually proves effectual. At other times, when he has discovered the winter retreat of the bear, he covers the entrance of the den with branches, interweaving them so thoroughly, as to leave only a sufficient space for the animal to thrust out his head. Armed with his hatchet, he proceeds to rouse and irritate the sleeping inhabitant, who generally advances in the utmost rage to the opening among the branches; but, as soon as he pushes forth his head, the hunter levels a blow with the axe, which rarely fails, if it strike him below the eyes, to fell him to the ground. They form canoes of thin planks, fastened together by means of cords, which are so light as to be easily carried on the back; and which they guide with surprising dexterity in the most rapid currents.

The maritime Laplanders are principally employed in fishing, and particularly during the summer season, when the Russian vessels are stationed on the coast, pursuing the same object, and purchasing the fish of the natives. At this busy period, they often lie out at sea in their boats for many weeks; and by the disposal of their fish, procure meal for their support in winter. Their condition is, however, very inferior to that of the mountain or field Laplanders; and they are always eager to exchange their boats and earnings, for the greater freedom and better living of their pastoral neighbours. Their fish, train oil, and meal, is counted wretched poverty, in comparison with the fat broth and full repasts of rein-deer flesh enjoyed by the mountaineers. It is only when they are forced by necessity, in consequence of the deficiency of their herds, that they betake themselves to the watery element in quest of that sustenance which they can no longer find among the mountains. With three hundred of these animals, they would be in a state of moderate prosperity; but would live very miserably on the produce of one hundred. From their predilection for the pastoral life, they rarely apply themselves to improve the benefits of the more stationary residence, which they might have on the coast. Their huts, or gammes, are only calculated for a few months duration; and are changed at least twice, and sometimes three times in the year, for the sake of procuring pasturage for the few rein-deer, or milk cows, in their possession. Some of these dwellings, which were seen by Baron Von Buch on the coast, were little calculated either for shelter or accommodation. They were not more than eight feet in diameter, and four in height, nearly resembling a baker's oven, with a square hole in the middle, to serve as window and chimney. They were constructed of branches, and covered on the outside with grass, but so carelessly put on as to admit the wind in every direction. In these, during the absence of the men at sea, are crowded together as one family, a mother, daughter, daughter-in-law, and servant maids; but even in the little circle which they occupy, all confusion is prevented, by an exact allotment to each of their own space and side of the dwelling. A great part of the Swedish Laplanders in Kemi Lapmark, and especially in the Forsamling of Enare, live principally by fishing, like those on the coast, and possess few rein-deer, but generally have ten or a dozen sheep. In summer, they subsist on fish from the lakes, and drink, as a luxurious draught, the water in which their fish has been boiled. In winter, their diet consists of dried fish, and soups made of water, fir bark, and rein-deer tallow, with a little ewe milk, and a few mountain bramble berries. In the lakes and larger rivers, they take the salmon by means of nets, or by striking with the spear. This latter mode is practised chiefly during the night by means of lights or fires, and is described as singularly picturesque. On the front of the boat is an iron basket, or grate, fastened to the end of a long crooked stick, so that the burning wood which it contains stands far above the boat. Immediately behind the fire stands the fisher with his trident, which is a long spear, with five or six strong barbed points; and behind him sits the pilot, who moves the boat along with gentle and imperceptible strokes. The salmon is attracted by the blaze of the fire, and, raising himself slowly to the surface of the water, comes within reach of the spear. The silence of the moving boats, the crossing of the fires as they advance in different directions, the immoveable figures of the fishers hanging forward over the prow in readiness for the blow, and the sudden animation imparted to these seeming statues when the salmon is struck, render these fishing scenes peculiarly interesting to the eye of a spectator. The dexterity with which the Laplanders guide their boats down the most rapid falls in the rivers is not less remarkable, and presents a spectacle as sublime as the last mentioned is beautiful. This, however, must be given in the words of an eye witness. Baron Von Buch thus describes his passage through the fall of Eianpaika, below Muonianiska. "I heard the noise of the fall long before we approached it, while the river still glided on smoothly. Then followed several falls, which were not high nor long, but the stream became rough and agitated. Rocks began now to rise along both sides, and points to appear above the surface. The agitated water presses through between the closely approaching rocks. The waves began to rear themselves up, to foam, and dash over. They drove the boat with incredible rapidity down the abyss; they dash over in the most wild and alarming commotion; the sky, rocks, and woods, all disappear; and nothing is seen or heard but the foam and roaring of the water. The wave dashes the boat with one sweep against the rock; but the bold pilot guides it with a strong and steady hand with still greater rapidity than the wave, as if in sport, from one side to the other; and the next moment it is again floating on the no longer agitated current. The two men in the fore part of the boat have a most frightful appearance. Their fixed look, their eyes, which seem to start from their sockets, endeavour to read every thought of the pilot, whether they ought to row in the fall more rapidly or more slowly. Their own preservation depends on their correct undertstanding of the thoughts of the pilot. Every muscle is stretched in the highest degree, and the arms only are in motion." The boats are as strong as sea boats, and their huge helms seem made for large ships. In this way the natives proceed down to Torneo with large burdens of butter, tea, fish, and hides; and drag the boat with incredible labour along the bank, when they come to the fall in ascending the stream.

The Laplanders discover considerable ingenuity in making the various utensils which they possess. Their sledges and canoes are so artificially put together, that not a drop of water is able to penetrate their sides. From the wood of the birch tree, they form vessels of various capacities, from an ordinary drinking cup, to casks for holding the milk of the rein-deer. From the horns of the rein-deer they manufacture spoons in a very neat manner, which they stain with figures tolerably well designed. With no other instrument than a knife, they also carve their bowls and spoons with wonderful expertness. The steel of these knives they manufacture for themselves, and ornament in a style of some elegance. They tan their leather with the first inner bark of the birch, which they cut into small pieces, and boil for half an hour; and, having previously freed the hides from the hair, by plunging them in warm water, burying them under ground, and scraping them with a roundish knife, they immerse them in the liquor, a little cooled; and, for two days, the liquor is warmed, and the skins replaced. By means of fir bark, they give the leather a red stain; and dye their wool of that colour with the blood-root, or tormentil. They cement broken earthen-ware, by tying the fragments together with a thread, and boiling the whole in fresh milk. The women prepare the skins of foxes, fawns, otters, and other animals for sale, by stripping off the membranous parts, and curing them with fish oil. The women make tinsel wire of different thickness, by drawing it through a machine formed of a rein-deer's skull; and with this wire they embroider coats, gloves, harness, &c. in a very fanciful style. The Laplanders manufacture thread from the tendons of the rein-deer. These they hold before the fire, and beat with wooden hammers, to render them more pliant and divisible. They lay hold of them with their teeth, and split them into filaments, moistening them occasionally with rein-deer marrow. These filaments are drawn through holes of different sizes in a wooden or metal instrument, to render them as smooth as possible. They are then twisted into threads, by rubbing them with the hand upon the thigh or knee, and moistening them from time to time with saliva.

During winter, the Laplanders carry on some traffic with the Swedes, bartering skins, furs, dried fish, and venison, gloves and short boots, for coarse flannel, cloth, hemp, copper, iron, and various utensils, but particularly for tobacco, brandy, meal, and salt; besides exchanging fish for meal, from the Russians on the northern coast. Some idea of the amount of this commerce may be furnished from the following abstract of the exports from Westrobothnia to Stockholm, which principally come down from Lapland:

	Rix-dollars.	sk.
Fish, consisting of salmon, pike, tusk, cod, sea-oil, and blubber, - - -	52,015	16
Provision of various sorts, buds, cheese, butter, salt beef, tallow, rein-deer's flesh, and tongues,	66,199	0
Hides and furs, chiefly hare, squirrel, calf, goat, and rein-deer skins, with Lapland gloves, shoes, and boots, - - - -	24,870	0
Iron, deals, rein-deer, horn, glue, feathers, sponge, and touch-wood, - - -	78,142	0
	221,226	0

The principal weapons of the Laplanders in more remote times, were bows and arrows; but now, they chiefly employ fire-arms, and are in general excellent marksmen: They still amuse themselves with throwing a javelin at a mark, as one of their sports. They are expert wrestlers and leapers. One usual mode of the former exercise, consists in fastening their hands in each other's belts, and striving who shall lift and throw his opponent; and of the latter, in leaping over a stick held by two persons in a horizontal position. Another diversion, is to strike a stuffed leathern ball into the air, and to catch it before it reaches the ground; and, at other times, two of them, or two equal parties, lay hold of a rope by means of a stick at each end, and strive to disengage it from each other's grasp, till the struggle is decided by the breaking of the rope, or the giving way of the weaker party. A more sedentary game, in their long winter imprisonment, is that of the fox and geese, played with pegs, upon a board. The Laplanders are said, by some travellers, to have a sort of trumpet called lur, and pipes made of the bark of mountain ash: but Acerbi affirms, that they have no idea of harmony whatever, and that all artificial music appears to be banished from their solitary districts. He affirms, that neither by the power of money or of brandy, could he ever prevail with any of the natives to produce any thing like a song, except a monotonous vociferation, in a kind of fainting or fading voice, prolonged and repeated till the breath is exhausted. He found as little poetry as music in the song, of which the words and notes, equally unvaried, were as follows:—"a good journey, my good gentlemen—gentlemen—gentlemen—gentlemen—a good journey—journey—journey—my good gentlemen—gentlemen—a good journey—journey—journey—journey."

The Laplanders rarely intermarry with the Norwegians or other neighbouring nations. Their matrimonial negociations are conducted with extraordinary formality and decorum. When a young man has selected his object, he communicates his wishes to his own family, who repair in a body to the dwelling of the young woman's parents, carrying a slight present, such as a ring or ornamented girdle to the fair one, and a quantity of brandy to entertain the friends. When arrived at the hut, the suitor is left without, till he shall be invited to enter; and as soon as the rest of the party have entered, their spokesman fills out a bumper of brandy, which he offers to the girl's father, and the acceptance of which indicates his approbation of the match to be proposed. After the liquor has gone round the company, leave is obtained for the young man to present himself, while his advocate in a set speech opens the treaty. The lover, upon being introduced, takes his seat near the door, at some distance from the rest; and it is only when the parents of the girl have signified their full consent, that he offers her the present which he has brought, and promises wedding clothes to her father and mother. Sometimes a sum of money is given, both to the bride and to her parents; and not unfrequently considerable bargaining is employed to raise the amount. All that the bride receives on this occasion becomes her own private property; and among the better class, a wife, counting all expenses, commonly costs the husband about a hundred copper dollars. Should the parents depart from their promised consent, it is an established law, that they must repay all the expenses and presents, even to the brandy which has been drunk at the first visit. After the parties have been in this manner betrothed, the young man is allowed to visit the bride, whose favour he generally endeavours to conciliate, by presenting tobacco, brandy, or whatever he thinks will be most acceptable. On the marriage day, the bride appears in her best dress, but her head, commonly closely covered, is on this occasion only adorned with a bandeau or fillet, while her hair flows loose upon her shoulders. The banns are usually published only once. The marriage ceremony, which is very short, is sometimes performed before, and sometimes after the entertainment. The wedding feast is celebrated in a frugal and sober manner, without music, dancing, or any other festivity. Such of the guests as are able, make a present to the bride of money rein-deer, or other useful article, to begin the stock, or furnish the dwelling of the young couple. In some parts of Lapland, it is the custom that the friends and relations of the parties meet together, a few days after the marriage, and partake of a homely entertainment, consisting usually of a mess of broth, a little roast mutton, and metheglin. The bridegroom usually remains with the parents of the bride for the space of one year; and, at his departure, receives what portion they are able to give with their daughter, to establish the young people in the world. It is usual, at the birth of a child, to assign a female reindeer, with all her future offspring, as a provision for the boy or girl, who is thus, when grown up, not unfrequently the owner of a considerable herd.

The funerals of the Laplanders are conducted with little ceremony. The body, slightly wrapped in a coarse cloth, is carried to the grave by the friends and relatives, who are entertained with a slight repast, and a small portion of metheglin. In former times, it was the custom to raise a heap of stones over the grave; but an old sledge turned with its bottom upwards, is now the only monument placed over the spot of interment. Before the conversion of the Laplanders to Christianity, they placed an axe and tinder-box beside the corpse of a man, and beside that of a woman her needle and scissars, supposing them to require these implements in the other world. They likewise interred a quantity of provisions along with the dead body; and, during the first three years after the decease of a relative, were accustomed, from time to time, to deposit, in holes dug beside the grave, small quantities of tobacco, or of whatever was most agreeable to their departed friend during his life-time.

From the time that so large a portion of Lapland fell under the dominion of Sweden, repeated attempts were made to convert the natives to the Christian faith; and the same object was diligently prosecuted by the Danish government. The Laplanders, however, continued to retain a strong attachment to their ancient mythology; and, even so late as the middle of the 18th century, a great part of the nation secretly worshipped idols, while publicly professing the Christian religion. Their ancient deities were sufficiently numerous, but may all be arranged under four classes. 1. The super-celestial, namely, Radien Atzhie, the chief divinity, and Radien Kiedde, his only son, to whom was transferred the power of creating and governing the world. 2. The celestial, namely, Beiwe, the sun, the fountain of light and heat; Ailekes, and Ailekes Olmak, two deities to whom were dedicated the days of Friday and Saturday. 3. The sub-celestial, namely, Maderatja, who kept the region of the air nearest the sun, and procreated all things; Maderakka, his wife, the protecting goddess of the Lapland women; Sarakka, and Juks akka, their daughters, equally adored with their mother, and to the latter of whom were particularly recommended the newly born children; and Horagalles, the god of thunder. 4. The subterranean, namely, Sairvo and Sairvo Olmak, the gods of the mountains, who preserve the traveller from dangers; Saiwo Guella, the conductor of souls to the shades below; Jabme Akko, or death, who presides also over the region of departed spirits, where the good, furnished with new bodies, enjoy, in an exalted degree, all the dignities and pleasures which they had left on earth, and are prepared to attain a more complete felicity in the presence of Radien; Rota, the sovereign of the infernal regions, where the wicked are for ever banished, and the god who sends all diseases on men and beasts. The rein-deer, and the rest of the brute creation, were also believed to partake of the peaceful enjoyments in the regions of Jabme Akko. To these deities were presented various offerings and sacrifices. Upon any change of habitation, libations were made of whey or milk, to conciliate the guardian divinity of the place; and of brandy to the Lares or household gods, who were supposed to reside under the fire-place. To conciliate the favour of the deities to their children, sacrifices of sheep or deer were offered before the child was born: a dog was buried alive at the moment of the birth; and some other animal killed when the infant was at the breast. Offerings and sacrifices were usually made for the removal of epidemic disorders, for success in hunting, &c. In these cases, sometimes the whole of the victim was presented; sometimes only a part; sometimes merely the bones; while the blood was sprinkled upon staves, which were left on the spot, or mingled with the waters of an adjacent river or lake. The liver of a bear, the horns and other parts of a deer, taken in the chase, were very commonly consecrated to the deity of the place. Different mountains and rocks, remarkable for their shape or height, were distinguished as holy places; and, to this day, the Laplanders abstain from hunting or pitching their tents in the vicinity of these sacred spots, and sometimes pay them a respectful annual visit, dressed in their best clothes. All these sacrifices were performed by a privileged class of men, named Noaaids, who divided the victims with great expertness, and wore at the time of sacrificing a peculiar habit. No woman was allowed to have any concern in preparing or solemnizing these rites; but the females had a full share in the ancient magical arts of their nation. Their skill, indeed, is now nearly extinct, and not a wind is to be purchased along the whole of the coast. But a few of these superstitious practices are occasionally observed, particularly the Runic drum, Ganic flies, and Juoige. The Runic drum, resembling the head of a common drum, has its wooden frame hung round with brass rings, placed so near each other as to rattle together upon the slightest touch. The skin or parchment stretched over the drum is covered with painted characters, representing the different deities, and other mystical figures, to the number of forty-five symbols. These drums are esteemed according to their antiquity; and are preserved with great care and secrecy. In any affair of importance, they are consulted in the following manner:—

A ring is placed upon the drum-head, which is then smartly struck with a small hammer made of deer's horn, so as to drive the ring from side to side over the painted surface: and according to the course which it takes, or the figures which it touches, the omen is interpreted as good or bad. Private families have their own drum for ordinary cases; but in matters of public import, such as an epidemic sickness among the people or cattle, the Noaaids, or privileged soothsayers, regularly trained to the art, hold a public consultation of the oracle. During the ceremony, he makes a number of frightful grimaces, and takes an unusual quantity of tobacco and brandy, by which he is at length so intoxicated as to fall into a deep sleep. Upon awakening from his supposed trance, he pretends to have been conveyed to one of the holy mountains, where he had an interview with the deities, and delivers their directions as to the proper sacrifice to be offered, which is commonly that of a well fed deer; at whose immolation the soothsayer himself is always the principal guest. Should the sacrifice fail in procuring the desired object, the simple Laplander consults another Noaaid, whose response commonly requires the sacrifice of another fat deer—and so on, till either the rites are considered successful, or the victims happen to be exhausted. The Ganic flies are evil spirits, supposed to be under the Noaaid's authority, to whom alone they are visible, and who pretends to keep them safely in a box till he requires their services. Should he be employed to recover stolen goods, he repairs to the tent where he suspects the thief may be found, and pouring a quantity of brandy into a dish, makes many grimaces over it for a considerable time. He then takes the suspected person aside, charges him with the crime, declares that he saw his countenance distinctly reflected in the dish of brandy, and threatens to let loose upon him a swarm of Ganic flies until he make restitution. In this mannner he so works upon the fears of the suspected person, that, if really the thief, he seldom fails to replace the stolen goods as secretly as he had taken them away. The juoige, or song of incantation, is used by the Noaaid in the exercise of his magical function, and is delivered with the most hideous kind of yelling that can be imagined. It is frequently employed by those who are not professed magicians, as it is supposed to have the power of driving away the wolf, and other enemies of the herds. The words and import are sufficiently simple; but the mode of uttering them is accounted by no means unlikely to alarm even the ravenous prowler in his haunts.

Kumpi don ednak vahag leg dakkam
Ik shjat kalka dam packest orrot
Mutto dast erit daakkaa
Mailme kiotzhjai mannat,
Ja don kalkak dai
Pazhjatallah, dacheke jetzhja lakai hewane.

Accursed wolf! far hence away!
Make in these woods no longer stay;
Fly hence, and seek earth's utmost bounds,
Or perish by the hunter's wounds.

The Laplanders still retain much of this superstitious spirit, even in the Christian rites which they have adopted. They particularly regard the sacrament as a powerful charm to preserve them from the attempts of evil spirits. It is not long since they used to take a cloth with them to church, into which they were accustomed to spit out the sacramental bread, which they wrapped up with great care, and afterwards divided into as great a number as possible of small crumbs. One of these crumbs was given to every one of their cattle, in the full persuasion that the herd would thus be secure from all injury. Their very deficient acquaintance with Christianity may, in some measure, be ascribed to the very inefficient manner in which they are instructed. It has generally been the practice of the missionaries and pastors to address the natives by means of an interpreter; and the attempts of the Danish government to remedy this defect have hitherto proved unsuccessful. Neither could the Laplanders be prevailed upon to pursue in Denmark the necessary education for officiating as preachers to their countrymen; nor could they be induced to adopt the Danish language as the prevailing dialect. The plan of encouraging young persons to study the Lapland language, and of recompensing their labours among them as missionaries, by recalling them to better situations, is more likely to prove successful.

The Laplanders are wholly destitute of learning; and have no accurate division of time. They begin the year with the Friday before Christmas; and have names for all the festivals, of which they are reminded by the clergy, who insist rigidly upon their attendance at church on these days, even in the most stormy weather, and from the greatest distance. They use no almanack of their own; but the better instructed among them, and particularly the clergy, have almanacks from Sweden. The Laplanders employ, in place of these guides, a kind of instrument composed of seven small splinters or boards, like the ancient Runic calendar of the Goths. They have no months, but divide time by weeks. The following are their names for the days of the week:

Sunday,	*Sotno peive*
Monday,	*Mannotaka*
Tuesday,	*Tistaka*
Wednesday,	*Kaska vacco* (i. e. middle of the week.)
Thursday,	*Tourestaka*
Friday,	*Peratakka*
Saturday,	*Lavvetaka*
Midnight,	*Kekia*
The remainder of night,	*Pajja kaske*
The morning dawn,	*Thieeetalga*
Sunrise,	*Peivi Morota*
Two or three hours after sun rise,	*Areitee.*
Hour of milking the rein-deer, 8 or 9 o'clock,	*Ina peive*
Noon or dinner hour,	*Kaska peivi*
Afternoon,	*Elctis peivi.*
Sunset,	*Penddit*
Night,	*Ja*

Though the lot of the Laplanders is full of toil and penury, their attachment to their native country is remarkably strong. Of this the Danish missionary Leanis mentions a striking proof, in the difficulty which he experienced in prevailing upon any of their young men to accompany him to Copenhagen, to be presented to the king of Denmark. Notwithstanding the ingenuity and dexterity with which they construct their canoes and sledges, manufacture thread from the sinews of animals, and sew the harness of the rein-deer, they discover very little intellectual ability. In their persons they are dirty, and covered with vermin; never cutting their hair, or employing any other comb than their fingers. In their manners they are destitute of any kind of delicacy, rising naked from their beds, and dressing themselves promiscuously in the presence of either sex. They are described as very ignorant, which may well be supposed; as extremely indolent, which is the case with most nations so little removed from the savage state; as strongly addicted to the use of spiritous liquors, which is so commonly characteristic of the inhabitants of cold countries.* Some travellers have farther stigmatized them as cowardly, covetous, and knavish; a description which appears to be more applicable to those who inhabit the woody country bordering on Sweden, than to those who occupy the alpine regions, who are much more distinguished by their honesty and hospitality. On the other hand, their state and manners have been pictured in the most pleasing colours, as almost realizing the ancient descriptions of the golden age; as those of a people who enjoy undisturbed the blessings of freedom, contentment, innocence, and peace. There is good and grave authority, at least, for saying that they are very attentive to religious duties, particularly observant of the Sabbath, and decently devout during the performance of divine service; that they are uniformly respectful towards their pastors and missionaries; chaste in their manners, and free from every kind of profanity in their speech; that beggars are unknown among them, and the wants of the aged and infirm duly supplied by their neighbours and relations; that they are strangers to the vice of thieving, never needing to use such things as locks or bolts, and very generally sleeping with open doors in perfect security. See Lemmius *de Lapponi Finmarchiæ Commentatio*, a work which is held in high estimation for its accuracy by the northern literati; Acerbi's *Travels in Sweden and Lapland*, where the substance of the last mentioned work is contained; Linnæus *Lachesis Lapponica, or Tour in Lapland*, translated by Dr. Smith; Baron Von Buch's *Travels through Norway and Lapland*; Skioldebrand's *Picturesque Journey to the North Cape*. Thomson's *Travels in Sweden*; Wahlenberg's *Introductio Geographica to his Flora Lapponica.* (q)

LAR. See LARISTAN.

LARCENY, (*latrocinium,*) in the law of England, signifies *theft.* It is distinguished into two sorts: *simple* larceny, or plain theft, unaccompanied with any other atrocious circumstance; and *mixed* or *compound* larceny, which includes the aggravation of a taking from one's house or person. When simple larceny is committed, by stealing goods above the value of twelve-pence, it is called *grand* larceny; when of that value, or under, it is *petit* larceny. These offences are considerably distinguished in their punishment, but not otherwise. See Blackstone's *Comment.* b. iv. ch. 17; and Jacob's *Law Dict.* (z)

LARDNER, NATHANIEL, DR. was born at Hawkherst in the county of Kent, on the 6th of June 1684; and was the son of Mr. Richard Lardner, a respectable minister among the Protestant dissenters. The place where he received his grammatical education cannot be ascertained; but after studying a short time at a dissenting academy in London, under the care of Dr. Joshua Oldfield, he was sent, in the sixteenth year of his age, to prosecute his studies at Utrecht, under professors Dr. Uries, Grœvius, and Burman. After three years residence at Utrecht, he removed to Leyden, where he studied about six months; and returned to England in 1703, from which period there are no memorials concerning him till the year 1709, when he preached his first sermon, in the 26th year of his age. In 1713, he was engaged as domestic chaplain in the house of Lady Treby, widow of Sir George Treby, Lord Chief Justice in the Court of Common Pleas; and at the same time as tutor to her youngest son, Brindley Treby. At the death of this lady in 1721, he seems to have been thrown into considerable perplexity with regard to his future plans, having now preached (to use his own words) many years without being favoured with the approbation and choice of any one congregation; but, about the year 1723, he was engaged, in conjunction with a number of ministers, in carrying on a course of lectures on a Tuesday evening in the Old Jewry; and the proof of the credibility of the Gospel history having been assigned to his department, he became from that time busily occupied in preparing the first part of his admirable work on that subject. It was not till the year 1729, when he was forty-five years of age, that he obtained a settlement among the dissenters, as assistant minister at Crutched Friars. In this situation, his time was chiefly employed in preparation for the pulpit, and in the prosecution of his great work already mentioned; but he found leisure, nevertheless, to publish several occasional pieces,† which not only extended his reputation among the dissenting denomination, but also attracted the regard of the most distinguished characters in the church of England. In the year 1740, upon the decease of his colleague, Dr. William Harris, he was unanimously invited to undertake the pastoral charge of the congregation at Crutched Friars, in conjunction with some other minister of whom they were to make choice; but in consequence probably of an extreme deafness with which he had long been afflicted, and it may be of some other reasons, he declined taking any share in the pastoral office, and continued to act in the capacity of assistant preacher. In the beginning of the year 1745, he received from the Marischal College of Aberdeen the degree of doctor in divinity, a mark of respect, which, being bestowed without solicitation, he did not think it unbecoming in him to accept; and in the following year he was appointed one of the corresponding members in London of the Society in Scotland for propagating Christian Knowledge. In 1751, he resigned the office of morning preacher at Crutched Friars, chiefly in consequence of his increasing deafness, and his application to the important work in which he was engaged on the credibility of the Gospel history. This invaluable performance was finally completed in 1755, the supplement in 1757, and the Jewish and Heathen testimonies in 1767. Upon these works the laborious and learned author had employed the greater portion of his time during the space of forty-three years. In pursuance of the same design, he next applied himself to give an account of the heretics of the first and second centuries, but he did not live to complete his intentions, though he left such materials on the subject, as formed a posthumous publication of considerable value. It is rather remarkable that he experienced very limited encouragement in the prosecution of his literary labours; that few men of the wealthy dissenters purchased his volumes; that he incurred loss instead of acquiring gain by the publication of most of them; and that he finally sold the copy right of the Credibility for the sum of 150*l.* In the summer of 1768, he was seized with an affection of the lungs, and was removed to Hawkherst, the place of his nativity, where he had a small paternal estate, in the hope that a change of air might recruit his strength. He died at this place on the 24th day of July, at the advanced age of 85 years, retaining all his faculties (with the exception of his hearing) to the last in a remarkably perfect degree. In consequence of his own particular request, no sermon was preached on the occasion of his death; but, some time after his decease, a stone, with an English inscription, was erected to his memory in Bunhill-fields, where his remains had been deposited.

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* This is peculiarly the case with the maritime Laplanders on the northern coast, who are calculated to consume the half of their annual earnings on brandy; and who are inveterately convinced, that brandy must be as nourishing as bread, because, like bread, it is prepared from grain. "They do not drink," says Baron Von Buch, "for the purpose of lightening the severity of their labour, or for the purpose of keeping themselves warm in winter on sea, for they very seldom have brandy in the boat with them in their voyages. They do not drink to assist in the digestion of their meals of fish and fat fish-livers; for they seldom have any brandy in their gammes. All is consumed at the merchant's, and before his door; and they would themselves be astonished, if they returned from the merchant's without becoming raving mad with the liquor, and afterwards lying for several hours senseless, and dead drunk before the door."—"The brandy at last deprives them of their appetite; and they become feeble, powerless, and worn down, and are at last unable to perform the most necessary operations."

† Particularly his "Vindication of the Three Miracles, against Woolston;" his "Counsels of Prudence for the use of Young People;" and his "Caution against Conformity to this World."

Dr. Lardner's mode of life was extremely retired, in consequence of his extreme deafness, as well as his indefatigable application to study. He was continually visited, however, by persons of various professions; and maintained a very extensive correspondence, both with the learned of other nations, and with the most eminent literary characters of his own country. He was honoured with the friendship of many respectable clergymen of the church of England, and received repeated testimonies of their esteem for his character; especially from Bishop Waddington, Lord Barrington, and Archbishop Secker. His private deportment was peculiarly amiable and decorous; and his manners in every respect polite, gentle, and obliging. In communicating with his visitors, it was requisite for them to propose their remarks in writing; to which he replied with great frankness and cheerfulness. As a preacher he was not held in much estimation; and his pulpit discourses were seldom attended by a numerous audience. Though serious in his manner, and perspicuous in his language, he was utterly devoid of eloquence and elocution. His utterance was in fact rather unpleasing, perhaps in consequence of his deafness; but his sermons themselves, as far as can be judged from those which have been published, were too dry and didactic in their whole strain of sentiment and expression to interest ordinary hearers. In theological learning, critical skill, patient research, and sound judgment, as far as regard the external evidences of Christianity, he holds a most distinguished rank as an author; and has rendered by his writings the most essential services to the cause of revealed religion. As a private Christian, his whole character was peculiarly exemplary; and his humble piety, unostentatious benevolence, unaffected candour, unassuming disposition, meekness of temper, purity of life, and modesty of mind, may be proposed to universal imitation. He was especially devoid of all literary vanity and ambition; and uniformly shewed a disposition to estimate the virtues of the Christian spirit above all the powers of intellect and stores of learning, even when exerted in behalf of Christian truth. "I have lately published," he said on one occasion, "the seventh volume of the second part of the Credibility; but a temper and conduct worthy the doctrine of the Gospel are more valuable than any written defences and apologies for it, or explication of it. I beg that I may be more and more possessed of that temper of humility and meekness, which shall bear good fruits." He was peculiarly characterised by an ingenuous and candid mind, a calm and dispassionate inquiry after truth, a temperate and humble statement of his sentiments; virtues which are the more worthy of being recorded, as being so rarely exemplified in almost all the numberless controversies which agitate the literary, the political, or the theological world. His learning was mixed with diffidence, his zeal tempered by prudence, and his faith accompanied by benevolence. Thus far all parties and persons in the Christian church concur in estimating the character of Dr. Lardner; but while they acknowledge the excellent spirit which pervades his writings, and the eminent services which his productions have rendered to the general authority of the sacred records, they cannot fail to lament, that he should have been able to extract from the page of revelation nothing better than the creed of Socinianism; a creed which a Socrates might have taught, and almost did in fact teach, without any revelation at all.* (*q*)

LARISTAN, is the name of a small province of Persia, which stretches along the northern shore of the gulf of the same name, from the 55th degree of East Longitude to the 58th. It is bounded by Fars on the north-west, and Kerman on the north-east. The province is diversified with plains and mountains. It is poor and unproductive, and is so extremely arid and destitute of water, that the inhabitants are barely enabled to cultivate the date tree, and a little wheat and barley. The coast is in the possession of several piratical Arab tribes, who reside in small towns and mud forts on the shores of the Gulf. Their sheiks pay a small tribute to the king.

Lars, the capital of the province, was formerly a magnificent city, but is now in ruins. It is situated in East Long. 52° 45′, and North Lat. 27° 30′, at the foot of a range of hills, in a wide plain, covered with palms. It contains many elegant buildings; and the bazar is said to be the noblest structure of the kind in Persia. It is built on a much greater scale than that of Shiraz, with loftier arches, and of superior workmanship. The houses in the town are convenient, and well furnished. Each of them has a badgeer and surdab; the former to cool the inner apartments, and the other as a place of retirement from the insupportable heats of summer. The residence of the khan is in the middle of the town, and is encircled with a strong wall, flanked with towers. The ruins of the famous castle of Lars, are still to be seen on the summit of a hill, immediately behind the town. The principal manufactures of Lars, are muskets and cotton cloth; and the population is about 12,000.

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* A complete edition of the works of Dr. Lardner, in eleven volumes, 8vo. with a life of the author, by the Rev. Andrew Kippis, was published in 1788; and a new edition in five volumes, 4to. has just been printed for T. Hamilton, Paternoster Row, London

The city of Tarem contains about 12,000 inhabitants. It stands on a plain on the banks of a salt river, and is a mean town, consisting of a mud fort, encircled by wretched huts, formed of the branches of the date tree.

The port of Congoon contains about 7000 inhabitants, and has an excellent roadstead. See Macdonald Kinneir's *Geog. Memoir of the Persian Empire*, p. 81.

LARYNX. See ANATOMY.

LASSA. See THIBET.

LATAKIA, the ancient *Laodicea*, is a sea-port town of Syria, in the pachalic of Tripoli. It stands on the southern side of a small peninsula, which runs about half a league into the sea. The harbour, which is a sort of basin surrounded by a mole, is capable of holding from 25 to 30 vessels; but it is now choked up. This place carries on a considerable trade in olives and tobacco, of the last of which about 20 cargoes are annually sent to Damietta, for which rice is obtained in return. Population about 5000. East Long. 35° 44′ 15″, and North Lat. 35° 32′ 30″. See Volney's *Travels.*

LATHE. See TURNING.

LATIMER, HUGH, bishop of Worcester, was the son of an honest yeoman at Thurcostan, in Leicestershire, and was born about the year 1470. At the age of four years, he gave so great proofs of a ready apprehension, that his parents, having no other son, resolved to educate him for a learned profession; and at the age of fourteen, he went to the university of Cambridge, where he applied himself chiefly to the theological studies of those times. Having taken priest's orders, he distinguished himself, at a very early period, by his zeal for the tenets of Popery, and his invectives against the principles of the reformers; but having subsequently embraced the Protestant faith, principally through the instructions of Thomas Bilney, a devout clergyman in the university, he became equally ardent in promoting the cause of the reformed doctrines. His eminence as a preacher, and the exemplary life which he led with his friend Bilney, had a very considerable influence in spreading the new opinions; and all the exertions of the opposite party were called forth to counteract his growing popularity. Doctor West, bishop of Ely, was at length constrained to exercise his authority as diocesan; but, being a man of great moderation, he contented himself with preaching against the heretics, and forbidding Latimer to preach in the university. Doctor Barnes, however, prior of the Augustine Friars, licensed Latimer to preach in the church of his priory, which, like most religious houses, was exempt from episcopal jurisdiction; and here, in spite of all the machinations of his adversaries, he continued for three years to address the most crowded audiences with distinguished success and applause. Even the bishop of Ely was frequently observed among his hearers, and candidly acknowledged his excellence as a preacher. About this time, King Henry VIII. desirous to conciliate the Pope, had enjoined Wolsey to put the laws in execution against heretics; and Latimer was summoned, among others, to answer for his avowed sentiments. According to some accounts, he consented to subscribe the articles which were proposed to him; but others affirm, that Wolsey was so pleased with his answers, that he dismissed him with a very gentle admonition. He had even begun to be in favour at court; and having preached before his majesty at Windsor, was noticed with more than usual affability. He was not the less resolute in his adherence to the cause of the reformed religion: and had the courage even to write a letter to the king, against a proclamation which had been issued for prohibiting the use of the Bible in the English language. Though his remonstrance, which singularly marked the sincerity and openness of his character, produced no effect, yet the king, who had before been pleased with Latimer's plain and simple manner of address, or who had at the time other ends to serve by his aid, received it with the utmost condescension. He was afterwards still more firmly established in the royal favour by the exertions which he made, in full consistency with his principles, to support the plea of the king's supremacy. By the friendship of Doctor Butts, the king's physician, and of Cromwell, the prime minister, both favourers of the reformation, he was presented to the living of West Kingston, in Wiltshire; and, contrary to the advice of his patrons, he resigned all attendance at court, to devote himself to the duties of his parish. He extended his labours also with great diligence into the adjoining parts, wherever he observed a deficiency of pastoral instruction; and was rising rapidly in the estimation of all good men in those districts, when his enemies drew up a charge of heresy against him, and procured a citation for his appearance before Stokesley, bishop of London. But this step only furthered his promotion; for while he was greatly harassed in the archiepiscopal court, by frequent examinations, and crafty interrogatories, and urgent injunctions, to subscribe their articles, the king, having been privately informed of the treatment to which he was subjected, interposed his authority, and stopped all proceedings against him. Other accounts seem to imply, that he had previously made all the submissions which the bishops required; but in whatever way the matter was settled, he does not appear to have fallen in the king's estimation; and, soon after the date of these troubles, he was promoted to the see of Worcester, through the influence of his steady patrons, Cromwell and Butts. In this station, he applied himself with all his usual fidelity to the discharge of his office; and proceeded, with as much zeal as the state of things would admit, in correcting the tendency of Popish superstitions. In 1536, he attended the session of parliament and convocation, in which the Protestant influence so far prevailed, as to abolish form out of the seven sacraments, and to authorize the translation of the Bible into English. Returning to his bishopric, and shunning all concern in state affairs, he occupied himself entirely in the silent discharge of his pastoral duties, till the year 1539, when the act of the Six Articles was passed, which reduced him to the necessity of surrendering his office, or his conscience. Instantly he resigned his bishopric, and retired to a private situation in the country; but being obliged to repair to London, in consequence of a severe bruise, which required better medical assistance than his neighbourhood could supply, he was soon discovered by Gardener's emissaries; and, upon an allegation of having spoken against the Six Articles, was committed to the Tower, where he suffered a severe imprisonment during the remaining six years of Henry's reign. Immediately after the accession of Edward VI. he recovered his liberty, and found his old friends again in power; but he declined all their proposals to reinstate him in his diocese, and took up his residence with Cranmer at Lambeth. Here he occupied himself chiefly in redressing the grievances of poor persons, who flocked to him in great numbers; and assisted in preparing the first part of the English Homilies. He seldom failed, however, to appear in the pulpit on Sundays; and, besides preaching the Lent sermons before his majesty, frequently officiated at St. Paul's cross, and other churches in London.

After the death of Somerset, he withdrew from the metropolis, and made use of the king's license as a general preacher, wherever his services appeared to be required. But, upon the restoration of Popery, at the commencement of Mary's reign, he was once more silenced, together with all the Protestant teachers; and in a short time, summoned to London before the ecclesiastical council. He had long been persuaded, that, sooner or later, he should be called to answer with his life for the cause which he had espoused; and, particularly, that, in the eye of Bishop Gardener, now prime minister, he was marked for proscription. Though forewarned of the designs meditating against him, and of the approach of the messenger with the citation from court, he was so far from availing himself of the opportunity to escape, (which, it is conjectured, would have been more agreeable to his enemies than his appearance,) that he instantly made ready to accompany the officer, and addressed him in language expressive of the utmost readiness to attend his orders. The messenger, however, acquainted him, that he had no authority to seize his person; and merely delivering the citation, took his departure without delay. Latimer prepared to obey the summons, proceeded straight to the metropolis; and, on the day after his arrival, presented himself to the council, by whom he was loaded with reproaches, and committed to the tower. Notwithstanding the infirmities of his advanced age, and the severity of treatment which he experienced, he bore his confinement with the utmost patience, and even frequently indulged in his habitual jocularity. Being denied the benefit of a fire, even in the midst of winter, he said one day to the under-keeper, "that if he did not look the better to him, perchance he should deceive him." The lieutenant, upon being informed of these expressions, became apprehensive of some intention on the part of his prisoner to effect his escape; and, coming to him in person, required an explanation of his words. "Yea, master lieutenant," said Latimer; "for you look, I think, that I should burn; but, except you let me have some fire, I am like to deceive your expectation, for I am like here to starve for cold."

In 1554, after half an year's imprisonment, he was conveyed to Oxford, together with Cranmer and Ridley, for the purpose of holding a public disputation with the most eminent Popish divines. At these conferences, which were conducted in a most disorderly manner, it is observable, that, though Latimer avowed his intention to shun argument as of no avail, and to content himself with offering a plain account of his faith, he nevertheless managed the controversy with more ability and consistency than his colleagues, who attempted to answer the citations from the Fathers in the quibbling style of the schoolmen, while the other adhered to the pure strain of scripture language, and disclaimed all authority which did not coincide with its plain import. "Then you are not of Chrysostome's faith, nor of St. Augustine's faith?" said his opponents. "I have said," replied the bishop, "when they say well, and bring scripture for them, I am of their faith; and farther Augustine requireth not to be believed." After the termination of the disputations, sentence was pronounced against the three Protestant prelates as heretics; but they remained in custody till the month of September in the following year, when commissioners were appointed to examine them a second time, and to afford them an opportunity of retracting the sentiments which they had formerly avowed. The aged bishop, adhering resolutely to his confession, was led to the stake along with his fellow prisoner Ridley, on the 16th of October, 1555, where he met the painful death of his martyrdom with the utmost composure and fortitude. "Mr. Latimer very quietly suffered his keeper to pull off his hose and his other array, which, to look into, was very simple; and being stripped into his shroud, he seemed as comely a person to them that were there present, as one should lightly see; and whereas, in his clothes he appeared a withered and crooked silly old man, he now stood bold upright, as comely a father as one might lightly behold." As the faggots were kindling, he said to his companion in suffering, "Be of good comfort, Mr. Ridley, and play the man; we shall this day light such a candle by God's grace in England, as, I trust, shall never be put out;" and as the flame embraced his body, he repeatedly cried with a firm voice, "O Father of heaven, receive my soul!" and expired in a short time without any appearance of extreme agony.

The general character of this venerable person is most honourable to the cause which he embraced, and presents a worthy pattern to every Christian bishop. He was always more attentive to the pursuit of useful knowledge than of curious literature; and, even in his advanced years, was regularly occupied with his studies many hours before sun rise, both in winter and summer. He avoided all interference in secular or political concerns, and devoted himself wholly to the discharge of his office as a christian pastor. He was a celebrated and popular preacher in his time; and his manner of address in the pulpit is described as having been remarkably earnest and impressive; but his sermons, which are extant,* though frequently marked by the most affecting simplicity, abound too much in the low familiarity, and even studied drollery, which suited the taste of that age, and which had their origin, with so many other deviations from apostolic example, in the most corrupted church, and darkest periods of Christendom.† See Fox's *Acts and Monuments*; Strype's *Ecclesiastical Memoirs*; Wordsworth's *Ecclesiastical Biography*. (*q*)

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* The sermons, nevertheless, throw much light upon the state of morals and society in those times, and are ranked among the most curious and amusing specimens of our early literature.

† The following specimen of the good bishop's pulpit pleasantry may gratify the curiosity of the reader, and furnish some idea of the taste of the age in which he lived. "Well, I would all men would look to their dutie as God hath called them, and then we should have a flourishing Christian common weal. And now I would ask a strange question. Who is the most diligentest bishop and prelate in all Englande, that passeth all the rest in doing his office? I can tell, for I know him who it is; I know him well. But I think I see you listening and harkening that I should name him. There is one that passeth all the other, and is the most diligent prelate and preacher in all Englande. And will ye know who it is? I will tell you. It is the devil. He is the most diligent preacher of all others; he is never out of his diocese, he is never from his cure; ye shall never find him unoccupied; he is ever in his parish; he keepeth residence at all times; ye shall never find him out of the way; call for him when you will, he is ever at home, the diligentest preacher in all the realme; he is ever at his plough, no lording or loytering can hynder him; he is ever applying his busnyess; ye shall never find him idle, I warrant you. And his office is to hinder religion, to mayntaine superstition, to set up idolatry, to teach all kynds of popery. He is ready as can be wished for to set forth his plough, to devise as many ways as can be to deface and obscure God's glory. Where the devill is resident, and hath his plough going, there, Away with books, and up with candles! Away with Bibles, and up with beades! Away with the light of the gospel, and up with the light of candles, yea at noon dayes! Where the devill is resident, that he may prevayle. Up with all superstition and idolatry, sensing, paynting of images, candles, palmes, ashes, holy water, and new service of men's inventing!—as though man could invent a better way to honour God with, than God himself hath appoynted. Down with Christ's cross, up with purgatory pick-purse! up with him, the Popish purgatory I mean. Away with clothing the naked, the poor, and impotent; up with decking of images,

LATITUDE. See ASTRONOMY, and GEOGRAPHY.

LAUDER, a royal burgh of Scotland, in the county of Berwick. It is situated on the river Leader, which runs into the Tweed below Melrose. The town consists principally of one street, which contains some good houses, but has no public buildings deserving of notice, and no [illegible]. Close by the town, on the banks of the Leader, stands Thirlestane Castle, or Lauder Fort, a handsome building, which was erected by Edward I. of England, and is now one of the seats of the Earl of Lauderdale. Lauder unites with Jedburgh, Haddington, Dunbar, and North Berwick, in sending a member to parliament. The population of the town and parish in 1811 was 336 houses, and 1742 inhabitants.

LAUDER, SIR JOHN, Lord Fountainhall, was born at Edinburgh in 1616, of the family of Lauder of Lauder Tower, of which he afterwards became the representative. He was the eldest son of John Lauder of Newington, merchant, and bailie of Edinburgh. Having early displayed a predilection for the bar, he went abroad to finish his education at Leyden, and, after visiting Paris, he returned to his native country, to prepare himself for the profession he had chosen, and passed advocate in 1668. There is reason to believe, that his talents as a pleader were of no mean character, and that his practice soon became considerable, for he seems to have appeared in causes of importance not long after he had put on the gown. He was one of those fifty advocates, who, disgusted with the partiality of the judges at that time composing the court of session, and more particularly with their arbitrary endeavours to crush appeals from their sentences to the king and parliament, were so spirited as to desert the court in a body, in February, 1678; and who were, in consequence of this determined step, deprived of the power of exercising the functions of their profession. He was afterwards restored, along with his companions, in January, 1679. Soon after this he had the honour of knighthood conferred upon him. Upon the occasion of Argyle's trial for the alleged treasonable interpretation of the test, in 1681, Lauder, with seven others of his brethren who formed the earl's counsel, had nearly been subjected to imprisonment by the tyrannical Scotch administration of the time, for having, merely as an ordinary piece of duty to their client, signed a favourable opinion as to the meaning of his expressions.

In 1685, he was returned to the Scotch parliament as member for East Lothian, in which county his father had purchased the estate of Fountainhall; and he represented that shire for twenty two years. When James II. made his attempt, in 1686, to pave the way for the introduction of popery, by endeavouring to procure from his Scottish parliament the repeal of all penal laws and tests relating to religion, Sir John Lauder made a vigorous stand in the house against the royal party, and seems to have materially contributed to their defeat, in regard to the chief object of their manœuvres. He was created a lord of session, under the title of Lord Fountainhall, by King William and Queen Mary, in 1689. In the same year he had a pension of L.100 Sterling granted to him; and, in 1690, he was made one of the lords of justiciary.

His father, when in his dotage, having married for his third wife Margaret Ramsay of Idington, a designing woman, she had succeeded in persuading him to apply for a baronet's patent from James II. which she had also managed, by her clandestine intrigues, and without her husband's knowledge, to get constructed in such a manner as to make the title descend to his son by her, instead of to his proper heir. Lord Fountainhall, however, raised an action of reduction, and obtained its annihilation; and another, running in the proper line, being granted by William and Mary, he soon afterwards succeeded to it. At that period, the office of lord advocate was frequently held in conjunction with a seat on the bench. This situation was offered to Fountainhall in 1692, and was refused by him, because he was denied permission to prosecute the inhuman perpetrators of the diabolical massacre of Glenco.

He was twice married; first, to Janet, daughter of Sir Andrew Ramsay, Lord Abbotshall—and, secondly, to a daughter of Anderson of Balram; and he had a numerous family by both these connections. Regular circuits having been established in 1707, Fountainhall, who by that time found himself too infirm to be equal to the fatigue of this additional duty, resigned his justiciary gown to Queen Anne, though pressed by her majesty to continue to hold it; and a little time before his death, he also resigned his seat as a lord of session. In resigning these offices, he also gave up the salaries appended to them. He died in September, 1722.

Lord Fountainhall was most particularly remarkable for his uncommon industry and unwearied assiduity, and for his devotion to his profession, and accuracy in recording its doctrines and precedents. Besides his occupation in the arduous duties of a lawyer and of a judge, he devoted much time to writing. Those MSS. which exist in his hand, are but a very small portion of those left at his death, as is manifest from the frequent references he makes to numerous volumes, by a variety of different letters and figures. The children of his second marriage being his executors, were too young to know the value of these writings, which was probably the cause of their being lost. Eight folios and three quartos now remain, said to have been originally rescued from a tobacconist's shop, but which fortunately came at last into the Library of the Faculty of Advocates, who, in 1759, published from them the two printed folio volumes entitled, *Decisions of the Court of Session from June 6, 1678, to July 30, 1712, containing also the Transactions of the Privy Council, of the Criminal Court, and Court of Ex-*

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and gay garnishing of stocks and stones! Up with man's traditions and his lawes! down with God's traditions, and his most holy word. But here some man will say to me, 'What, sir, are ye so privy of the devill's counsel, that ye know all this to be true?' Truly, I know him too well, and have obeyed him a little too much, in condescending to some follyes. And I know him as other men do; yea, that he is ever occupyed, and ever busy in following his plough. I know him by St. Peter, which sayth of him, *Sicut leo rugiens circuit, quærens quem devoret*, he goeth about like a roaring lyon, seeking whom he may devour. (I would have this text well viewed and examined, every word of it. *Circuit*, he goeth about in every corner of his dyocese. He goeth on visitation daily. He leaveth no place of his cure unvisited. He walketh round about from place to place, and ceaseth not. *Sicut leo*, as a lyon; that is, strongly, boldly and proudly, stately and fiercely, with haute lookes, with his proude countenances, with his stately bragginges. *Rugiens*, roaring; for he letteth not slip any occasion to speake or to roar out when he seeth his tyme. *Quærens*, he goeth about seeking, and not sleeping as our bishops doe; but he seeketh diligently, he searcheth diligently all corners, whereas he may have his prey.) He roveth abroad in every place of his dyocese, he standeth not still, he is never at rest, but ever in hand with his plough, that it may go forward. But there was never such a preacher in England as he is. Who is able to tell his diligent preaching? In the mean tyme, the prelates take their pleasures. They are lords, and no labourers; but the devill is diligent at his plough. He is no unpreaching prelate. He is no lordly loyterer from his cure, but a busy ploughman; so that among all the prelates, and all the pack of them that have cure, the devill shall go for my money; for he still applyeth his buysness. Therefore, ye unpreaching prelates, learne of the devill to be diligent in doing of your office. Learne of the devill; and if you will not learne of God, nor good men, for shame learne of the devill! *Ad erubescentiam vestram dico.* I speake it for your shame. If you will not learne of God nor good men to be diligent in your office, learne of the devill."—Preached in St. Paul's church, London, 1548.

chequer, and interspersed with many Historical Facts, and other curious Anecdotes. There still remains much unpublished matter, of a historical nature, scattered through these MSS. which, it is hoped, may, at some period be arranged and submitted to the press, as they display considerable observation, and afford much information regarding the political characters and transactions, as well as the manners of these interesting times.

LAUNCESTON. See Newport.

LAUSANNE, the *Lausonium* of the ancients, is a city of Switzerland, and the capital of the Canton de Vaud. It is built on three hills, and in the adjoining vallies, and is situated 432 feet above the lake of Geneva, from which it is distant about two miles. One of the principal public buildings in Lausanne is the cathedral. It is a large Gothic building, situated in the highest part of the town, and has a lofty square tower, terminating in a small pyramid, with lesser pyramids at each angle. The portal, or entrance on the south side, contains many finely sculptured figures. The interior of the church is very fine. The south window in the transept is circular, and filled with painted glass; and opposite the pulpit are several seats of finely carved wood, for the members of the council. Within the cathedral are the tombs of Pope Felix I. the Countess Orloff, the Countess Walmoden, and several English. From the top of the tower, which is ascended by 250 steps, there is a fine view of the town, and the lake of Geneva, with the Savoy Alps towering above it. There are two other churches in Lausanne, namely, that of St. François, and St. Laurent, none of which are particularly handsome. On the north side of the cathedral, and very near it, is the college or academy, founded in 1537, and endowed from the secularised convents. The academical library, founded in 1549, is in the upper story of the college, and was enriched with the library of M. de Quiros, a Spanish gentleman, who settled in Lausanne in 1750, and was appointed professor of church history. The Maison de Ville is a large stone building, with an arcade below, two stories above, and a small spire in front.

On the north of the academy is the chateau, which the bailiffs inhabited. It was built at the beginning of the fifteenth century, by the bishop William de Challant. The chateau, in which the public offices are kept, has its upper part built of brick, and the lower part of stone, with four projecting bastions of brick at the angles. The hospital is a neat building, with two projecting wings. It consists of three stories, and is ornamented with Tuscan pilasters. Besides these buildings there is a manege, and a charity school. A lyceum or school of design was founded by the cantonal government in 1808, and was directed by M. Ducroz, a celebrated painter, who spent 32 years at Rome, There is a good collection of natural history and mineralogy at the house of Professor Struve, and another belonging to M. Lardy. The ornithological collection of the late Colonel Desruines is placed in the academical library. A society of emulation was established here in 1804, and has published several interesting memoirs, under the title of *Notices d'utilité publique.*

The ancient *Lausonium* was situated between the country houses of Vidi and Dongry, on the great road to Morges, about half a league from Lausanne. Parts of walls, bricks, Roman coins, and a group in bronze, representing a priest preparing a bull for the sacrifice, have been at different times found in this spot. The remains of a Roman road, which went from Vidi to Ouchy, and Vevay, have also been discovered. In February 1807, there were found in the wood of Vaux, not far from Vidi, a subterraneous apartment, filled with arms and medals, and containing four great amphoræ, the remains of marble columns, iron and copper pens, silver and copper pins, a bronze statue of Diana, and other remains of antiquity.

The most interesting promenades at Lausanne, are that of Montbenon, at the gate of St. François; the Signal, situated on the top of a high eminence, north of the town, which commands a prospect of all the adjacent country, and near which is a beautiful glen, finely wooded, and highly picturesque, through which runs a small stream. The views from the terrace of the cathedral, from the terrace of the house occupied by Gibbon, (now the banking-house of M. Dumolin,) are very much admired. The population of Lausanne is about 8000. East Long. 6° 45′ 30″ North Lat. 46° 31′ 5″. See Switzerland.

LAUTERBRUNNEN, or Lauterbrounn, is the name of a valley and of a village in Switzerland, in the Canton of Berne, remarkable for the beauty and grandeur of its scenery. Lauterbrunnen is commonly visited by travellers from Berne. The journey from Berne to the town of Thun is performed in about three hours, and as there is no carriage road along the banks of the lake, travellers sail along the lake to Newhaus, which is accomplished in less than three hours. The traveller arrives at Interlachen, through Unterseen, in less than an hour, and he generally ascends to a wooden pavilion, on the other side of the Aar, from which there is a charming view of Unterseen, the Aar, the lakes of Brienz and Thun, and the mighty summit of the Jungfrau. The journey from Interlachen to the village of Lauterbrunnen is generally performed in little more than two hours in a charabanc. The road passes through beautiful orchards and rich green fields, and then enters the valley of Zweylutschinen, defended on the right hand with magnificent and lofty rocks. The valley soon separates into two, namely, that of Grindelwald, and that of Lauterbrunnen; the Black Lutschinen running through the former, and the White Lutschinen through the latter. The valley of Lauterbrunnen is now very narrow, and is flanked on both sides with lofty calcareous rocks, exhibiting the most extraordinary contortions in their stratification, and generally rising to the height of 800 and 900 feet. The rocks of Eisenflue, 900 feet high, have a village of the same name on their summit, and are beautifully covered with wood. The singular cylindrical rock of Hunenflue presents at its base horizontal strata, while those above are highly inclined, and in great confusion.

The view up the valley of Lauterbrunnen from the village is extremely grand. On the right is seen the Staubach, throwing itself over a rock about 1000 feet high; and a little farther up, on the same side, the fall of the Spisbach; beyond which, on the same side, is a magnificent bare wall of rock rising to the height of 900 feet. In returning in an autumn evening from the fall of the Spisbach, the writer of this article had the good fortune to see the scenery of the valley in all its beauty and grandeur. The deep valley, and its precipitous walls of rock, were almost involved in total darkness, while the red twilight shed a bright hue over the snowy flanks of the Jungfrau, the Breithorn, and the Lauterhorn, which appeared through the extreme opening of the valley as if they were portions of a different world. This appearance was still more striking at a later hour, when Saturn appeared over the Jungfrau, and when the lights in the cottages seemed like so many stars on the dark declivities of the valley.

The valley of Lauterbrunnen is about five leagues long, and seldom half a league in width. More than twenty brooks rush over the rocks which enclose it; and it is probable, that from this cause it has received its name, which signifies *many springs.* The village of Lauterbrunnen is situated 715 feet above the lake of Thun, and 2450 above the sea. See Jungfrau.

LAVA. See VOLCANO.

LAVATER, JOHN CASPAR, the celebrated writer on physiognomy, was born at Zurich, in Switzerland, on the 15th of November, 1741. His father, Henry Lavater, was a doctor of medicine, and a member of the government of Zurich; a man of a most respectable character, of a sound understanding, and great industry, but by no means gifted with any uncommon talents. His mother possessed more genius, a very lively imagination, and an insatiable thirst for knowledge of every description. Both his parents were remarkable for their piety.

In his early youth, Lavater appears to have exhibited no indications of superior talents; on the contrary, his progress in learning was extremely slow. His parents were exceedingly attentive to his education; but it seems to have been very difficult to fix his mind upon any particular study. As he was not permitted to join his companions in any of their youthful sports, he spent a great part of his time in modelling all kinds of figures in wax. It is remarkable that, for a long period, he was considered as totally destitute even of the most ordinary talent of expressing his thoughts by language, and especially of the power of reasoning upon any subject; insomuch that he was often taunted by his school-fellows on account of his apparent dulness.

In the year 1753, he was seized with a dangerous illness. During the progress of his recovery, which was slow, he amused himself with optical experiments and drawing; and throughout the whole of his subsequent life, he retained a fondness for these occupations. In other respects, this illness had a beneficial influence upon his disposition. About this time, Wieland, the celebrated poet, came to Zurich, a circumstance which excited considerable sensation in the town. Even the boys at school talked with admiration of the man who understood so many languages, whose attainments in science were so great, and whose powers of observation were so unrivalled. Lavater was so much engrossed with this subject, that he could think of nothing but Wieland; and although he only saw him once, he is said to have frequently remarked, that Wieland's image was indelibly impressed upon his mind. From this period, he began to display a fondness for reading. He had recourse to his father's library, where he perused a variety of books on different subjects, but in a desultory manner, and without adhering to any regular plan. He had neither patience nor resolution to read any work from beginning to end; whatever required laborious study or reflection disgusted him. At a later period, he endeavoured, with great difficulty, to acquire a habit of steady and regular application, and even made it an inflexible rule never to lay down a book which he had once begun, without perusing it to the end, whatever exertion it might cost him, and however small the entertainment or information he might derive from it.

Having finished his school education, he entered the academical *gymnasium*, or humanity college, in the year 1758. Here he formed an intimate friendship with the two brothers, Henry and Felix Hess, and Henry Fuessli, who were his fellow students of theology. Bodmer and Breitinger, who were at that time the most distinguished professors at the gymnasium, did not fail to perceive the characteristic excellencies of Lavater's understanding; and they paid particular attention to him and his friends. Bodmer especially devoted much of his time to them; a circumstance which is supposed to have had considerable influence on the poetical talents of Lavater. In the year 1759, he attended the philosophical lectures; and towards the end of that year, he was admitted into the theological class. His attention was now almost exclusively devoted to the study of divinity. About this time, too, he composed many devotional poems; some of which were afterwards inserted in his *Collection of Spiritual Songs*.

In the year 1762, having completed his theological studies, he entered into the ministry. About this time a circumstance occurred, which at once developed the characteristic energy of his mind, and laid the foundation of that celebrity which he afterwards enjoyed. Lavater and his friend Henry Fuessli (the celebrated painter) had heard much of the acts of injustice committed by a ruling magistrate in one of the bailiwicks of Zurich. But although the complaints of his conduct became daily louder, and his guilt more evident, yet it seemed difficult to obtain redress, as the burgomaster of Zurich was his father-in-law. Lavater and his friend first addressed an anonymous letter to the unjust magistrate, containing a list of his offences, and threatening a public accusation, unless he gave immediate satisfaction to those whom he had plundered. No notice having been taken of this letter, the two friends made their complaint public, in a pamphlet, entitled "*The Unjust Magistrate, or the Complaint of a Patriot*," which was printed and introduced into the houses of the principal members of the government. The business was at length taken up by the council at Zurich; a rigorous inquiry was instituted; and the authors of the complaint were called upon to make themselves known. Lavater and Fuessli immediately stepped forward, and boldly avowed what they had written. The magistrate, however, did not choose to await the issue of the inquiry; but thought it prudent to abscond. The result of the investigation was such, as did equal credit to the patriotic exertions of the complainers, and to the impartial administration of justice by the council of Zurich. The unjustly acquired property was restored, and the guilty magistrate condemned to a suitable punishment.

With a view to his improvement, Lavater now undertook a journey through a great part of Germany; during which he had an opportunity of visiting and conversing with many individuals of the highest eminence in literature, and of making many observations on the characters of men. After being absent about a year, he returned to his native country in 1764. Although he had at this time no living in the church, yet he preached often; and the style and form of his sermons, though new, were much admired. His delivery was warm and energetic, and he possessed great clearness in the exposition of scriptural truths. In the year 1766, he married Anna Schinz, the daughter of a respectable merchant in Zurich. In 1769, he was appointed pastor of the Orphan's Church; a situation which gave him an opportunity, which he always sought, of being useful, and of doing good. Here, too, he improved that talent for communicating instruction to children, which he afterwards brought to such perfection.

From an early period of his life, Lavater had been accustomed to observe, with particular attention, the varieties of form in the human countenance, and to make drawings of such features as appeared to him to indicate any peculiarity of character. The more he observed, the more was he confirmed in his belief, that the essential qualities of the mind of every man were sensibly pourtrayed in the conformation of his whole body, especially of his head and face. The result of these observations induced him to think, that it might be possible to discover some certain principles upon this subject, which might be systematically arranged in the form of a science. He both corresponded and conversed upon this subject with his friend Dr. Zimmermann; and in spite of his objections, and those of other learned men, Lavater still continued to be persuaded of the truth of his favourite theory. The principles from which he set out are to be found in a small work, published by Zimmermann in 1772, entitled "*John Caspar Lavater on Physiognomy*," being the first publication which appeared upon the subject.

The first volume of his great work on Physiognomy was published in 1775, under the title of "*Fragments*," which was soon followed by three other volumes. This work, which contains a great many curious and interesting observations, exhibits much delicate feeling, and refined, though fanciful reasoning, was read with great avidity; and the theory of Lavater, although now almost consigned to oblivion, became a fashionable study, among the learned and the unlearned, throughout the whole of Europe. It was soon discovered, however, that this theory wanted consistency, and that it was founded on no just or certain principles. Lavater himself, who was more remarkable for the liveness of his imagination, than for depth of reflection or soundness of reasoning, seems to have totally overlooked those circumstances which were most calculated to give his theory even the appearance of systematic science. He sought the indications of character chiefly in the *solid parts*, especially the forehead and the nose; and from these he drew conclusions with regard to the *original* dispositions of men. He neglected the soft and more moveable features, such as the eye, and particularly the lines about the mouth and nose; from which he might have been, perhaps, better warranted in forming conclusions respecting the acquired dispositions, the feelings, and the passions of the individual. But although this work must be considered as the production of a fanciful, rather than of a scientific mind, it contains undoubtedly many ingenious and interesting observations, which shew that the author possessed much delicate knowledge of the human heart. There is in it, however, as in almost all the productions of Lavater, too great a parade of language,—many elegant and sententious passages, not greatly overburdened with meaning. Many will esteem the work as valuable chiefly on account of the engravings; a number of which, exhibiting the heads of men and animals, are exquisitely finished, and singularly expressive. It may be proper to observe, that the French translation of Lavater's *Physiognomy*, from which the English version was made, was not a mere translation from the original German work, but, in many respects, a new treatise, translated under the eye, and revised by Lavater himself. An abridgment of the work, in four volumes 8vo. was published by Armbruster (1783-1786), which, according to Lavater, contains, in a less expensive form, the whole essence of the large edition.

In the year 1778, Lavater was appointed dean of St. Peter's church, which considerably enlarged his sphere of exertion. From this period he continued to publish numerous works, which were calculated to promote the knowledge, and advance the interests of religion. Having translated Bonnet's *Inquiry into the Evidences of Christianity*, he had the imprudence to dedicate the book to the celebrated Jewish philosopher, Moses Mendelssohn, with a challenge, either to refute it publicly, or to profess his conviction of the truth of its arguments, by embracing the Christian faith. Mendelssohn answered in a style at once modest and manly; and Lavater afterwards repented of the step he had taken, and acknowledged in public, that his zeal had led him beyond the bounds of discretion.

At the commencement of the French Revolution, Lavater, who had always been distinguished for his ardent love of genuine freedom, was naturally led to regard that event with a favourable eye; but after it had assumed a character of atrocity, and threatened destruction to the sacred and salutary principles of religion, of morals, and of social order, he loudly proclaimed his abhorrence of the enormities which it [illegible] and strove to avert the calamities which impended over his native country. During the revolutionary scenes which ensued in Switzerland, he preserved the character of a sincere and zealous patriot. He endeavoured to infuse a spirit of moderation into all parties, and never ceased to raise his voice freely and boldly, against all manner of oppression and injustice. His conduct, indeed, gave umbrage to the members of the Helvetic Directory, and he became a victim to that system of *deportation*, by which the revolutionary faction endeavoured to rid themselves of all those who ventured to call their measures in question. The sentence against him, however, was afterwards recalled, and he was set at liberty. At the storming of the city of Zurich by the French army under Massena, in 1799, Lavater had the misfortune to receive a wound in the breast. The wound was not considered dangerous, although he was obliged to confine himself to bed, and suffered great pain. Having exerted himself, however, beyond his strength, in religious and charitable duties, before his wound was completely cured, he brought on a train of dangerous symptoms, which at length terminated his life, on the 2d of January, 1801, in the sixtieth year of his age.

The character of Lavater was in the highest degree amiable; he was a zealous and upright patriot—an active and conscientious minister of religion—and a man of the most genuine benevolence. His moral conduct was, upon every occasion, most exemplary; and his whole life was spent in unwearied efforts to promote the happiness of mankind. His virtues, indeed, seem to have contributed more than his talents towards elevating him to that height in the scale of celebrity which he held during his life. So great was his popularity at Zurich, that, in his walks, the people frequently flocked around him, and kissed his hand in token of their respect.

We have already alluded to some of the works of Lavater. Among these, his physiognomical publications enjoyed a very extensive, though ephemeral, celebrity. His other works, chiefly on religious subjects, are very numerous; and some of them were extremely popular in their day, though now little read. His learning was not very extensive—his powers of reasoning by no means remarkable—and, in all his productions, he seems to give full scope to the play of his fancy, and to revel in the regions of enthusiasm. His pulpit eloquence, however, was much admired; for his genius seemed better calculated to influence the feelings of an audience, than to display itself in writings, which were destined to be perused and coolly analyzed in the closet. His *Aphorisms on Man* have been considered as one of the best of his miscellaneous publications; and his *Schweitzerlieder*, (Songs of the Swiss) and some of his devotional effusions, are still read and admired by his countrymen. See Leonard Meister's *Berühmte Zuricher*, and *Berühmte Männer Helvetiens*, 1782; K. L. von Haller, *Denkmal der Wahrheit auf J. K. Lavaver; J K. Lavater's Lebensbesuhreibung von seinem Tochtermanne* Georg. Gessner, 1802, 1803; Meiner's *Briefe über die Schweitz*, 2d edit. Berlin, 1788; and Jorden's *Lexicon Deutscher und Prosaisten.* (*z*)

LAVOISIER, Anthony Lawrence, the celebrated French chemist, was born at Paris, on the 26th of August, 1743. His father, being in opulent circumstances, gave his son every advantage which a liberal education could bestow; and the genius of Lavoisier was directed, at an early period, to the study of the physical sciences, which he cultivated with great zeal and success. In the year 1764, he drew up a memoir, in answer to a question proposed by the French government, on the best and most economical means of lighting the streets of a great city, which obtained for him the prize of a gold medal, and was printed at the expence of the Academy of Sciences, of which he was elected a member on the 13th of May, 1768. During this period, he distinguished himself as the author of several valuable treatises on philosophical subjects, which were printed in various periodical works. His observations on the experiments made with a view to prove the possibility of converting water into earth, will be found in the Memoirs of the Academy for 1770. In the course of various journies through different districts of France, he found opportunities of collecting copious materials for the mineralogy of that kingdom, which served as the foundation of a work on the revolutions of the globe, and the formation of the strata of the earth, of which he gave interesting sketches in the Memoirs of the French Academy for 1772 and 1787.

The brilliant discoveries in chemical science which were made, about this period, particularly by the British philosophers, attcrated the attention of Lavoisier, who seems to have been fully aware of the great importance of these discoveries in the further prosecution of physical research. In his *Opuscules Chymiques*, which were published in 1774, he exhibited a clear and elegant view of the history of pneumatic chemistry, along with some ingenious and accurate experiments of his own. In the year 1778, he entered into an examination of Dr. Priestley's dephlogisticated air, and published his proofs that this substance is a constituent principle of all acids; and to this principle, therefore, he gave the name of *oxygen*. This was the first great step in his progress towards a new system of chemical science. He next proceeded to make experiments on the production of water, by burning oxygen gas with hydrogen gas, and on its decomposition into the same elements; and he at length completed his system, by his theories of combustion and oxydation, his analysis of atmospherical air, his doctrine of caloric, &c. In the year 1789, he published his *Elemens de Chymie*, a work which has been much admired as a model of scientific composition. In these elements, the author completely overthrew the previous theory of Stahl; and, by a beautiful chain of logical ressoning, established one more consistent with the recent discoveries. The system of Lavoisier, however, was not received without opposition; but its merit has at length been generally acknowledged, and its principles were ultimately adopted by the most eminent chemists of France and Great Britain. In order to complete the revolution in chemical science, Lavoisier and his associates invented a new nomenclature, which, after a violent controversy, has been pretty generally adopted.

The talents and scientific acquirements of Lavoisier pointed him out, upon several occasions, as a person whose services might be employed for the benefit of the public. In the year 1776, he was engaged by that enlightened minister, Turgot, to superintend the manufacture of gunpowder; and his chemical investigations of the proper mode of preparing this article, were so successful, that he increased its explosive force by one-fourth; while, by reforming the existing regulations with regard to the collection of materials for the manufacture, he quintupled the produce. To the sciences, arts, and manufactures, he rendered many other most important services, both in a public and private capacity. Having been appointed to the office of treasurer to the academy, he introduced order into the accounts, and economy into the expenditure. He was a most active promoter of all useful plans and inquiries; and when the new system of measures was proposed, he endeavoured to throw some light on that subject, by contributing some new and accurate experiments on the expansion of metals. At an early period, his attention was directed towards agricultural pursuits, and he allotted a track of 240 *arpents* of land, on his estate in the Vendomais, for the purpose of experimental farming. He was consulted by the National Convention with regard to the best method of manufacturing *assignats* and of securing them against forgery. Having been invited by a committee of the Constituent Assembly, in 1791, to draw up a plan for rendering more simple the collection of the taxes, he produced a most valuable memoir on the various productions of the country, and their consumption, which was afterwards printed by order of the assembly, under the title of *Richesses territoriales de la France.* After having been one of the administrators of the *Caisse D'Escompte*, he was appointed one of the commissioners of the national treasury; and into this department he introduced the greatest order and regularity.

A life thus spent in the cultivation of science, and talents thus active and beneficially devoted to the service of his country, ought to have secured for Lavoisier the lasting esteem of his fellow-citizens, and the quiet enjoyment of that reputation which he had so well merited by his exertions. But he had the misfortune to live during a period, when talents, however eminent, and virtues, however conspicuous, were insufficient to protect their possessor from the wanton outrages of lawless power. During the horrors of Robespierre's usurpation, he seems to have in part foreseen the fate that awaited him, and used to observe to Lalande, that when stript of his property, he was prepared to earn his subsistence by his labour. His opulence, indeed, was his chief crime; or that, at least, which marked out as a proper victim to the rapacity of the existing rulers. Having been involved in charges fabricated against twenty-eight farmers-general, he was capitally condemned. A vain attempt was made to touch the compassionate feelings of the tribunal, by a description of the works, and recapitulation of the merits of Lavoisier. The hearts of these ferocious instruments of oppression and cruelty were completely hardened against such an appeal; and he suffered on the scaffold, on the 8th of May, 1794.

Such was the unmerited fate of Lavoisier; a man no less distinguished for the mildness and humanity of his private character, than for his scientific attainments. In his person he was tall, and his countenance indicated genius, intelligence, and benignity. The great influence he possessed, on account of his fortune, his talents, and his situation in the treasury, was continually employed in doing good. He was married, in 1771, to Marie-Anne-Pierette Paulze, the daughter of a farmer-general; a lady of pleasing manners, and considerable talents and accomplishments. She engraved, with her own hand, the copperplates to his last work. This lady afterwards gave her hand to the celebrated Count Rumford.

The merit of Lavoisier as a philosopher, particularly with regard to the services he rendered to chemical science, are universally acknowledged. His own experiments were generally simple and well chosen, and performed with great accuracy; but his talents were most conspicuous in the judicious use he made of the discoveries of others, which his genius enabled him to reduce into a lucid and connected system. In the Memoirs of the Academy of Sciences, from 1772 to 1793, there are forty papers of his writing, containing many valuable observations on some of the most important subjects of physical research. One of the last of his philosophical works was a treatise on the perspiration of animals, which was first read to the Academy on the 4th of May, 1791, which contains the result of a number of curious experiments, made with great delicacy, and highly interesting to the science of physiology. See Lalande's *Account of the Life and Writings of Lavoisier; Dict. Biog. et Hist. Gen. Biog. Dict.* (z)

LAW.

Few subjects are more comprehensive than that of law. It has, indeed, in every department of it, been overloaded and oppressed with a mass of commentary, sometimes contradictory, often unintelligible, commonly futile, and therefore almost always alike unprofitable to the student, and disregarded by the intelligent practitioner. But, independently of so monstrous an overgrowth, the main stem and branches of this noble science occupy a large space, and to be adequately conceived, would require a very ample delineation. Besides the principles common, or which ought to be common, to all law, (we mean the immutable principles of morality and religion,) how various and important are the modifications of the different systems instituted in different countries! How various the circumstances on which these modifications necessarily depend!—the peculiar genius of the people, from whatever causes originating; the habits and customs which have insensibly grown up among them; the inland or maritime situation of the territory; the greater or less degree of progress already made in civilization; the character of the popular superstitions, whether introduced by accident, policy, or imitation; the nature of the government; the agricultural or commercial facilities of the country; and a thousand other causes which infinitely diversify the judicial systems of different communities. It is not to be expected, therefore, that we should in this place attempt any thing like a detail of so comprehensive a subject. We must confine ouselves to such branches of it as appear to be of paramount importance, or of which a detail, as far as our limits will admit, may be the most generally interesting and useful. We mean to submit, therefore, 1*st, Some observations on law in general; 2d, An outline of the law of nations; 3d. An institute or abstract of the law of England;* and 4*th, A similar institute or abstract of the law of Scotland.* For the judicial establishments of other countries, with whose institutions it is less necessary we should be intimately acquainted, we refer our readers to what they may find under the different correspondent articles of this work. We only here observe, that, with the exception of certain local customs, the laws of Ireland, and of the various extensive colonies dependent on Great Britain, are, with a few occasional modifications, similar to those of England; and that the enactments of the British Parliament reach to every quarter of the empire, either where it is expressly so provided, or where the general tenor of the enactment has indicated such to be the intention of the legislature.

PART I. OF LAW IN GENERAL.

1. Law, as applicable to human conduct in general, may be defined a rule of moral action proceeding from a superior having right to command, and directed to inferiors bound to obey. Of this authority on the one hand, and obligation to obedience on the other, the foundation, or principle, is the happiness of those to whom the rule is directed. If the rule does not substantially contemplate this happiness, it has proceeded without the correspondent authority in the superior, and is not obligatory on the inferior.

2. It is, however, a very different consideration, in what manner the *presence* of this obligatory principle is to be ascertained. To assert that every individual is bound to obedience, according only *as he may discover* the connection of his happiness with the rule, would be to make ignorance the measure of submission, and to subject order to the blind caprice of inclination, prejudice, or passion. Even in the administration of the unchangeable precepts of morality proceeding from the deity himself, it sometimes seems hard, even to the intelligent and reflecting, to reconcile the observance of them, under some particular circumstances, with the happiness of the individual; how much oftener to the vulgar, who, uninstructed by contemplation, or blinded by the selfishness of vice or passion, so frequently indicate by their conduct their ignorance of the presence of the principle, and their practical disbelief in the obligatory nature of the rule. But with regard to laws of human institution, this propensity to disobedience, so far as the mere principle in question is concerned, must be greater. The source from which *they* proceed, even in their purest state, is ever liable to be disturbed by interest or error. There is hazard, therefore, in every instance, that the obligatory principle may be absent, whilst, in some, that absence is obvious and certain. Hence a perpetual occasion to the ignorant, that is, to the people in general of whom every community is composed, to question the obligation of the laws. The obligations of morality, indeed, can in no instance be denied, even by the intelligent and reflecting, without involving a contradiction in their conception of the divine nature, since the moral constitution of man, by which he judges of right and wrong, approves and disapproves, proceeds from the same Being who has ordained the precepts of morality themselves; but in laws of *human* institution, such an argument for the invariable presence of the obligatory principle, can have no place, and the intelligent must sometimes unite with the vulgar in regarding the rule as wanting the essential characteristic of its authority.

3. Of what use, then, is a principle which it may be often difficult to discover, and which is always liable to be misunderstood or perverted by those who stand most in need of the restraints of law? The principle itself, we answer, is not therefore the less real; nor is it possible to discover any other reasonable foundation on which, on the one hand, the authority of him who issues the rule, and, on the other, the obligation to obedience of him who is to obey, can be rested. In fact, it is for the most part sufficiently obvious, where selfish views of an exclusive interest do not interfere to mislead the judgment; and bad must be that system of law, where it is not in most instances recognizable. Yet as it is often found, even where it is sufficiently apparent, to be of too fine or distant an application to effect popular control, other sanctions more direct and impressive than the mere privation of the good consequent upon obedience, are commonly superinduced. In morality, the

reproaches of conscience, and the disapprobation of our species, amounting, in aggravated cases, to direct hostility, constitute this sanction; in human institutions, it consists in the personal suffering of the offender, or the diminution of his estate by pecuniary penalties. Where the principle is less apparent, or peculiarly liable to be mis-apprehended or perverted, such superinduced sanction, it is obvious, becomes still more requisite to secure submission to the rule. Yet it were absurd to regard this sanction as the test, either of the superior's right to command, or of the inferior's obligation to obey; since, where the principle in question, that is, the good of the inferior, is altogether absent from the rule, or it may be his positive hurt plainly contemplated, superinduced sanctions, and these of the severest sort, become the most indispensably necessary. Whilst, therefore, on the one hand, these superadded sanctions are necessary to secure obedience to the law, there is, on the other, no principle but the good of the inferior, by which we can measure its legitimate authority. Undoubtedly, where its enactments are on the whole beneficial, a wise people will, for the sake of the general system, yield their obedience, even in those cases where their good is obviously not contemplated; nor, whether prospective reasoning be consulted, or the actual experience of nations, will they withhold their submission, until, by an honest and accurate estimate of all the tremendous consequences of revolution, they plainly perceive a preponderance of advantage as the result.

4. From the various relations in which the human species is placed, arise various classes or denominations of law; some more, others less general: As,

First, From the relation in which man stands to the Deity, arises *religion*, or the *divine law*, comprehending those duties which, as a creature variously endowed, he owes to the Creator, from whom these endowments proceed. Possessing life, reason, moral perception, the affections of the heart, and all the other sources of enjoyment incident to his condition, he recognises the duty of *gratitude*, as at once founded in natural sentiment, and demanded by its own reasonableness. Possessing intelligence, by which he derives a glimpse of that infinite wisdom and power which appear to pervade creation, he in the same manner acknowledges at once the sentiment and the duty of *adoration*. Dependent from day to day for every good he enjoys, and conscious of the ennobling influence of communion with a Being so holy, so beneficent, so powerful, he feels his obligation to *prayer*, and delights in the exercise of it. Perceiving, in fine, that what are usually called the evils of life cannot, consistently with the notions of perfection which he is forced from every consideration to form of the divine nature, be otherwise regarded than as ultimately connected with a scheme of infinite beneficence; and awaiting, upon grounds of the highest reason, an immortality beyond the present existence, where the perfect wisdom of that scheme shall be fully disclosed, he recognizes the duty of *resignation*, and derives from the practice of it a support and satisfaction infinitely beyond the reach of any philosophical precepts unconnected with that principle. Thus, from the various points of relation between man and his Creator, may be deduced the various duties of religion, or those divine laws which the Deity has made it at once the duty and the happiness of all his rational creatures to observe.

But to these obligations, which are common to *all* the species, being the duties of mere *natural* religion, the doctrines and duties of *revealed* religion are to be superadded, which, as Christians, we are in like manner bound to believe and practise.

Second, From the relation in which, as partaking of one common nature, the different individuals of the species, under whatever government or in whatever region of the globe they may be placed, stand to one another, arise the obligations of *morality*, or *ethics*. Hence the duty of *benevolence*, or an affectionate desire of the happiness of all men, prompting us to the actual performance of every kind office within our power. Hence likewise the obligations of *justice*, *truth*, *candour*, and all the other duties which form the proper subject of the moralist.

Third, From the relation subsisting between men as constituting different nations, communities, or bodies politic, is derived *international law*, or as it is usually, though less accurately called, the *law of nations*; of which we are afterwards to treat more at large.

Fourth, From the relation subsisting between the different individuals who compose one nation, or community, arises *civil*, or *municipal law*; being that body of rules which, issuing from a supreme authority, duly constituted by national consent, direct or implied, are obligatory on each individual alike, for the good of all. Thus, there are as many separate systems of civil or municipal law as there are separate and independent communities, for no people can exist in a state of union without a system of rules of some sort or another, by which their transactions and conduct may be more or less regulated and controlled.

5. Each of these general departments, or sorts of law, may again be divided into distinct subordinate branches, according to the subject or class of circumstances to which they more immediately refer. Thus, civil law may be divided into *political law*, which relates to the principles of the constitution of the state, and the rights and duties of the governors and governed relatively to one another;—into *criminal law*, which refers to the *moral* conduct of the citizens, in cases of such atrocity as are thought to affect the general peace and welfare of the community;—into *ecclesiastical law*, which relates more immediately to the *police* of religion, and the rights of the church and its functionaries;—into *civil* law, in a restricted sense of the word, or those rules which, in contradistinction to ecclesiastical, criminal, and other branches of the municipal code, refer to contracts, succession, &c.;—into the *law of process*, comprehending the structure of courts of law, and the various modes, adapted to various circumstances, by which civil suits as well as criminal procedure must be conducted. And so of the other general departments of law.

6. Like every other science, law has advanced gradually to its present state. At first, laws regarded only great inconveniences and concerns of highest importance. *Criminal* laws extended only to such crimes as were most dreaded, and in proportion as new and more artful disorders arose, new remedies were applied; whilst *civil* institutions, properly so called, regulated the public worship of the gods, the distribution of lands, marriage, succession. To detail the progress of law in different countries, and to trace the successive improvements which one country derived from another in this respect, would be sufficiently interesting and instructive. We here sketch only the outline.

7. The earliest of all laws is that of nature, according to which, men, in their wildest state, originally lived. As in such a state they had little need of law, so the dictates of nature were comparatively few and simple—a mere ray of that moral sentiment and right reason which God has intended should, in a more advanced stage of the social progress, direct and regulate our more frequent intercourse with one another.

8. So far as regards human regulations, it is scarcely to be doubted that the first were those domestic rules which the father of a family would have occasion to observe in

the control of it. Nor can these regulations, or first principles of human laws, be regarded as unimportant, since, in the earliest condition of society, families form so many distinct communities.

9. When men began to unite in villages and cities, these more private regulations would be found inadequate to restrain a more numerous society; and a body of rules, as well as an authority accompanied with greater power than the merely paternal, became necessary. Afterwards, when many towns and districts united for their common convenience and defence, the judicial regulations necessarily multiplied; and the Supreme Authority from which they emanated and were to be enforced, issued, sooner or later, in the different states thus formed, in a Monarchy, an Aristocracy, a Democracy, or a compound of two or more of these simpler forms of magistracy.

10. The conduct of the justest and wisest individuals in all their transactions of a public nature, would naturally suggest a rule of behaviour to others, whilst their counsels and advice would gradually acquire force, and be adopted as a general regulation. Thus sages and philosophers were the first authors of laws.

11. Moses, the most ancient of legislators, ordained several sorts of laws to the Jews. Besides those which, as we are bound to believe, were dictated to him by the Deity himself, commonly denominated the *decalogue*, as being distributed into ten commandments, he instituted ceremonial laws for the regulation of their public worship, and political laws for their civil government.

12. The lawgivers of nations bordering on that of the Jews, borrowed many of their institutions from the laws of Moses.

13. Osiris, one of the earliest of the kings of Egypt, regulated the worship of the gods, the distribution of lands, and the distinction of ranks. He abolished the creditor's right to reduce his insolvent debtor to slavery in acquittance of the debt; and, to insure a better chance of sound decision in the courts of law, he prohibited the use of rhetorical embellishment in public pleadings.

Amasis annexed the punishment of death to murder, calumny, and perjury; and they who, having it in their power to assist a fellow-subject in danger of losing his own life, allowed the fact to take place, became liable to the same penalty.

This extraordinary people used to deposit the embalmed corpses of their fathers with their creditors in security of their debts, and if the pledge was not redeemed some time before their own death, the deepest infamy was incurred. They had even a tribunal before which they tried men after their death, that the dread of posthumous condemnation on the one hand, and the hope of applause on the other, might impel them to the practice of virtue. Their kings themselves were subjected to certain exclusive regulations; their food, in particular, and occupations, were the objects of certain fixed rules, from which they could make no deviation without responsibility to the laws.

14. In Crete, Minos instituted a community of tables and repasts; he required all the children in the state to be brought up together, proscribed idleness and luxury, and enjoined the greatest reverence to be paid to the divinity, and to the fundamental laws of the state.

15. Lycurgus, the Lacedæmonian lawgiver, also instituted, in imitation of Minos, a community of tables and a public education of the youth. He established a senate, which might temper the power of the kings by an equipollent authority. He prohibited the use of gold and silver money, that, by thus obstructing commerce, he might the more effectually encourage the military spirit. He forbade the exercise of any of the superfluous arts; ordained an equal distribution of the lands among the citizens; and confined agriculture exclusively to the Helots, that the attention of the citizens might not thus be withdrawn from their martial exercises. He permitted a community of wives, wishing, as it would seem, to people the state without affording occasion for particular attachments, or the more endearing affections, lest the aptitude of the men for military occupations might be thereby impaired. With the same martial policy, unhealthy children were ordered to be destroyed; for Lycurgus deemed the man unworthy to live who was incapable of bearing arms. In the same spirit, the youth of both sexes had their exercises of amusement together, which they performed naked, and in public; and one of the severest punishments to which the young men were subject, was that for inexpert theft—an extraordinary department of education, in which they were carefully trained, as the means of rendering them enterprizing, dexterous, and bold. And, finally, to secure these martial institutions from all mixture of foreign and less hardy manners, strangers were strictly prohibited from settling at Sparta.

16. Draco, the first lawgiver of Athens, introduced laws of such extraordinary severity that they were said to be written in blood. He visited the most inconsiderable offences with death; and even things inanimate did not escape his terrific enactments; a statue, for example, having bruised a citizen by its fall, was banished the city. Institutions so ridiculous and disproportioned to offences, could not long be enforced; and accordingly they enjoyed not the same immortality to which the enactments of other early legislators were destined, being quickly superseded by the milder and more equitable institutions of Solon.

This celebrated lawgiver had no difficulty in cancelling the institutions of Draco, which had necessarily become altogether unpopular. The law against murder was almost the only part of this sanguinary code which was retained; and every punishment was proportioned to the crime to which it was annexed. He made no law against parricide, because such a crime, he said, was so horrible, that he would not, even by the mention of it, have his countrymen suppose human nature capable of it. They who died in the service of the state were ordered to be buried with great pomp, and their families were maintained at the public expense; and such as refused to bear arms in defence of their country were declared infamous. The institutions regarding marriage were improved; the childless were permitted to dispose of their estates as they pleased; and the adulterer was thought a fit object for capital punishment. The associate of lewdness and debauchery was prohibited from speaking in public; "for," said Solon, "a man who has no shame is not capable to be entrusted with the people." To speak ill of the dead, as well as of the living, was declared a crime; nor was the character of the worthy, even after their decease, thought undeserving of the protection of the laws. It was the great purpose of Solon to protect the poorer citizens against the power and influence of the rich; and by dividing the whole body of the Athenians into separate classes, the last of which, consisting of the ordinary citizens, being permitted to speak and vote in the assemblies, though not to participate in the offices and honours of their superiors, he conferred upon them a privilege which, considerable even from the first, came at last (what he probably did not intend) to control all the affairs of government, and rendered the people masters of the republic. He reformed also the Areopagus, increased the authority of the members, enjoined them in particular to inquire yearly how every citizen maintained himself, and to punish such as, living in idleness, were not serviceable to the state by the exercise of some honourable or lucrative employment. These celebrated laws were engraved on public tablets, and that the Athenians might the better retain them on their memory, they were written in verse.

17. Romulus and Numa Pompilius appear to have been the first legislators among the Romans who deserve any notice. And yet so rude and uninstructed was that people for a long period after their authentic history commences, that it was not till about the year 300 of the city, that they appear to have had any *written* laws. About that time, the discontents of the plebeians having risen to a great height on account of the arbitrary proceedings of their superiors, they justly conceived that a *written* body of law, duly promulgated, would be the surest means of controlling their oppressors, and securing their own protection. Accordingly after long and violent struggles they succeeded: deputies were sent to Athens and other Grecian states, to collect the laws of Solon and of other renowned legislators, upon whose return ten persons, called Decemviri, were chosen from the senate to select and arrange the most appropriate of the institutions thus collected. The celebrated law of the Twelve Tables was the result, of which Cicero, *De Orat.* i. 44. observes, *omnibus omnium philosophorum bibliothecis anteponendam.* Nothing now remains of this collection of laws but fragments scattered in different ancient authors, and chiefly in the writings of Cicero, but there is little doubt that it served, if not as the root, at least as the stem from which that immense variety of Roman laws afterwards sprung, which was destined to become the rule of civil conduct to so many subject nations, and ultimately to mingle itself, more or less, with the municipal code of every nation of modern Europe.

It were idle to select here any part of so great a body of institutions as more curious and important than another, of which the whole has been properly denominated, a written collection of human reason applicable to almost all the relations of civil life. We shall only observe, that under several successive emperors abridged digests were made of it, and particularly under Justinian, whose collection, known by the title of the *Corpus Juris Civilis*, (See art. CIVIL LAW.) is the latest, and by far the fullest and most valuable, that has come down to modern times.

18. The northern nations who over-ran the Roman territories naturally introduced their own rude institutions into their new conquests, and particularly the feudal regulations, so well adapted to the views of a warlike people anxious to retain permanent possession of their settlements. It is probable that the Roman jurisprudence, which had so long flourished in Italy and some other countries, and had begun to take root in almost all the other districts of Europe, was never entirely supplanted by the customs and laws of the barbarians; and when the revival of letters brought to light the high degree of refinement to which the Roman people had attained, their civil institutions naturally claimed a pre-eminent attention. The discovery of the Pandects at Amalphi (if indeed that or any part of Justinian's Collection had ever entirely disappeared;) the importance of the science of which it treated; the beauty and excellence of its dictates, being the result of the reason acting upon the experience of the most civilized nation which the world had hitherto produced; the easy adaptation of the greater part of it to modern circumstances; all contributed to recommend it to the attention of princes and legislators. It came therefore to be adopted in some countries as the great body of their common law; in others, it was only partially received, according as its institutions corresponded with the native customs of the people; whilst in all, its maxims were more or less extensively incorporated with their own proper institutions.

19. The various systems of jurisprudence which thus grew up in modern Europe, compounded partly of the original laws and customs of the respective nations who supplanted the Roman greatness, and partly of the more refined institutions of that people, form a sufficiently extensive branch of study. Fortunately it is to the general student more curious than useful. A knowledge of the laws of our own country, aided by some acquaintance with such foreign institutions only as are of acknowledged excellence, or of the nearest affinity to our own, constitutes an object of paramount importance. Without, therefore, attempting any detail of that nature, we shall here content ourselves with bringing together a few observations applicable to all systems of law collectively.

20. (1.) We have said, that the obligation of law is ultimately grounded in its reference to the good of those whom it is intended to control. In like manner, the obligatory force of any inferior law may be considered as more immediately derived from that which is superior to it. Thus, with regard to families, corporations, and other subordinate societies, we can prescribe nothing which is contrary to the law of the state of which they make a part; the municipal law of each particular state must prescribe nothing contrary to the law of nations; and this law must, in its turn, be consistent with those essential principles of morality and religion, which the Deity evidently intended to be obligatory on every individual of mankind. And thus good civil laws are nothing else than natural law itself detailed, modified, and applied by the sovereign power in a state. If the inferior law contain any contradiction to the superior, it must, by the established nature of things, itself be ultimately and substantially inconsistent with the good of those who are required to obey it; and therefore wants, by that contradiction, the proper obligation of law. Such laws, when their deviation from the principles of morals and religion is direct and immediate, excite detestation, and, in aggravated cases, horror. In the edict of proscription against the Prince of Orange, Philip II. promises to him who shall kill the prince, and to his heirs, 20,000 ecus, with the rank of nobility, and that on the word of a king and as the servant of God. Nobility for murder! and its perpetration enjoined by a servant of God! Here insult and outrage is offered to every sentiment of honour, of morality, and religion—which nothing but the poison of bigotry could have so entirely stifled in the breast of the tyrant who dared to publish the reward.

21. (2.) Nothing should be so dear to a people as laws, when intended to be a rampart against despotism, the substance and safe-guard of a rational liberty, and the means, in short, of rendering them good, wise, and happy. "The great difference," says Xenophon, "which Lycurgus created between Lacedæmon and other states, consists in this —that he has, as a primary principle, secured the submission of the citizens to the laws. They fly to yield obedience at the call of the magistrates; but at Athens, a rich man would go frantic to think that his conduct depended upon the authority of any magistrate." The first act of the Ephori on entering upon their office was, to issue a proclamation inviting the citizens to *love*, rather than enjoining them to *obey* the laws, that their submission to them might thus be natural and easy. In truth, among the Spartans, as well as among the earlier Romans, laws and manners appear to have been so intimately blended, as to have formed, so to speak, but one body. Luxury, commerce, and the love of gain, seem to be inconsistent with such a state of public sentiment.

22. (3.) All new laws, which it may be proposed to introduce, should bear reference to the state of circumstances in which the people may at the time be actually placed; to the nature of the government already establish-

ed; to the climate; the character of the soil; the extent and local situation of the territory; the manner of life of the inhabitants, as consisting in agricultural, commercial, or other pursuits; their customs; their prejudices; their superstitions. Yet laws may contribute much to form the morals, manners, and character of a nation. All that is meant is, that we ought not to attempt a direct change, in any of these respects, by violent enactments. This were the highest impolicy, if not rather a species of tyranny. Following rather the example of Solon, legislators should impose such laws only as the people are fit to receive, not such as are most perfect in the abstract; since it is better to leave disorders altogether untouched, than to ordain laws which will either be imperfectly obeyed, or altogether neglected; and thus the whole body of the law incur disrespect.

23. (4.) They who enact and who administer law should themselves, of course, be bound by it indiscriminately with the rest of the people. It is the law, and not men, who ought to rule. This constitutes the essential difference between a free and an arbitrary government. "Law," says Plutarch, "is queen over mortals and immortals." The edict, 1499, of Lous XII. is a rare instance of magnanimity in a prince possessing the absolute disposal of the laws; "the law only," says he, "is to be obeyed, notwithstanding any orders to the contrary which importunity may elicit from the monarch."

24. (5.) In the best system of laws some are found which relate to matters beneath the dignity of law, and some which are altogether useless. Such laws are always unwise, because, treating of things trifling or indifferent, they lead men's minds to regard as trifling or indifferent what is essentially important.

25. (6.) The *style* of laws should be simple, definite, concise—burdened as little as possible with exceptions, limitations, modifications—without subtlety, because they are not a system of dialectics—without artifice, because their prime intention being to advance the public morals, prosperity, and happiness, they should speak in the purest spirit of innocence and candour.

26. (7.) Perhaps laws ought always to commence at once with the enactment. Preambles, originally introduced no doubt for the justification of the legislature and the satisfaction of the people, are often unsatisfactory, because not containing a sufficiently strong and explicit reason for the enactment; often imperfect, because not reaching to the whole of the enactment; always superfluous, because if the law is bad, that is, contrary to the general welfare, it ought not to be enacted; if good, there is no occasion for an apology. But if a reason be at any time thought necessary, either in the enactment itself, or in the writings of those who are authorized to expound it, that reason ought, 1st, to be worthy of the law: A law of Rome declares, that no blind man shall exercise the office of advocate, because, says the law, he cannot see the decorations of the magistrate—a paltry reason, when so many better were obvious. 2d, The reason alleged should be true: Charles IX. of France was declared major at the *commencement* of his 14th year, in place of its termination; because, says the Chancellor Hopital, the law respects the begun year as finished, where the acquisition of honours is in question—as if the government of a people included nothing but the honour of him who was to govern. Finally, It should be deduced by reasoning from what is real to what is real, and not from what is figurative to what is real, or from what is real to what is figurative. A law of the Lombards l. ii. tit. 37. prohibits every woman from marrying who turns nun; "for," says this law, "if the man who, by the ceremony of the ring, has merely contracted, without consummating, a marriage, cannot without a crime marry any other woman than her with whom he has contracted, *a fortiori* she who has become the spouse of God, cannot."

27. (8.) Laws, to be obeyed, must be known. Hence the absurdity, once so prevalent in some countries of Europe, of expressing laws in a language of which the people are ignorant. The English acts of parliament were at one time written in Latin, at another in French—a proceeding equivalent to a concealment of the very rules to which obedience was required. Among some nations of early antiquity, laws were composed in verse and sung to popular airs, that they might be the more generally known as well as easily retained on the memory. The Athenians engraved their laws on plates of brass, which they fixed up in public places; and, among the Romans, to commit to memory the Twelve Tables was an indispensable branch of the education of children.

28. (9.) The laws which are borrowed from other countries, sometimes appear to be the same with those of the countries from which they have been derived, when, in truth, they are materially different. The Greeks and Romans punished the receiver of stolen goods with the same pains as the thief himself, and some modern nations follow the example. In the former case, this state of the law was just, in the latter it is otherwise; for, among the Greeks and Romans, a pecuniary penalty was the only punishment of theft, and it is just that every man concerned in occasioning damage to another should be obliged to repair it; but in England, in Scotland, and in France, (at least before the Revolution,) the thief being punished with death, it is impossible in most instances, without confounding crimes, to punish the receiver with the same severity. The receiver may often be altogether ignorant of the particular theft in question—the thief himself never can. The receiver, it is true, by his very trade, encourages, generally, the commission of the crime, and often renders the conviction of the criminal more difficult; but it is the *thief* who has committed the crime; all is passive on the part of the receiver, the thief is active; the latter must have overcome greater obstacles before he could arrive at such a point of guilt, and acquired greater boldness in the commission of crimes.

29. (10.) There is a principle, capable of being reduced to considerable precision, which will serve as a general rule for estimating the merits of the *criminal* code of a people. A capital excellence, in such a code, consists in the punishment being drawn from the peculiar nature of the crime committed, and a correspondent defect in a deviation from this principle. Nothing can tend more to connect the idea of punishment with guilt, as well in the breast of him who is about to commit the crime, as of them who are witnesses of his punishment, whilst also it naturally conducts to a just proportion between the punishment and the offence. Upon this principle Montesquieu* has sketched the outline of a criminal code.

"There are," says he, "four sorts of crimes: the first sort offend against religion; the second, against manners; the third, the peace of society; and the fourth, the security of the citizens. The punishments proper to each of these sorts of crimes, should be derived from the nature of each.

"The class of crimes which relate to *religion*, should comprise such only as directly attack it, as are all cases of simple sacrilege[*]; for crimes which disturb merely the *exercise* of religion, belong to the class either of those against the public peace, or the security of the citizens. That the punishment of these acts of simple sacrilege may be derived from the nature of the thing, it ought to consist in depriving the guilty person of all the advantages which the national religion confers; such as exclusion from places of public worship, excommunication, &c. In matters relating to the public peace, or the security of the citizens, acts, though of a less open or direct nature, may be the proper subject of human justice; but in matters relating to the Divinity, where there is no public act, there is no ground for accusation. In that case, the matter is solely between God and his creature; and to God alone it then belongs to make the measure and the time of his vengeance. But if, confounding the nature of things, the magistrate is industrious to detect such *private* deviations from the national standard,[†] he introduces an inquisition which is not only unnecessary, but highly impolitic, and destroys the liberty of the citizens, by arming against them the united zeal of every timid and every intolerant conscience. The evil arises hence, that it is deemed necessary to avenge the Deity;—as if it should not be our study rather to honour the Deity than to avenge him. Proceeding upon this idea, where shall punishments stop? If human laws are to avenge an infinite Being, they ought to be regulated by adequate notions of his infinitude, not spring from the imbecility, the ignorance, and the caprices of human nature.

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* See *Theorie des Peines et des Recompenses*, par Jer. Bentham, who has enlarged upon this sketch of Montesquieu.

"The second class of crimes, or those against *manners*, are such as violate public or private decency in the mode of gratifying the senses. The punishment of these should in like manner be drawn from the nature of the thing. Deprivation of all those advantages which society has connected with purity of manners; shame; necessity of withdrawing from the view of the citizens; public infamy; expulsion from the city, or even from the community; in short, the different sorts of punishment which are properly *corrective*, should suffice to repress the shamelessness of either sex. In truth, such offences are less founded in criminality, or an intention to injure another, than in forgetfulness or contempt of one's self. But we must here keep in view those offences which affect manners only,—not those crimes which, affecting also the security of the citizens, such as the abduction of women, and rape, fall properly under the fourth class.

"The crimes of the third class are those which relate to the *public peace*. And here also the punishment ought to refer to the nature of the offence, and be strictly corrective, as confinement, exile, and such penalties as tend to reform unquiet spirits, and bring them back to established order. But neither must such offences be confounded with those which include a violation of the public security, but must be confined to a simple breach of police.

"The penalties of the fourth and last class of crimes, or such as offend against the *security of the citizens*, are those which are more strictly denominated punishments. They arise from a sort of *lex talionis*, which requires that the society should withdraw its security from him, who has deprived, or endeavoured to deprive, another of that security. This sort of punishment is derived from the nature of things, is founded in reason, and has a direct reference to the very principles themselves of good and evil. A citizen deserves death, when he has violated the public security so far as to have deprived another of life. But this punishment of death ought to be regarded as an extreme remedy for diseased society. It may sometimes happen, that when the public security *with regard to property* has been injured, there may be reasons for inflicting a capital pain; but it were perhaps wiser, and would certainly be more agreeable to the nature of things, if the punishment in such cases were commonly confined to the loss of property. But as it usually happens that the property of others is attacked by those who have none themselves, corporal punishment supplies, of necessity, the place of pecuniary."

30. (11.) As enactments cannot foresee and particularize every case, it is the business of reason to compare the facts which are omitted with those which are specified. With the public good in view as the great rule of decision, the new law should be compared with the old; a strict regard maintained to the whole tenor; the real spirit and import considered rather than the mere terms; the defects and obscurities of expression supplied and explained by reference to that real import; and even recurrence had to neighbouring institutions. Yet we must be jealous of an arbitrary extension of one case to another, and above all in matters penal. That subtlety which busies itself in drawing consequences is contrary to the sentiments of humanity, derogatory to the legislature, and inconsistent with liberty. It is only in favourable cases that a liberal interpretation can be allowed; in all others the evil should be tolerated, until an express enactment can be made to suppress it.

31. (12.) But a custom perfectly established by a long succession of examples, and thus unequivocably adopted by the people, supplies the defect (which in this case must be supposed to be intentional) of the enactment, holds the place of a statute, and becomes tacitly a law by prescription.

32. (13.) To enable courts of law to arrive at a just and accurate decision, forms of procedure are indispensable. The misfortune is, that it is the interest of practitioners, sometimes of the judge, to multiply these forms, and to baffle every attempt of the most upright magistrate, as well as of the legislature, to simplify and abridge them. Thus forms are every where so numerous, as to embarrass the operation of the very laws which have established them; a suit becomes an inheritance; property remains uncertain; and the parties and their heirs are ruined in their endeavours to ascertain the right.

33. (14.) After the example of the Athenians, such laws should from time to time be carefully collected as are superannuated, contradictory, or useless, that the national code may thus be purified and diminished, lest that contempt which awaits or has already overtaken such laws should, like a gangrene, overspread those also which are truly excellent. Yet let this reformation be wrought with much precaution and solemnity, that the people may perceive the sacredness of the law, which requires so much formality even to correct it.

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[*] *Les sacrileges simples*—by which we suppose Montesquieu means, all violent and grossly indecent attacks upon the doctrines of the received religion; which, being hallowed in the public mind, and adopted as a part of the law of the land, cannot be insulted without insulting the law itself, and the whole body of the people

[†] *Les sacrileges cachees*

PART II. OF THE LAW OF NATIONS.

Introduction.

1. Each nation being considered as a moral being living in a state of nature, the obligations of one nation towards another are no more than those of individuals modified and applied to nations; and this is what is called the *natural law of nations*. It is *universal* and *necessary*, because all nations are *obliged* by it, and whether they will or no. The foundation of this *natural*, *universal*, and *necessary* law, is the relation which a human being, as such, bears to God, to himself, and to the rest of the species. Hence writers on international law commonly begin with a statement of the obligations arising from these three relations, or a view of the *law of nature*; and this law they apply as the rule in all questions between independent states, where special convention or custom is silent. For this part of the foundation of international law, we refer the reader to our articles Religion (*Natural*), and Moral Philosophy.

2. But as the simple law of nature is insufficient, even in questions between individuals, and still less between nations, when they come to have intercourse and to carry on commerce with one another, their common interest obliges them to soften the rigour of the law of nature, to render it more determinate, and to depart from that perfect equality of rights, which must ever, according to that law, be considered as extending itself even to the weakest. These changes take place in virtue of conventions (express or tacit) or of simple custom. The whole of the rights and obligations thus established between two nations, form the *positive* law of nations between them. It is called positive, particular, or arbitrary, in opposition to the natural, universal, and necessary law.

3. On the example of two nations, all the nations of Europe might, by common consent, make treaties to regulate their different rights; and then these general treaties would form a code, which might be called the positive law of nations. But there never yet existed such a general treaty, either between all the powers of Europe or even a majority of them. In this sense, then, there exists no positive law of nations, and perhaps none such ever will exist.

But on the other hand it is clear, that what has become a law between two or three, or even the majority of the powers of Europe, either by treaty, or from custom, can produce neither rights nor obligations among the rest. However, by comparing the treaties which the powers of Europe have made with one another, we discover certain principles, that have been almost universally adopted by the different powers that have made treaties on the same subjects. It is similar with respect to custom—a custom received among the majority of the powers of Europe, particularly among the great powers (when it is not founded upon their particular constitutions) is naturally adopted by other powers, as far as it can apply to them; and, in general, all nations give a certain degree of attention to the customs admitted by others, although it cannot be proved that they have ever been admitted by themselves. It is true, we cannot say as much of express conventions. It nevertheless often happens, that a treaty made with a particular power serves as a model for the treaties of the same sort to be made with other powers; and very often what takes place in one nation, in virtue of treaty, is admitted in others as a custom: so that, in many points, the law of nations is founded on treaty in one country, and on custom in another.

It is then the aggregate of the rights and obligations established among the nations of Europe (or the majority of them) whether by particular but uniform treaties, by tacit convention, or by custom, which forms the general positive law of nations.

4. We find some vestiges of a positive law of nations among the ancients, particularly among the Greeks and Romans; but it is needless for us to go back so far. The political situation of Europe is so much changed, since the fifth century in particular; the introduction of the Christian religion, of the hierarchical system, and all its other important consequences; the invention of gunpowder, the discovery of America, and of the passage to the East Indies; the ever increasing taste for pomp and luxury; the jealous ambition of powerful states; the multiplication of all sorts of alliances; and the introduction of the custom of sending ambassadors in ordinary; have had such an influence in forming our present law of nations, that, in general, it is necessary to go no farther back than the middle centuries of the Christian era: and, indeed, on many points, no information can be obtained by going farther back than the time of Henry the Great, the peace of Westphalia, or even the beginning of the 18th century.

It is, then, in the general history of Europe during the latter centuries, and of the particular states of which it is composed, that we must look for the existing law of nations.

BOOK I.

Of the Basis of the Positive Law of Nations.

Chap. I.—*Of Treaties.*

1. As sovereign powers acknowledge no legislator over them but God, they can have no rights and obligations between them but such as the divine laws impose. But they may add to these primitive obligations, by renouncing voluntarily a part of their rights, or taking on themselves new obligations, after which they stand engaged to do, not to do, or to suffer, what they were not absolutely obliged to do, not to do, or to suffer. The basis of these new rights and obligations, which form the positive law of nations, is then the mutual *will* of the nations concerned. This will may be *declared* by words, gestures, or other marks received as the signs of thought, or by actions from which consent may be deduced; or it may be *presumed*. For instance, what a nation has always done hitherto we may presume it will do for the future. Hence the different foundations of the positive law of nations, viz. express covenant, tacit covenant, and custom.

2. Express covenants made between nation and nation, are called public covenants, or *treaties*.

3. For a covenant to be obligatory, five things are necessarily supposed: *First*, That the parties have power to consent. *Second*, That they have consented. *Third*, That they have consented freely. *Fourth*, That the consent be mutual. And, *Fifth*, That the execution be possible.

First, *The parties must have power to consent.* The treaty must have been contracted in the name, and by the authority, of the sovereign power. Any thing that has been promised by the chief, or his agent, beyond the limits of the authority with which the state has entrusted him, is, at most, no more than a simple promise, which only obliges the person who promises to use his endeavours to procure its ratification, without binding the state, which, of course, may refuse such ratification: On the contrary, every thing that has been stipulated by an agent in conformity to his *full powers*, ought to become obligatory on the state, from the moment of signing, without even waiting for the ratification. However, not to expose a state to the errors of a single person, it is now become a general maxim, that public conventions (but not simple military arrangements in time of war) do not become obligatory till ratified. The motive of this custom clearly proves that the ratification can never be refused with justice, except when he who is charged with the negociation, keeping within compass with respect to his public full powers, has gone beyond his secret instructions, and consequently has rendered himself liable to punishment; or when the other party refuses to ratify.

Second, *That they have consented.* The consent must have been fully and clearly declared, either by words, or by signs, to which custom has attributed the same value. It is totally indifferent as to the obligation, whether the words have been actually articulated, or whether they have been committed to writing. Now-a-days, however, in order to facilitate the proof, they are always committed to writing. The form of the treaty is of no consequence: a simple promise, declared and accepted, has the force of a treaty between nations as of a contract between individuals.

Third, *That they have consented freely.* The consent must have been a voluntary act of each contracting party. What has been extorted by physical necessity is not obligatory, because the party has not consented. What has been extorted by moral necessity, that is, by the fear of a greater evil, is obligatory, if the violence employed by the other party was just; but if it was unjust, the obligation ceases through default of title in him who wants to acquire the right. However, the security, liberty, and independence of nations, could not subsist, if, in default of a superior judge, and in default of a right to judge in their own cause, they did not acknowledge as just (with respect to *external effects*) all violence employed by each other. Therefore, the plea of *fear* cannot be opposed to the validity of treaties between nation and nation, except at most in cases where the injustice of the violence employed is so manifest as not to leave the least doubt.

Fourth, *That the consent be mutual.* The consent must be mutual, and must be given for the same object. When an error takes place with respect to the object of the covenant, it excludes the consent. It is of no consequence whether the error be involuntary, or owing to the insincerity of the contracting parties, or one of them, or to a third person.

The injury on the contrary that a nation may sustain from a treaty is not a justifiable reason for such nation to refuse complying with its conditions. It is the business of every nation to weigh and consult its own interests; and as nothing hinders a nation from acquiring a right by a covenant with another, and it being impossible for any one to determine the degree of injury requisite to set a treaty aside, or to judge, in an obligatory manner, of the injury sustained, the security and welfare of all nations require that no exception should be admitted which would sap the foundation of all treaties whatever.

Fifth, *That the execution be possible.* The execution of the treaty must be physically and morally possible: so that if the accomplishment be physically impossible, either from the nature of the promise or from circumstances, or if the accomplishment interferes with the interests of a third party, or tends to ruin the nation which has promised, the covenant becomes void, or at least ceases to be obligatory.

4. Treaties serve either to confirm to a nation the rights which belong to it by the law of nature, or to change into a positive right what was before a natural one. There are some treaties that are fulfilled at once; as treaties of boundary, of exchange, &c. And others which can be fulfilled successively only, and as the occasion presents itself; such as treaties of commerce, alliances, &c. These latter are called *treaties* in a more particular sense, (*fædera*), in opposition to transitory covenants (*pacta transitoria*). To this may be added, that treaties are sometimes *mixed*, including articles of both sorts.

5. Treaties, properly so called, are either personal or real. They are personal, when their continuance in force depends on the person of the sovereign with whom they have been contracted. They are real, when their duration depends on the state, independently of the person who contracts; consequently all treaties between republics must be real. All treaties made for a time specified, or for ever, are also real. With respect to those which are made for an indefinite time, attention must be paid to the terms of the treaties themselves, to circumstances, and to the constitutions of the contracting states, in order to decide to which class they belong. Of late, sufficient care has been taken to express this matter so fully as to leave no room for dispute.

6. Treaties cease to be obligatory when the sovereign power with whom they were concluded ceases to exist, and when the state passes under the dominion of another power. Sometimes they cease when the state changes its constitution; and always when a war, on whatever account, breaks out between the contracting parties; except provisions be contained in them specially in reference to the event of a war. Such provisions, for instance, as relate to the treatment of each other's subjects, their vessels, merchandize, &c. in the case of a rupture. All treaties, then, existing between belligerent powers, previous to the war, must be renewed at the peace, if the parties wish to continue them.

7. In order to secure the observation of treaties, the contracting parties had recourse formerly to a great number of accessary covenants, some of which were ridiculous enough. They almost always made use either of oaths, hostages, pledges, or guarantees, for which the subjects or vassals of the contracting states were often chosen. But now oaths are laid aside in treaties between sovereigns. Hostages are yet made use of, but this is generally in military arrangements, or for the fulfilment of some particular article of a treaty of peace. The custom of choosing subjects and vassals for guarantees has changed by little and little since the sixteenth century, till it is now become an established rule to solicit foreign powers to take on them that office: Hence our modern guarantees, which, after all, are perhaps more frequent than useful.

CHAP. II.—*Of Tacit Covenants, Custom, and Analogy.*

1. As express consent supposes words, or signs, which have the same value as words, so tacit consent supposes actions, which, though not the signs substituted for words, prove the will of the party that makes use of them. By these are formed what we call tacit covenants. They have the same force as express covenants, with regard not only to the nature of the obligation they produce, but to their irrevocability also. There are an infinity of actions, from which we may deduce consent to what is of a transitory

nature; and there are also actions, by which a power engages itself tacitly for the future. But for an action to produce this effect, it must, *first*, have been undertaken or omitted freely and knowingly; *second*, the party must have believed himself in duty bound to act thus; or at least, *third*. the action must be of such a nature, that it cannot be omitted, or committed, once, without giving the other party a right to require its continuation for ever after.

When these three circumstances, or at least the two first, concur, one single action is enough to prove a tacit consent; a repetition of it serves only to facilitate and strengthen the proof.

2. A single action, absolutely arbitrary, or dictated merely by the common principles of humanity, decency, or politeness, is by no means sufficient to prove that the party making use of it engages to do the same for ever after, when a like occasion presents itself; nor even if, during whole ages, a nation has continued to repeat such an action, can that repetition ever amount to an engagement for the future: nor can it ever take from one nation the right of changing its conduct in that respect as often as it thinks proper, without consulting any other. All that can be built on such actions is, a *presumption* that the nation will continue to act as it hitherto has done as long as it does not declare its intention to the contrary, and as long as circumstances do not change. This presumption may be founded on a single action, if the action be of a presumptive nature. It is naturally strengthened by time; and a frequent repetition of actions uniformly undertaken grows at last into an established custom. A custom does not consequently rest on tacit consent, but on the presumed will of the party that observes it.

One nation having a right to presume on the will of another, implies an obligation on the other side to give timely notice before it abolishes, or deviates from, a custom; so that no other nation may be induced, by such custom, to take a step that might be contrary to its interests. This obligation, although imperfect in itself, has much weight with nations united by treaties of friendship, and is generally acknowledged and observed by all the powers of Europe.

3. Analogy often forms the basis of decisions in the affairs of nations. It is no more than the application of what has been determined by the treaty or custom in certain cases, to other cases which resemble them, and which have not yet been decided. The weight and justice of an analogous decision depends, therefore, on the resemblance of the two cases.

BOOK II.

Of the States of Europe in General.

Chap. I.—*Of the States of which Europe is composed.*

1. Upon a view of the states of which Europe is composed, we see that there are some which are entirely free and sovereign, and others which, though they pretend not to an entire sovereignty, ought nevertheless to be considered as immediate members of the society of European nations. For a state to be entirely free and sovereign, it must govern itself, and acknowledge no legislative superior but God. Every thing which is compatible with this independence is also compatible with sovereignty, so that mere alliances of protection, tribute, or vassalage, which a state may contract with another, do not hinder it from continuing perfectly sovereign, or from being looked upon as occupying its usual place on the great theatre of Europe. The limits or strength of a state make nothing with respect to its sovereignty; if it be totally independent, it is sovereign. All subordinate corps, on the contrary, (whether communities, cities, or provinces.) which form but a part of a greater corps, and which, consequently, do not enjoy an entire independence, are represented mediately by their sovereign in all transactions with foreign powers. It may and does happen, however, that the different members of *compound* states acquire a right, not only of governing solely in their own internal affairs, but of treating, of their own accord, with foreign powers; provided always that they adhere to the restrictions which their bonds of union and submission impose. Members of such states have then a right to treat each other, and to be treated by other powers, as independent states; and ought to be looked upon as immediate members of the society of sovereign states. Nevertheless, their sovereignty not being entire, the distinction has arisen of *sovereign* and *demi-sovereign* states; but as the law of nations, with some few restrictions excepted, applies to the latter in the same manner as to the former, they must both be regarded as the the *subject* of the science of the European positive law of nations. The number of sovereign and demi-sovereign states in Europe has varied at different epochs. Sometimes it has been augmented by the division of a state into two or more, or by revolutions ending in the independence of some hitherto subjected part of a state: at other times the number has been diminished by the union (often caused by the extinction of families) of many states into one.

2. There was no general connection existing between the states of Europe, till the Romans, in endeavouring to make themselves masters of the world, had brought the greatest part of the European states under their dominion. From that time there necessarily existed a sort of connection between them; and this connection was strengthened by the famous decree of Caracalla; by the adoption of the Roman laws; and by the influence of the Christian religion, which introduced itself insensibly into almost all the subdued states. After the destruction of the empire of the West, the hierarchical system naturally led the several Christian states to consider themselves, in ecclesiastical matters, as unequal members of one great society. Besides, the immoderate ascendant that the Bishop of Rome had the address to obtain, as spiritual chief of the church, and his consequent success in elevating the emperor to the character of its temporal chief, brought such an accession of authority to the latter, that most of the nations of Europe showed, for some ages, so great a deference to the emperor, that in many respects Europe seemed to form but one society, consisting of unequal members, subject to one sovereign. This order of things remained till the different powers, perceiving that their rights were violated, and shaking off the yoke of the Pope, or diminishing his influence, reduced all the prerogatives that the emperor enjoyed over the other crowned heads to the mere point of precedence. Since that time there has subsisted no such *general* unequal connection between the powers of Europe, either in spiritual or temporal affairs. An exception might indeed be made, with respect to spiritual affairs, of those states which still remain attached to the Romish church; but as to temporal affairs, every sovereign state enjoys an equal degree of independence. However, the resemblance in manners and religion, the intercourse of commerce, the frequency of treaties of all sorts, and the ties of blood between sovereigns, have so multiplied the relations between each particular state and the rest, that one may consider Europe (particularly the Christian states of it) as a society of nations and states, each of which has its laws, its customs, and its maxims, but which it cannot

put in execution without observing a great deal of delicacy towards the rest of the society. There exist, moreover, particular relations between some members of this society, which bring them, more or less, near to each other. Some states are held together by equal connections; as where several states belong to the same sovereign, or where there exists a perpetual treaty, in virtue of which a particular system is established between states. The connections between others are unequal, such as those existing between Catholic states in spiritual matters, or between the several members of a *compound* state: and there are other states which have neither treaties nor commerce with each other. In short, these relations are almost as various as are the conditions of the particular states relatively to their power and constitutions.

Chap. II.—*Of the States of Europe, classed according to their Dignity, Power, &c.*

1. The states of Europe may be distributed into different classes, as great, little, royal, sovereign, demi-sovereign, &c.

2. The division of the great states according to their local situation, into northern, southern, eastern and western powers of Europe, has less to do with law than with politics, and with the particular interests that sometimes actuate neighbouring states. But there is another division which, though it depends in some measure on the local situation of states, ought not to be neglected in treating of the law of nations; we mean the division into maritime powers, and powers not maritime. It is common enough to call every state maritime that is situated on the borders of the sea, and is capable of carrying on commerce on that element; but a maritime power, properly speaking, is a power that keeps up a fleet of ships of war; and in this acceptation of the term, there are only Great Britain, the Seven United Provinces, Spain, Portugal, the Sicilies, Denmark, Sweden, Turkey, the republic of Venice, and, since the beginning of the eighteenth century, France and Russia, which can be called maritime powers. The other powers have either never been maritime, or have ceased to be so. But this term, in a more restricted sense, is applied to those powers only whose principal strength consists in ships of war, or whose power by sea has a preponderance over that of the other powers on the same element. In this double sense, England and the United Provinces have, since the end of the seventeenth century, been exclusively distinguished by the appellation of the maritime powers.

BOOK III.

Of the Internal Constitution of a State, as far as it relates to Foreign Powers and their Subjects.

Chap. I.—*Of the Rights of a Nation with respect to its internal Government and Constitution.*

1. The internal constitution of a state rests, in general, on these two points: viz. On the principles adopted with respect to him or them in whose hands the sovereign power is lodged, not only at present, but for the future also; and on those adopted with respect to the manner in which this sovereign power is to be exercised. Both these depend on the will of the state, foreign nations having no right to interfere in arrangements which are purely domestic. However, there are some exceptions to this rule. In case a dispute should arise concerning either of the points above mentioned, a foreign power may, *first*, Offer its good offices, and interpose them, if accepted; *second*, If called in to the aid of that of the two parties which has justice on its side, it may act coercively; *third*, It may have a right, from positive title, to intermeddle; and *fourth*, If its own preservation requires it to take a part in the quarrel, that consideration overbalances its obligations to either of the parties. These exceptions, and particularly the two last, have been so extended by the practice of European nations, that no internal dispute of importance can now arise in any of them, but foreign powers find some pretence to take a part in it, without looking upon their interference as a violation of the law of nations.

2. Suppose that the interior troubles of a state come to an open rupture between the sovereign and his subjects, and that the whole nation, or part of it, should wish to drive him from the throne; or suppose that a province or territory, subjected to another state, refuses obedience to it, and endeavours to render itself independent; in either of these cases there are two points which must be separated in determining on the conduct that foreign powers ought to observe: *first*, The conduct to be observed towards the old or new sovereign, or towards the people who, after having revolted, have declared themselves independent; *second*, The assistance to be given to either party.

With respect to the first of these, a foreign nation, not under any obligation to interfere, does not appear to violate its perfect obligations, nor to deviate from the principles of neutrality, if, in adhering to the possession (without examining into its legality) it treats as sovereign him who is actually on the throne, and as an independent nation, people who have declared, and still maintain themselves independent. The opposite party, however, never fails to complain of this conduct, as long as he does not himself acknowledge, by treaty, the validity of such possession or independence.

As to the second point, namely, the assistance to be given to either party, when once obedience has been formally refused, and the refusing party has entered into the possession of the independence demanded, the dispute becomes similar to those which happen between independent states; consequently, any foreign prince has a right to lend assistance to the party whom he believes has justice on his side, whether he be obliged so to do by treaty or not; provided, however, that he has not promised to observe a strict neutrality. But as to espouse an unjust cause is unlawful, and as it is impossible that the opinions of the two parties should not differ with respect to the justice of their cause, it is also impossible that those against whom succours are directed, should not consider such a step as a departure from neutrality, and as an injury. In fact, whether we speak of the passive conduct observed in such circumstances, or of the succours furnished by foreign powers, it is state policy that commonly decides whether he who feels himself offended shall dissemble, or at most complain of the injury, or whether he shall seek retaliation by violent means.

When a nation acknowledges, expressly or tacitly, the independence of the revolted state, or a prince renounces the throne he occupied, foreign powers have no longer right to oppose the revolution, nor is even their acknowledgment of its validity necessary.

Chap. II.—*Of the different Rights of Sovereignty belonging to the internal Government, in relation to Foreign Powers and their Subjects.*

1. The sovereign has a right to forbid all foreigners to

pass through, or enter his dominions, whether by land or sea, without express permission first obtained, even if such passage or entry should not be prejudicial to the state. Now-a-days, however, no power in Europe refuses, in time of peace, to grant such permission to the subjects of another power; nor is it even necessary for such subjects to ask permission to enter a state and bring their property into it. Thus then the liberty of entry and passage may be considered as generally established between the powers of Europe; and it is particularly so among the states of the German empire. But as this liberty ought not to become prejudicial to the state, every power has reserved to itself the right, *first*, To be informed of the name and quality of every foreigner that arrives; and to this end, passports taken at the place from whence a foreigner comes ought to be regarded as authentic, provided they have been granted by persons having authority to grant them, such as sovereigns, magistrates, or foreign ministers; *second*, Each state has a right to keep at a distance all suspicious persons; *third*. Each state has a right to forbid the entry of foreigners, or foreign merchandises of a certain description, for a time or for ever, as circumstance may require; *fourth*, The liberty of entry and passage extends to individuals only. A number of armed men, before they enter the territory of a foreign state, must have an express permission from the sovereign. This takes place also with respect to vessels of war entering a port to take shelter under the cannon of a fortress, unless this permission has already been granted by treaty.

2. The expenses of government ought to be defrayed by all those who enjoy the protection of the state. When the revenue of the domains is not sufficient for the purpose, imposts must be raised. A foreigner, enjoying the protection of the state, cannot, while he remains in it, expect to be entirely exempted from imposts. Besides, it may be made a condition of his admission. He may even be loaded more heavily than the native subjects of the state, if no treaty between this state and his own specifies the contrary. Yet, as far as concerns personal imposts, it is customary not to exact them from foreigners till they have for some time been inhabitants of the state. Imposts on real estates, on the contrary, and duties on the entry and consumption of merchandises, ought to be paid indiscriminately by foreigners as well as subjects, unless they can prove an exemption. Consequently, the tolls that are imposed for the maintenance of institutions of public utility, such as turn-pike roads, canals, &c. are collected indiscriminately from those who profit from such institutions.

3. One of the most essential rights in the hands of the sovereign, is the *judiciary power*. It extends indiscriminately to all who are in the territory, and the sovereign only is the source of it. But it must be remembered, *first*, That there are persons whose exterritoriality exempts them from this jurisdiction, such as foreign princes and their ministers, with their retinues; *second*, That the sovereign sometimes grants to foreigners the privilege of being tried by their own judges, under the name of consuls, or some other title.

The tribunals of a state being intended to supersede all acts of violence between individuals, foreigners, even though they should not live in the territory, are obliged to address themselves to these tribunals to obtain justice against the subjects of the state; and if those against whom they proceed should be only temporary subjects, they must nevertheless plead at the same tribunals. But, on the other hand, the sovereign is, to all intents and purposes, obliged to administer justice to them as promptly and as impartially as if they were his own subjects.

Foreigners have never a right to demand a preference in judicial proceedings, nor have they a right to demand judgment by a special court. And if (in cases where the competence of the judge is indisputable) the cause has been determined according to form, and the judge is not suspected of having acted contrary to his duty, the sentence that he has pronounced in the last resort cannot be called in question by any foreign power, whose subjects may be dissatisfied with the decision. This principle is justified by the reciprocal advantage of nations.

But a formal refusal of justice, or an unusual delay, is a violation of the law of nations. And if a foreign subject has reason to complain of it, his sovereign may not only retaliate, but may make use of all the means employed by nations when their rights are invaded by others. He may make reprisals, and even declare war, to oblige the state, which has thus failed in its duty, to make a proportionate satisfaction.

4. In determining the effect that a sentence pronounced in one state may have in other states, it is necessary to distinguish two points: its execution and its validity. With respect to the first, no sovereign is positively obliged to execute in his territory a sentence that has been pronounced out of it. Nevertheless, *first*, The particular connection subsisting between several states, and in virtue of which they form a compound state, may oblige them to execute reciprocally every sentence pronounced by a competent judge. *Second*, Sometimes states enter into reciprocal engagements by treaty, for the purpose of executing sentences. *Third*, Friendship and utility often induce a state not to refuse the execution of a sentence pronounced by a competent judge, when the usual request has been made, with an offer of rendering the like service.

With respect to the validity of a sentence pronounced in a foreign territory, if such sentence has been pronounced by a judge every way competent, and is the result of a trial conducted in the usual mode, according to the laws that ought to serve as a basis for the decision, and if the cause has been judged definitively, no foreign judge can admit of a second suit on the same cause, between the same persons: the sentence has the same force as the awards of arbitrators fixed on by the parties ought to have in a state of nature.

5. The end of civil society requires that the sovereign should have a right to forbid actions hurtful to the state and its members, to award penalties for such actions, apprehend and judge the criminals, and execute the sentence pronounced on them. These rights collectively taken, together with their necessary concomitants, form the criminal power. This power extends to every one in the territory, whether subject or foreigner. So that though foreign sovereigns and their ministers may not be subject to the jurisdiction of the state, yet the sovereign is justifiable in taking such measures even against them as are necessary to save the state from the dangers into which their crimes would otherwise plunge it.

A sovereign can punish foreigners, whether they have committed a crime in his dominions, or whether, after having committed it in a foreign country, they seek shelter in his dominions. In neither case is the sovereign perfectly obliged to send them for punishment to their own country, nor to the place where the crime was committed; not even supposing they have been condemned before their escape. According to modern custom, to send a criminal back to the place where the crime has been committed, is more frequently granted on the request of a power who offers to render the like service, than to send one from the place where the crime has been committed to his own country, or to some court of justice of his own country. This latter is never granted except in virtue of treaty; or if it be, the sovereign must have an extraordidary deference for the power that makes the request.

6. On the other hand, the sovereign, owing the protection of the state to foreigners as well as to his subjects, is obliged to punish, with the same scrupulousness, and with the same rigour, all crimes committed against the persons and properties of foreigners living in his territories, as he would punish the same crimes if committed against the persons or properties of his own subjects. But with respect to crimes committed out of his territories, the sovereign is not perfectly obliged to punish the criminal who seeks shelter in his dominions, nor to execute a sentence pronounced against his person or property. However, the general good seems to require that those who attack immediately the safety of a state should not go unpunished; and accordingly, in case of requisition, no sovereign refuses *directly* to take cognizance of such crimes.

7. The criminal power being confined to the territory, no act of its authority can be exercised in foreign countries without violating their rights. Consequently neither the pursuit of a criminal by armed men, nor a seizure or carrying away by force, nor the conducting of a criminal by an armed force, can take place on a foreign territory without permission from the sovereign.

8. The right of cancelling a criminal suit, or of pardoning the criminal, can be exercised by no sovereign beyond the limits of his territory. A prince may pardon a crime committed in his own or a foreign territory, but this pardon cannot hinder a foreign sovereign from prosecuting the same person, for the same crime, when he can seize him. The prince who first pardoned him has no means of hindering the effects of such prosecution, but those of intercession; except in cases where the manifest innocence of the accused party authorises coercive means.

BOOK IV.

OF TRANSACTIONS WITH FOREIGN NATIONS, AND THE RIGHTS THENCE ARISING.

CHAP. I.—*Of the Liberty and Security of Nations.*

1. A natural consequence of the liberty and independence of nations is, that every sovereign has a right to make in his own dominions whatever arrangements he may judge proper for the internal security of the state; whether it be to return the blow he has received, or to ward off the one that menaces him. So that, provided he has the authority, and provided he is not bound down by treaty, he may build or rebuild as many fortresses as he thinks proper, as well on the frontiers as in the interior of his dominions; he may augment the number of his troops and vessels; make treaties of alliance, of subsidy, &c. and, in short, do every thing that he thinks necessary to enable himself to support a war, without being obliged to give an account of his proceedings to any other power whatever. Yet such extraordinary armaments seldom fail to give umbrage to the neighbouring powers, and to create suspicions, which every state ought to remove when they are unfounded. For this reason policy has introduced the custom of requiring explanations concerning armaments of this sort, and of giving such as ought to be satisfactory, even to states less powerful; that is to say, when such explanations can be given with sincerity, and when they have been asked for in a becoming manner. Very often a sovereign informs before hand the powers in friendship with him, that he finds it necessary to take such or such measures of security. It is, in general, only when a satisfactory answer cannot be given, that a sovereign pleads that independence of nations which dispenses with his giving any at all.

On a principle established on this custom, it is understood that those powers who take umbrage at the extraordinary armaments of their neighbours, should ever precede hostilities by an amicable explanation; and indeed this, to a certain degree, is acknowledged by the law of nature.

2. Every state has a natural right to augment its power, not only by the improvement of its internal constitution and resources, but also by external aggrandizement; provided that the means employed are lawful; that is, that they do not violate the rights of another. Nevertheless, it may so happen, that the aggrandizement of a state already powerful, and the preponderance resulting from it, may sooner or later, endanger the safety and liberty of the neighbouring states. In such case there arises a collision of rights, which authorises the latter to oppose by alliances, and even by force of arms, so dangerous an aggrandizement. This right is still more essential to states which form a sort of general society, than to such as are situated at a great distance from each other; and this is the reason why the powers of Europe make it an essential principle in their political system, to watch over and maintain the balance of power in Europe.

3. In all ages nations have regarded, with a jealous eye, the disproportionate aggrandizement of any one among them. We see that many enterprises were undertaken by ancient nations, to diminish the overgrown preponderance of some particular state; but they seem never to have made the maintenance of a balance of power a systematic part of their policy. The greatness of the Romans, and, since the migration of the northern nations, that of Charlemagne, and perhaps that of Henry V. are convincing proofs, that it was very long before the nations of Europe saw the necessity of attending constantly to the prevention of dangers of this sort. It was not till the sixteenth century,—when the immense addition to the power of the House of Austria, and to that of the King of France, roused them from their lethargy. They then began to fear that one or the other of those powers might establish an universal monarchy; and since that time, following the example of England, the other nations of Europe have never lost sight of the system for maintaining a balance of power. Some of them, however, consulting their immediate interests only, have occasionally deviated from this system.

The greatest part of the states of Europe at present look upon this right of maintaining the balance of power, as a right that belongs to them.

It is for politicians to determine when this balance is in danger, and to point out the means of re-establishing it; the history of Europe proves how many vicissitudes it has undergone since the beginning of the sixteenth century.

4. The principle treated of in the last section, may authorise the powers of a certain part of Europe to oppose the immoderate aggrandizement of any state among them. Hence the system for maintaining a balance of power among the eastern powers of Europe, among those of the West, or those of the north; among the states of Germany, or those of Italy; among the Europeans in America, &c. The same principle may be applied to commerce, and more particularly to navigation; but it never can be carried so far, as to hinder a state from extending its commerce by lawful means, or from augmenting the number of its vessels of war, at least while it does not abuse its power by exercising or extending an usurped empire over the seas.

5. Every free sovereign state has a right to form with

other powers whatever treaties may appear to be conducive to its interests, provided such treaties do not violate the rights of another. Foreign powers cannot force a treaty upon a free state, nor can they dispose of its rights by treaties made between themselves.

This liberty is reciprocally acknowledged by all the powers of Europe, as far as the theory goes; but, in practice, *first*, Modern history furnishes examples enough of a combination of powers having forced independent states to accede, against their will, to treaties made by the combination, and even of their having put such states among the contracting parties, without designing to consult them before hand. *Second*, In surveying the weaker states of Europe, we see that they are far from being able to exercise that liberty in relation to treaties, which the universal law of nations attributes to them; and that there are but too many of these little states, which, enjoying a *nominal* independence, are *really* dependent on their too powerful neighbours. *Third*, Sometimes it happens that nations have themselves contracted their liberty of making treaties, by treaties they have already made with other powers; and the demi-sovereign states are subjected to certain laws, which sometimes act as restraints on their liberty of making treaties.

Chap. II. *Of Commerce.*

1. The commerce carried on with foreign nations being one of the most efficacious means of augmenting the ease, the riches, and power of a nation, it is of the first importance to examine what are the rights of nations with respect to it. External commerce, that is, the commerce between nation and nation, has several branches. It consists in selling the superfluity; in purchasing articles of necessity, as well productions as manufactures; in buying from one nation and selling to another; or in transporting the merchandise from the seller to the buyer, to gain the freight.

2. Men being by nature obliged to assist each other reciprocally, there exists a sort of general obligation on them to carry on commerce with each other. This obligation, however, is only an imperfect one; it does not go to hinder a nation to consult its interests, in the adoption of certain conditions or restrictions in the commerce that it finds convenient to carry on. Suppose even that one nation has, for a long series of years, carried on commerce with another, it is not obliged to continue so to do, if there are no treaties or agreements which require it. Still less can one nation oblige another to trade with it alone. It is permitted to promise one nation not to trade with such or such other nation; but, this case excepted, if two nations think proper to trade with each other, a third has no right whatever to hinder it. In this sense, the liberty of commerce is conformable to perfect natural right.

Generally speaking, the commerce of Europe is so far free, that no nation refuses positively and entirely to permit the subjects of another nation, when even there is no treaty existing between them, to trade with its possessions, in or out of Europe, or to establish themselves in its territory for that purpose. A state of war forms here a natural exception. However, as long as there is no treaty existing, every state retains its natural right to lay on such commerce whatever restriction it pleases. A nation is, then, fully authorized, *first*, To prohibit the entry or exportation of certain merchandises. *Second*, To institute customs, and to augment them at pleasure. *Third*, To prescribe the manner in which commerce with its dominions shall be carried on. *Fourth*, To point out the places where it shall be carried on, or to exempt from it certain parts of its dominions. *Fifth*, To exercise freely its sovereign power over the foreigners living in its territories. *Sixth*, To make whatever distinctions between the nations with whom it trades it may find conducive to its interests.

3. The mere general liberty of trade, such as is acknowledged at present in Europe, being too vague to secure to a nation all the advantages that it is necessary it should derive from its commerce, commercial powers have been obliged to have recourse to treaties for their mutual benefit. The number of these treaties is considerably augmented since the sixteenth century. However they may differ in their conditions, they turn generally on these three points: *First*, On commerce in time of peace. *Second*, On the measures to be pursued with respect to commerce and commercial subjects in case of a rupture between the parties. *Third*, On the commerce of the contracting party that may happen to remain neuter, while the other contracting party is at war with a third power.

4. With respect to the first point, the custom is: *First*, To settle, in general, the privileges that the contracting powers grant reciprocally to their subjects. *Second*, To enter into the particulars of the rights to be enjoyed by their subjects, who shall reside on the territory of the other power, as well with respect to their *property* (particularly in regard to imposts, confiscation, sequestration, &c.) as to their *personal* rights. Particular care is usually taken to provide for the free enjoyment of their religion; for their right to the benefit of the laws of their country; for the security of their books of commerce, &c. *Third*, To mention specifically the kinds of merchandise which are permitted to be imported or exported, and the advantages to be granted relatively to customs, tonnage, &c.

With respect to the rights and immunities in case of a rupture between the contracting parties, the great objects to be obtained are: *First*, an exemption from seizure of the person, or effects, of the subjects residing in the territory of the other contracting power. *Second*, To fix the time that they shall have to remove with their property out of the territory; or to point out, *Third*, The conditions on which they may be permitted to remain in the enemy's country during the war.

In specifying the rights of commerce to be enjoyed by the neutral power, it is particularly necessary, *First*, To exempt its vessels from an embargo. *Second*, To specify the merchandises which are to be accounted contraband of war, and to settle the penalties in case of contravention. *Third*, To agree on the manner in which vessels shall be searched at sea. *Fourth*, To stipulate whether neutral bottoms are to make neutral goods or not, &c.

5. Sometimes nations permit, either from custom or treaty, other nations to send consuls into their territories. We find instances of this as far back as the 12th century, when some states began to establish, *at home*, judges, whose particular function it was to decide on matters purely commercial, and to whom was given the name of *consuls*. In process of time, some of the powers stipulated, in their treaties with the Mahometan and Pagan states out of Europe, for the right of sending consuls into those states, to watch over the interests of their subjects trading there, and to judge and determine on differences arising amongst them touching commercial affairs, and sometimes even others. Following these examples, the Christian powers of Europe began, in the fifteenth century, to send consuls into each other's territory; but even at this day, the custom of receiving them cannot be looked upon as universally established. Besides, the rights of these consuls, where they are admitted, differ very widely in different states. Almost all the consuls, who are sent out of Europe, exercise a pretty extensive jurisdiction over the subjects of their

sovereign. In Europe, there are some places where the consuls exercise a civil jurisdiction, more or less limited, over their fellow subjects residing there; in others, they can exercise no more than a *voluntary* jurisdiction; and in others, their functions are confined to watch over the commercial interests of the state, particularly the observation of the treaties of commerce, and to assist with their advice and interposition those of their nation, whom commercial pursuits or connections have led to the place for which they are named. They assume their functions sometimes in virtue of credentials, but oftener by simple *letters of provision* and letters of recommendation. Although they are under the particular protection of the law of nations, they are far from enjoying the advantages that custom allows to ministers, either as to jurisdiction, impost, religion, or honours; so that it is only in a very extensive sense of the word that they can be called public ministers. The greatest part of the consuls out of Europe approach much nearer to the rank of ministers; some of them are, indeed, ministers and consuls at the same time,

Sometimes consuls-general are appointed. These are to officiate for several places at the same time, or else they are placed at the head of several consuls. In other respects their functions, as well as those of their vice-consuls, differ but little from those of simple consuls.

Chap. III. *Of the Rights of Nations upon the Seas.*

1. A nation may occupy and extend its dominion on the sea, beyond the immediate vicinity of its own particular coast, either in rivers, lakes, bays, straits, or the ocean; and such dominion may, if the national security require it, be maintained by a fleet of armed vessels. The empire of a nation on the seas may extend as far as it has been acknowledged to extend by the consent of other nations, and beyond the boundary of its property. It remains then to be considered, whether or not there are such extended limits on the European seas, acknowledged to be the property, or under the dominion, of particular nations. Among the bays, straits, and gulfs, there are some which are generally acknowledged to be free; there are others which are looked upon as under the dominion, and in part even the property of the masters of the coast; and there are others, the property and dominion of which are still in dispute.

2. (1) The following are acknowledged as free: The spanish Sea, the Aquitain Sea, the North Sea, the White Sea, the Mediterranean Sea, the Straits of Gibraltar. (2) The three Straits between Denmark and Sweden are under the dominion, and are looked upon as the property, of the king of Denmark; St. George's Channel, between Scotland and Ireland, is under the dominion of Great Britain; the Straits of Sicily are under the dominion of the king of Sicily; the Gulf of Bothnia is under the dominion of the king of Sweden; the Black Sea, the Egean Sea, the Bosphorus of Thrace, the Propontis, and the Hellespont, are all under the dominion of the Turkish emperor. (3) Other nations dispute with England her claim to the dominion, and in part to the property, of the four seas that surround her; particularly the British Channel, and the Straits of Dover. They dispute with the republic of Venice her claim to the dominion over the Adriatic; and with Genoa, her claim to the dominion over the Ligustic Sea. More than one dispute has arisen concerning the dominion over the Baltic.

3. With respect to the vast ocean, and the four great seas that compose it: *first*. The enormous extent of each of these seas, and particularly that of the Indian Sea, about which the greatest disputes have arisen, renders it not only extremely difficult to occupy, but puts it absolutely out of the power of any of the states of Europe to maintain and defend the possession of it. And even if this could be done, the want of a justificatory reason for keeping such possession would render it unlawful. Neither the right of discovery, nor the donation of the Holy Father, nor prescription, has been able to exclude other nations from that possession in common which ought to be preserved. The sole dominion must exist in the theory; but it has never been acknowledged by the nations of Europe to belong to any one of them. The ocean, then, is free; and surely it ought to be so. After the vain pretensions and contestations of the Portuguese on the subject, during the 16th and 17th centuries, all the powers of Europe now acknowledge the ocean and the Indian Sea to be exempt from all property and dominion, and to be the common possession of all nations. A nation may, however, renounce the liberty of navigating in the Indian, or any other sea.

4. Rivers and lakes are useful for navigation, or for fishing, or for other emoluments arising from their possession; and, therefore, the powers that are masters of the banks have a right to appropriate the use of them exclusively to themselves. In general, they do forbid foreigners to fish on them; but with respect to navigation, as such a prohibition would produce retaliation, and as it is contrary to the commercial liberty generally introduced in Europe, foreigners are now permitted, in time of peace, to navigate freely and without restraint. This liberty is founded in part on treaties, but in some demi-sovereign states on law. But in every case where it is only founded upon custom, that custom does not hinder a nation from making whatever regulations and restrictions it pleases, or from excercising over such part of its territories all the rights of sovereign dominion.

5. The sea surrounding the coast, as well as those parts of it which are land-locked, such as the roads, little bays, or gulfs, &c. as well as those which are situated within cannon shot of the shore, (that is, within the distance of three leagues,) are so entirely the property, and subject to the dominion of the master of the coast, that, *first*. He has the exclusive right to all the produce of it, whether ordinary or accidental, as far as relates to things unclaimed by any other lawful proprietor; *second*, He can forbid or restrain the navigation of foreigners in his roads, and their entry into his ports. Yet, in time of peace, this liberty is generally permitted to merchant ships, and even to ships of war to a certain number; *third*, He has a right to impose duties, tonnage, fees of entry, of clearance, &c. and he can institute tolls for the benefit of his navigation; *fourth*, He may require the maritime honours that custom allows to those who have dominion over any part of the seas. In short, the parts of the sea surrounding the coast ought to be looked upon as forming a part of the territory of the sovereign who is master of the shore.

6. The master of the shore cannot be said to have a right to appropriate to his own use the wreck of any foreign vessel cast away on his coast, nor the goods, &c. that, in a moment of danger, have been thrown over board. This pretended strand-right, contrary most certainly to the laws of nature as well as those of humanity, was formerly exercised pretty generally in Europe. It has been restrained from time to time, particularly since the thirteenth century, by privileges, laws, and a number of treaties; so that it may now be considered as generally abolished in our quarter of the globe If there still remain some relics of it in a few places, it is against such places only that it is made use of by way of retaliation.

7. The rights exercised on the sea, near the coast, are

exercised also in those straits which are not wider than two cannon shots. It is for this reason that the king of Denmark, by possessing the property and dominion of the navigable part of the Sound, claims there, not only the maritime honours due to him as sovereign, but certain tolls or rates for the liberty of passing. This payment is now fixed by his treaties with other nations.

8. With regard to the extent of the rights exercised on the seas adjacent to the landed territory of particular states:

First, The Turkish Emperor exercises his right of proprietor and sovereign of the Black Sea, in such a manner as not to permit even the entry or navigation of it to any nation whatever, unless he has granted it by treaty.

Second, Denmark, wishing to extend her empire and rights, as proprietor over the seas adjacent to Iceland and Greenland, to the space of four miles from Iceland, and fifteen miles from Greenland, claims a right of excluding foreigners from fishing, and even navigating, in that space. But this is disputed by many nations, and particularly by the United Provinces, in what concerns the right of fishing.

Third, Great Britain, claiming the property and empire of certain parts of the four seas that surround her, empire over more distant parts, and maritime honours on all the seas, has very often had contestations with foreign nations, who on their part, except bound by treaties, have never yielded her any more than what belongs to every master of the shore.

Fourth, The republic of Venice claims empire, and particularly maritime honours, on the Adriatic; but the neighbouring states dispute them with her, and recently she has not been in a situation to maintain this pretended right. An annual ceremony is of little use towards it.

Fifth, Genoa has no longer a naval force respectable enough to claim, with effect, the maritime honours which she pretends to be entitled to on the Ligustic Sea.

Sixth, After many disputes with respect to the empire of the Baltic, and particularly with respect to the honours of the flag, some of the states situated on its shores have agreed to yield those honours in certain districts, and to omit them reciprocally in others.

9. The maritime honours, about which there have been so many disputes, and which have often led to violent acts, and even to war, consist; *first*, In saluting with *cannon;* and on this point, it is to be determined who shall salute first, at what distance the salute shall be given, with how many guns, and if the salute shall be returned gun for gun; *second*, In saluting with the *flag*, or with the *pendant;* and here it is to be fixed whether it shall be furled up, lowered, or hauled quite down; *third*, In saluting with the sails, by lowering or hauling down the fore-top-sail. This last way of saluting is usually made use of by merchantmen, but vessels of war sometimes use it also.

10. Merchant ships, even when they are armed, are obliged to salute all vessels of war, fortresses, and posts, as well with their cannon as with their merchant flag and their sails.

BOOK. V.

Of Embassies.

Chap. I.—*Of Ministers, their Rights, Duties, &c.*

1. By *Public Minister*, is commonly meant the person whom the state has charged with its public affairs; in a more particular sense, the person who is at the head of some department of the government; and in a still more confined sense, the person whom the sovereign has appointed to superintend his affairs at some foreign court. This last sort of minister, (ambassador in a general sense,) is that of which we are to speak here. The sending of this sort of ministers being a necessary means of treating of state affairs, the right ot send them becomes one of the natural rights of sovereignty. These ministers are now employed, not only to negotiate the affairs of the sovereign by whom they are sent, (though all their rights are grounded upon their acting in that capacity,) but on points of ceremony also; and, since the introduction of perpetual embassies, sometimes the principal business of such a minister is to watch over the interests of his master, and give him an exact account of every thing that passes, and of which it imports him to be informed. Whatever difference a rigorous attention to theory might make as to prerogatives, &c. between negotiators and other ministers, in practice the same prerogatives that are enjoyed by negotiators are also enjoyed by embassies of ceremony, perpetual embassies, and embassies in ordinary.

2. The universal law of nations acknowledges but one order of ministers. It considers them all as public mandatories of the state which they represent, as far as relates to the business with which they are charged, and entitled to the rights essential to that quality, and to no other rights whatever. But the modern law of nations has established several orders of public ministers or ambassadors, which differs essentially in whatever concerns the ceremonial.

Formerly, there was but one class of public ministers, who were all called *ambassadors.* On their private affairs, sovereigns sometimes sent *agents;* and on missions of ceremony, or of little importance, they sent *gentlemen of birth;* but neither of these enjoyed the rights, or were honoured with the ceremonial, due to ministers. In the fifteenth century, ministers began to be received as the representatives of their sovereign; but the disputes resulting from their rights in that capacity, and the expense, which became more considerable as perpetual embassies grew more customary, gave rise to an order of ministers under the title of *Residents*, much inferior to ministers representing their sovereigns. These latter now took, exclusively, the title of *Ambassadors*. Residents were considered as the agents above mentioned, even when they were charged with affairs of state. These agents were afterwards called *Chargés des Affaires*, and the title of agent fell into disuse, except for those who were charged with the private affairs of the sovereign only, or as a mere empty title.

In time it became customary to grant to the gentlemen of birth a certain ceremonial, which, though very vague in the beginning, sometimes came nearly to that of ambassadors, but oftener resembled the ceremonial of residents. The custom of the present century has raised them above residents, and they now form a separate order between ambassadors and residents, called *envoys*. Many causes gave rise to a multiplication of the qualities of ministers, particularly of the second and third orders. Hence ministers plenipotentiary, ministers, ministers resident, residents, ministers chargés des affaires.

3. The next point to be considered relates to the retinue of the minister, and to his being acknowledged in his diplomatic capacity. The military procession accompanying ministers formerly is fallen into disuse, except in the great embassies that the Turks send to some European powers, and those they receive in return. The retinue of a minister varies according to his order. In that of an ambassador, there are often several gentlemen

and pages, secretaries, clerks, (sometimes a chancellor at their head) one or more interpreters, a numerous train of servants, in and out of livery, &c. With respect to his moveables, plate of all sorts and in abundance, and several coaches and sets of horses, seem necessary accompaniments. The retinue of ministers of the second and third order is much less: the envoys have rarely any gentlemen, and seldom more than one secretary. The heavy expences attending embassies of the first order, and which must be defrayed either by the court who sends the ambassador, or by the ambassador himself, have much contributed towards the disuse of perpetual embassies of the first order. Some courts, for different reasons, never send any at all of the first order.

4. Before a minister can expect to be acknowledged at a foreign court, he must produce a letter of credence, written by the sovereign who sends him to the sovereign who is to receive him. This letter makes mention of the motive of the mission, the name and quality of the bearer, and prays the person to whom it is addressed to give full credit to what he shall say on the part of his court. The form of these letters varies according to circumstances, but commonly they are in the form of letters of council. One letter of credence may serve for two ministers sent at the same time, if they are both of the same order. Sometimes, on the contrary, one minister has several letters of credence; this happens when he is sent to several sovereigns, or to one sovereign in different qualities.

5. Ministers to whom a negotiation is confided must also produce their full powers, specifying the degree of authority with which they are vested. These full powers are either general or special, as circumstances may require. A full power may be enclosed in the letter of credence; but if it be separate from it, it is commonly drawn up in form of a letter patent. Ministers sent to a congress, without being furnished with letters of credence to any court, produce only their full powers, which they exchange with each other, and which answer the purpose of letters of credence. Sometimes the full powers produced at a congress are put into the hands of the mediators.

6. The minister who is to carry on a negotiation is furnished with instructions; these are to be his guide in his general conduct towards the court to which he is sent, and towards the ministers of other courts whom he may find there, and particularly in the manner of opening and conducting his negotiation. These instructions, as well as those that it may be necessary to dispatch to him in the course of his embassy, being intended for himself alone, are not usually produced to the court to which he is sent, unless his own court orders him to do it, or unless he, from urgent motives, thinks himself justifiable in communicating certain passages of them. Sometimes he has two sets of instructions, the one public, and the other secret.

7. All ambassadors have now an undisputed right to the title of *excellency;* but, of all ministers, they only have that right. If it is sometimes given to the envoys extraordinary of kings, and even to other ministers of the second order, it is because it is due to them in some other quality than that of minister; or else it is given them out of mere complaisance.

8. The ambassador is distinguished from ministers of the inferior orders by many points of the ceremonial. This, however, depends so much on the particular usages of each court, that we can mention only such points as are most generally received: such is the right of going on visits, &c. of ceremony, in a coach and six, of ornamenting the horses with *fiochi,* of being saluted with military honours, of being admitted to balls and feasts, and at court on all days of ceremony. Great courts grant less to ministers of the second and third order than the little courts do; these sometimes yield as much to ministers of the third order as the former do to those of the second.

9. The audiences to which ministers of the first and second order are admitted in the course of their mission are either ordinary or extraordinary, and the latter are either private or public. These last take place when there is a notification to be made in ceremony, as also at taking leave.

10. All foreigners are under the protection of the law of nations; but foreign ministers of the different orders enjoy a higher degree of inviolability than that insured to all foreigners by the general law of nations, which extends no further than protection from injury. This inviolability they derive from the dignity of the state they represent, and from the interest that every nation takes in the honour and security of those who are to transact its affairs in foreign countries. The sovereign, then, must be careful to abstain from every kind of violence against the person of a public minister sent to his court; and he ought to punish, to the utmost rigour of the law, and as crimes of state, every act of violence committed against him by others: provided, however, that the offender commits such violence against the minister knowing him to be such, and provided he be subject to the jurisdiction of the sovereign. All the powers of Europe acknowledge this inviolability in ministers of all the orders, from the moment they enter their territory till they quit it; so that Christian states permit even the minister of an enemy, residing at their courts at the breaking out of a war, to return home in perfect security. The Turks only have preserved the barbarous custom of imprisoning foreign ministers on account of a rupture with their courts. In the course of a war, no minister can pass through, or enter in safety, the territory of an enemy, unless express permission has been first obtained.

11. The universal law of nations acknowledges in the minister a perfect independence in every thing that concerns, directly or indirectly, his functions as minister, and considers him in that respect as *exterritorial.* But that part of the law of nations which is founded on custom extends this exterritoriality still further. According to it, the minister, his retinue, his house, and his carriages, are usually considered, with regard to the rights of sovereignty, as out of the territory where the minister resides, and as in the state from which he is sent. This is what is now understood by exterritoriality. As it is, however, the effect of the will of nations, it is susceptible of limitation, and is, in fact, limited in many respects.

12. In virtue of this exterritoriality, the minister, and all those belonging to his retinue, as well as his property, are exempted from the civil jurisdiction of the state. The minister can be cited before no tribunal, except that of the sovereign who sends him; but we must except here, *first,* When he is a subject of the state to which he is sent, or when he is in the service of the state to which he is sent; *second,* When he has voluntarily acknowledged the jurisdiction of that state; *third,* When, as plaintiff, he is bound to submit to the jurisdiction to which the defendant is subject; and consequently is obliged to plead, in case of an action against him arising from the process; *fourth,* With respect to property, that which belongs to him in any other quality than that of minister is subject to the jurisdiction of the state, and may be seized on for causes not connected with the quality of minister. Though, strictly speaking, the property belonging to him as minister is exempt from seizure during the time of his mission; yet, the mission once terminated, if he attempt to quit the state without paying his debts, the state may refuse to let him depart, or at least to carry away his property; and may even seize upon

it. There are instances of this right having been exercised, though generally it is not.

13. Ministers and their retinue (the latter less generally) are exempt from the criminal jurisdiction of the state to which they are sent. A crime, then, committed by a minister, does not deprive him of the special protection of the law of nations, and of that inviolability which the interest of his sovereign requires him to preserve. Nevertheless, if it be some crime immediately against the safety of the state, the sovereign has a right to act against him as against an enemy of the state. If the safety of the state require it, his person may be seized, and he may even be put to death like another enemy. But, on account of the consequences, it would be dangerous to establish the principle. It is a custom among the courts of Europe, when a minister has committed a crime of a private nature, to demand his recal; and if it be a state crime, to seize his person and keep him confined as long as the state is in danger; and when that danger ceases to exist, to release him and send him home. But even imprisonment is seldom had recourse to, unless the danger be so very pressing as to render it unsafe to send him home, or write for his recal. With regard to the retinue of ministers, it often happens that courts do not grant the same exemptions to them as to the ministers themselves.

14. The general notion of the exterritoriality of the minister, and of his dwelling, seems to give him a great degree of liberty on the point of religion, but this exterritoriality itself admits of modification on all the points not essential to the object of the mission. Every thing here, then, must depend on custom and particular conventions.

15. The exterritoriality of the minister exempts him, and all his retinue, from the personal imposts, to which as subjects of the state they would be liable. With respect to duties, either direct or indirect, on merchandises, an exemption from them is not essential to the quality of minister.

Formerly it was the custom to defray, either wholly or in part, the expences of foreign ministers while on their mission. Since this is fallen into disuse among the Christian powers, they have generally substituted in its room an exemption from duties. Nevertheless, the enormous abuse that has been made of this exemption at many courts has caused it to be much restrained, or entirely abolished. At courts where it still subsists, it subsists during the first months of the embassy only; and where it is entirely abolished, a gratification is given in lieu of it.

It must be observed, however, that the dwelling and carriages of the minister are exempt from search, unless he consents to their being searched.

16. The immoveable property that a minister may acquire, should it be even the house in which he lives, is not exempt from the ordinary imposts, any more than property of the same kind belonging to a foreign sovereign. Such moveable effects also, which it is clear a minister does not possess in his quality of minister, ought to be subject to the ordinary imposts.

17. A minister cannot, any more than another foreigner, demand an exemption from the ordinary tolls, intended to reimburse the expence of a public institution, of which he partakes in the advantages; for instance, for turnpikes, bridges, &c.; neither can he demand an exemption from postage for his dispatches, &c. nor is this granted to ministers in general, not even to ambassadors. There may, indeed, be some motive for exempting them from post charges in those countries where the postage is become a sort of tax, as in Great Britain.

18. Ministers being mandatories of the state, it follows that their letters of credence and full powers must become void, in case of the death of their own sovereign, or of the sovereign to whom they are sent. They must then, in both cases, be provided with new credentials, without which they can neither continue to negotiate, nor perform their other ministerial functions, nor demand the honours and prerogatives due them as ministers; in such a situation, all they can claim is their inviolability till they can quit the state. Nevertheless, in practice, when circumstances make it reasonable to suppose that the interruption will not continue any time, the court to which they are sent not only continues to treat them as ministers, but sometimes to negotiate with them also. But this depends wholly on the will of the sovereign at whose court they reside.

A minister whose credentials and powers authorize him to act for a certain time only, or *per interim*, can act no longer than during the time specified, or till the return of the minister whose place he supplies. His functions in either case cease without his being recalled in form.

19. An embassy is sometimes terminated by a recal. This takes place, *first*, When the object of the mission is accomplished; *second*, On account of something that has no relation to the court at which the minister resides; *third*, At the request of a court, complaining against the minister and demanding his recal; *fourth*, For reasons of state; for instance, by way of retaliation, in consequence of an infraction of the law of nations, and, in general, in consequence of any dispute that threatens a rupture between the two powers. In the latter case, the minister is often ordered to depart without taking leave; but in the two former cases, (and sometimes even in the latter,) the minister, if present, ought to request an audience at taking leave. At this audience, which is sometimes public and sometimes private, he presents his letters of recal, and makes a speech. If the minister be absent at the time of his recal, he may take leave in writing, annexing to his own letter, his letter of recal. In both these cases he receives letters from the court where he has resided, which, if there be the least room for it, contain an eulogium on his character and conduct. After this he receives the ordinary or extraordinary presents intended for him, and his necessary passports. Having thus taken leave of the court, he takes leave of the other foreign ministers, ministers of state, &c. which is done in visits made in the same manner as his visits of arrival; and this ceremony ended, he takes his departure.

20. Sometimes a minister terminates his embassy himself, by quitting the place of his residence without being recalled. This happens, *first*, When, in virtue of his instructions, he may take leave without waiting for a recal in form; *second*, When the sovereign at whose court he resides requests him to take leave, or obliges him to quit his territory. This latter is sometimes done by way of retaliation, or in consequence of the misconduct of the minister, or in case of an approaching rupture. *Third*, When he quits the court of his own accord without taking leave. This is done when some gross infraction of the law of nations has been committed against his person.

21. An embassy may be terminated by the death of the minister. Those who have the care of his interment have certainly a right to insist on his being buried honourably; but whether a minister of a religion, not tolerated in the country where he dies, is entitled to a public solemn interment in the usual burial-place, is a point which, in default of particular convention, must be determined on the principles of the religion of the country where he resided at the time of his death. In case the corpse is sent home to the country of the sovereign who has sent the minister, it is customary to exempt it from the ecclesiastical dues known

in some countries, commonly called *jura stolæ*, and which are paid by subjects only.

Chap. II.—*Of Secret Embassies.*

Secret embassies are of several sorts. Sometimes a sovereign sends a person of confidence, to treat in secret of some affairs of importance, or that require dispatch, without giving him the quality of minister; or at least without permitting him to assume it openly till the object of his mission be out of danger. If the court to which he is sent be informed of the object of his mission, he ought to be granted all the inviolability due to him as minister; if not, he may be treated as a private person. Such persons can demand no part of the ceremonial due to them as ministers while they forbear to discover their quality as such; and, in general, they are looked upon by all the other ministers as private persons.

Chap. III.—*Of State Messengers.*

Messengers are the bearers between sovereigns and ministers of whatever they wish to convey with dispatch. Every sovereign grants, in time of peace, a full and entire inviolability to the persons of messengers, as well as to the dispatches of which they are the bearers, whether they are sent to his own court, or are on the road to some other court; but in order to this, they must announce themselves as such, and produce, if required, the necessary passports, &c. This inviolability has often been confirmed by treaty; and to commit an act of violence against a messenger is now looked upon as an enormous offence.

They are further granted an exemption from imposts and from being searched, as long as they do not abuse this favour.

In time of war, this inviolability is not so much respected. Belligerent powers take the liberty of seizing the messengers of their enemies, or of the allies of their enemies, where there are no treaties to the contrary. Sometimes it is agreed to grant them passports; and this very often is one of the first objects of a negociation for peace.

BOOK VI.

Of forcible means employed by a Nation in the Defence or Pursuit of its Rights.

Chap. I.—*Of Retaliation and Reprisals.*

1. In case of a difference between two sovereigns, he who complains of a violation of his natural or positive rights ought, unless his pretensions be of an indisputable nature, to begin by sufficiently proving those rights, as well as the violation of them complained of. This done, if he cannot obtain due satisfaction by amicable means, or if he foresees that it would be useless to try such means, he may, if he does not choose to renounce satisfaction altogether, have recourse to forcible means, whether it be in the defence or pursuit of his rights. Forcible means are, indeed, in such cases, the only ones that are left to sovereigns who acknowledge no judge or superior.

Forcible means are of several degrees, which differ widely from each other, and every sovereign is obliged to confine himself to the employment of the lowest degree by which he can obtain due satisfaction Above all, he ought to distinguish carefully the means of redress proper to be made use of in case of a violation of an imperfect obligation, from those which would be justifiable in case of a violation of a perfect obligation.

2. There are many ways of violating an imperfect obligation. In general, a sovereign violates his imperfect obligations, by refusing to permit or to do what equity and humanity dictate, and by doing what in rigour he has a right to do, but which humanity and equity forbid. Particularly, *first*, In refusing to observe a point of simple custom; *second*, In introducing into his dominions some partial right or law, to the prejudice of foreigners.

From the nature of imperfect rights and obligations, it is clear that no violation of them can authorize the use of forcible means, or the infraction of perfect obligations, in the pursuit of redress; but it is no less clear, that in order to obtain such redress a sovereign may make use of retaliation. He may, for instance, refuse to comply with the same custom with respect to another sovereign, that that sovereign has refused to acknowledge with respect to him; or he may refuse to comply with some other custom which is equivalent to it. He may introduce a partial right or law to the prejudice of such foreigners as have done the same with respect to him or his subjects. By these means he re-establishes reciprocity, or obliges unfriendly powers to change their conduct.

3. A sovereign violates his perfect obligations in infringing the natural or perfect rights of another. It matters not whether these rights are original and inherent, or whether they have been acquired by express or tacit covenant, or otherwise.

In case of such violation, the injured sovereign may refuse to fulfil his perfect obligations towards the sovereign by whom he is injured, or towards the subjects of such sovereign. He may also have recourse to more violent means, till he has obliged the offending party to yield him satisfaction, or till he has taken such satisfaction himself, and guarded himself against the like injuries in future.

Whether the state or its subjects be the offending party, if the state refuse to make satisfaction, the property of each of its subjects coming within the reach of the injured state is liable to seizure, (in which case such subjects have a right to be indemnified by the state to which they belong;) and even the persons of such subjects may be seized; but the life of an innocent person cannot be taken, unless in extraordinary cases, where there are no other means of obtaining satisfaction, and of preventing future violations.

There are many acts by which a sovereign refuses to do or to suffer what he is perfectly obliged to do or to suffer, or by which he does what he is ordinarily perfectly obliged to omit, in order to obtain satisfaction for a real injury sustained: all these acts are called *reprisals*.

4. One species of reprisal, the most frequently employed, is the seizure of the property and persons of the subjects belonging to the state from whom an injury has been received. This is done with a view of obtaining satisfaction by the confiscation of the property seized, if all endeavours should fail of obtaining it otherwise from the offending state.

5. Whatever difference there may be in the different species of reprisals, they resemble one another in this, that they are all determinate acts of violence, and that they are exercised separately; but when all these species of reprisals are exercised at once, they form a sort of warfare; indeed they no longer differ from actual war.

Chap. II.—*Of the Commencement of War.*

1. *National war*, as distinguished from *civil*, is a con-

flict between nation and nation. It never can be undertaken or carried on but by the authority of the sovereign; but he may vest the right of making war in such of his subjects as he thinks proper. Thus the India Companies of England and Holland, who enjoy a territorial superiority with respect to their possessions out of Europe, have also obtained from their sovereigns the right of making war. Their troops and vessels ought therefore to be treated as lawful enemies.

2. National wars are *offensive* or *defensive*. War is offensive on the part of the sovereign who commits the first act of violence against another, whether in entering his territory with an armed force, attacking him on the high seas, or in the territory of a third power. It is defensive on the part of him who receives the first act of violence. But it must be observed, that if a sovereign sees himself menaced with an attack, he may take up arms in order to ward off the blow, and may even commence the exercise of those violences that his enemy is preparing to exercise against him, without being chargeable with having begun an offensive war. Such measures in such a case are no more than the means of simple defence.

3. Nothing short of the violation of a perfect right, either committed, committing, or with which a nation is threatened in future, can justify the undertaking of a war. On the other hand, every such violation, when proved, and when amicable means have been tried in vain, or when it is evident that it would be useless to try such means, justifies the injured party in resorting to arms.

It is impossible that the sentiments of the belligerent parties should not be in direct opposition with regard to the justice or injustice of the war; yet, if it be not manifestly unjust, their own welfare induces them to consider it as lawful, as far as respects the treatment of the enemy, and the validity of conventions and treaties of peace.

4. The universal law of nations acknowledges no general obligation of making a declaration of war to the enemy, previous to a commencement of hostilities. Many ancient nations looked on such a declaration as essential, and it was practised in Europe till the seventeenth century; but now-a-days nations content themselves with publishing a declaration of war through their own dominions, and explaining their motives to other powers in writing. The publishing of war in this manner is looked upon as so essential, that nations have often demanded a restitution of every thing taken from them by the enemy before such publication. Sometimes, however, nations over-rule such demands, by insisting that the war has been tacitly declared.

5. From the moment a sovereign is in a state of war, he has a right, strictly speaking, to act as an enemy, not only with respect to the persons and property found in the territory of the enemy, but also with respect to his enemy's subjects and their property, which may happen to be situated in his own territory at the breaking out of the war. He has a right, then, to seize on their ships found in his ports, and on all their other property, to arrest their persons, and to declare null and void all the debts which the state may have contracted with them.

Nations, however, for their mutual benefit, have been induced to temper the rigour of this right. *First*, In many instances nations have stipulated, in case of a rupture between them, to give each others subjects residing in their territory at the breaking out of a war, or coming to it not knowing of the declaration of war, a specified time for the removal of themselves and their property. *Second*. Sometimes it is agreed to let the subjects of an enemy remain during the whole course of the war, or so long as they live peaceably and quietly. *Third*, Besides these precautions taken between nation and nation, many states have provided, by particular laws and privileges, for the protection of the persons and property of an enemy's subjects. *Fourth*, Generally a nation does not venture to touch the capital which the subjects of the enemy may have in its funds, or which it may otherwise owe to such subjects.

Where there are neither treaties nor laws touching these points, nations continue still to seize on all the property belonging to its enemy's subjects which is carried into its territories after the declaration of war. Sometimes, too, we see a state make seizures provisionally, till assurance is received that the state which has done the injury is ready to make reparation, or fulfil its obligations.

Whatever be the conduct observed towards the subjects of an enemy, his ambassadors or other public ministers are always obliged to quit the state as soon as a war breaks out; but they are allowed to depart, and to remove their property, without the least molestation. The Turks are the only nation who violate this law.

CHAP. III.—*Of the Manner of Making War.*

1. The law of nations permits the use of all the means necessary to obtain the satisfaction sought by a lawful war. Circumstances alone, then, must determine on the means proper to be employed; and therefore war gives a nation an *unlimited* right of exercising violence against its enemy. But the civilized powers of Europe, animated by a desire of diminishing the horrors of war, now acknowledge certain violences, which are as destructive to both parties, as contrary to sound policy, as unlawful, though not entirely forbidden by the rigour of the law of nations. Hence those customs which are at present called *the laws of war*.

These laws, which are sanctified by custom, and in some cases even by treaty, have been observed with greater punctuality since war has been carried on by means of regular troops: nor does any civilized nation now think itself justifiable in departing from them, unless the enemy set the example; or unless an urgent necessity, arising from extraordinary circumstances, admit of exceptions authorised by *reasons of war*.

2. According to modern usage, every individual in a state is not allowed to fall upon the enemy, even after war has been declared against him. Soldiers, by the order of their commanders, and such other subjects as may obtain express permission for the purpose from their sovereign, may lawfully exercise hostilities, and are looked upon by the enemy as lawful enemies; but those, on the contrary, who, not being so authorised take upon them to attack the enemy, are treated by him as banditti; and even the state to which they belong ought to punish them as such.

If subjects confine themselves to simple *defence*, it would appear that circumstances ought to determine whether, acting by the presumed order of their sovereign, they ought to be treated as lawful enemies or not. They are, however, generally treated with more rigour than those who act by express authority.

3. Among the arms and other means of doing injury to an enemy, there are several, which custom has declared to be unlawful. Such are, among secret means. poison, assassination, &c. but not different sorts of stratagems. Among open means, certain arms, the use of which is too cruel, and which the subject of the war does not render absolutely necessary.

4. From the moment we are at war, all those who belong to the hostile state become our enemies, and we have a right to act against them as such; but our right to wound or kill being founded on self-defence, or on the resistance opposed to us, we can with justice wound or

take the life of none, except those who take an active part in the war. So that, *first*, Children, old men, women, and in general all those who cannot carry arms, are safe under the protection of the law of nations, unless they have exercised violence against the enemy. *Second*, Retainers to the army, whose profession is not to kill, or directly injure the enemy, such as chaplains, surgeons, &c. ought not to be killed or wounded deliberately. *Third*, Soldiers, on the contrary, being looked upon as ever ready for defence or attack, may at any time be wounded or killed; unless when it is manifest that they have not the will or have lost the power to resist. When that is the case,—when wounded, surrounded, or when they lay down their arms and ask for quarter; in short, from the moment they are reduced to a state in which it is impossible for them to exercise further violence against the conqueror, he is obliged by the laws of war to spare their lives; except, however, *first*, When sparing their lives would be inconsistent with his own safety; *second* In cases where he has a right to exercise the *talio*, or to make reprisals; *third*, When the crime committed by those who fall into his hands justifies the taking of their lives.

It is always justifiable to make the vanquished soldiers prisoners of war, and even those who are not of the military profession.

5. When the conqueror receives the conquered as prisoners of war, all violence between them is understood to have ceased. The ancient custom of making slaves of the conquered is no longer practised by the powers of Europe, except by way of retaliation towards Barbarians. Christian powers generally keep prisoners of war under a guard till they are ransomed, or exchanged by cartel, or till the re-establishment of peace. Officers are often released on their parole of honour, by which they promise not to serve against the power who releases them, for a certain time, or during the war; and to appear at an appointed place as often as they shall be duly summoned. Those who, regardless of their parole, take up arms while the convention is observed on the other side, are looked upon as infamous; and if they again fall into the hands of the enemy, to whom they have given their parole, he is not by the laws of war obliged to give them quarter.

6. The conqueror has, strictly speaking, a right to make prisoners of war of all the subjects of the hostile state who may fall into his power, though they may have committed no violence against him; and of course he has a right to remove them to another country. But in modern usage, the conqueror generally carries his rights in this respect no further than to submit such subjects to his domination, to make them swear fealty to him, to exercise certain rights of sovereignty over them, such as raising and quartering troops among them, making them pay taxes, obey his laws, &c. and punishing as rebels those who attempt to betray him or shake off his yoke.

The intention with which a country or province is taken possession of, generally determines the conqueror in the alterations he makes in the form of government, if he makes any at all. It is clear that the conqueror is not obliged to preserve the constitution of a conquered country or province, nor to leave the subjects in possession of the rights and privileges granted them by their former sovereign, unless he has made them a promise to that effect previously to their submission.

7. The conqueror has a right to seize on all the property of the enemy that comes within his power: it matters not whether it be immoveable or moveable These seizures may be made, *first*, In order to obtain what he demands as his due, or an equivalent; *second*. To defray the expenses of the war; *third*, To force the enemy to an equitable peace; *fourth*, To deter him, or, by reducing his strength, hinder him from repeating in future the injuries which have been the cause of the war. And with this last object in view, a power at war has a right to destroy the property and possessions of the enemy, for the express purpose of doing him mischief.

The modern laws of war, however, do not permit the destruction of any thing, except, *first*, Such things as the enemy cannot be deprived of by any other means than those of destruction, and which it is at the same time necessary to deprive him of; *second*, Such things as after being taken cannot be kept, and which might if not destroyed strengthen the enemy; *third*, Such things as cannot be preserved without injury to the military operations, to which we may add, *fourth*, Whatever is destroyed by way of retaliation.

8. It is in battles that the laws of war ought to be adhered to with the most scrupulous exactness, as well with regard to the arms made use of, as to the treatment of the vanquished.

The victor, he who remains master of the field of battle, ought to take care of the wounded and bury the dead. It is against every principle of the laws of war to refuse or neglect to do either.

It is, however, sometimes a question, who is master of the field? and in such a case a truce is agreed on for some days, during which period both sides bring in their own wounded and bury their own dead.

9 The taking of a fortress or fortified town is effected by surprise, by a blockade, or by a siege. In the two last cases, the place surrenders by capitulation, or is taken by assault, after being summoned in vain.

All the means necessary to the reduction of a fortress are justified by the laws of war; consequently there are cases which may authorize the demolition or burning of the suburbs. But, except in cases of necessity, it is now admitted that the besiegers ought to direct their artillery against the fortifications only, and not intentionally against the public edifices, or any other buildings, either within or without the ramparts

10. If a fortress or fortified town surrenders by capitulation, on that capitulation depends the fate of the garrison, arms, warlike stores, and of the inhabitants and their property.

The terms of a capitulation depend entirely on circumstances; they are usually more or less honourable, as the situation of the besieged is more or less favourable; but if the place, after being duly summoned, refuses to surrender and is taken by assault, those found in it are obliged to submit to the discretion of the victor. All that the garrison can expect is to have their lives spared if they immediately lay down their arms. It is however customary for the victor to forbid pillage on such occasions.

CHAP. IV.—*Of Conventions entered into with the Enemy during the war.*

1. The belligerent powers often enter into conventions, either at the begining or in the course of the war. By these conventions they promise not to make use of such or such arms, or such or such means of injuring each other; settle the conditions and the manner to be observed in the exchange or redemption of prisoners of war; make arrangements relative to passports, safe conducts, &c. adjust the terms of a truce, &c.

2. As a security for the fulfilment of conventions made in the course of the war, it is still customary to place hostages in the hands of the party who would suffer by a non-fulfilment. If the other party breaks his engage-

ments, it is allowable to treat his hostages with severity, but not to take their lives, unless for some crime that they have committed, or by way of retaliation.

CHAP. V.—*Of Allies, Subsidies, and Auxiliaries.*

1. A sovereign may be obliged to join his forces to those of another power, sometimes in fulfilment of his treaties of alliance, and sometimes in consequence of a particular connection existing between him and such power; or he may do it from his own choice. In none of these cases does he act against the law of nations, if the cause he espouses be not unjust. To a sovereign so situated there result two sorts of rights and obligations; *first*, Relative to the power whom he assists; *second*, Relative to the enemies of that power.

2. Alliances are simply defensive, or they are offensive at the same time. An alliance is simply defensive, when the allies promise to assist each other in case either should be attacked first, or be in danger of an attack by some other power; it is offensive and defensive, when they promise to assist each other, not only in case of a first attack, but even should either of them make the first attack on some other power.

Both sorts of alliances are either general or particular. They are general when they extend to all wars in which either of the allies may be engaged; and particular when directed against a particular power, or confined to a particular war.

Alliances are formed sometimes before, and sometimes after, the beginning of a war. As to their duration, it is sometimes for a definite, and sometimes for an indefinite space of time, and sometimes for ever. The allies either promise a specific number of troops, or vessels, or of both; or they promise a certain aid in money; or to assist each other with all their forces; or finally to make common cause.

3. Simple treaties of subsidy must be distinguished from alliances. A treaty of subsidy is a convention by which one power engages, in consideration of a certain sum of money, to bring into the field a specific number of troops, &c. to be in the pay and service of another power. The time for which such troops are to remain in service is sometimes determinate, and sometimes not.

A power often receives a subsidy in consideration of engaging to keep a certain number of troops, &c. in readiness of service, and sometimes of engaging only to augment its own forces.

4. Strictly speaking, a belligerent power has a right to treat as his enemies all the powers who lend assistance to the enemy, from whatever motive, or in consequence of whatever treaty. Policy, however, has induced the powers of Europe to depart from this rigorous principle. They now admit, *first*, That a sovereign who furnishes troops, in virtue of a treaty of subsidy, does not thereby become the enemy of the power against which those troops act: *second*, That as long as a sovereign sends to the assistance of his ally no more than the number of troops, &c. stipulated in the treaty of alliance, and does not authorize them to serve upon any other footing than that specified in the treaty, such sovereign ought to be looked upon as an auxiliary, and not as the enemy of the power against which his troops make war; and, of course, that such sovereign ought to be permitted to enjoy his rights of neutrality. This is more especially the case, when the aid of an auxiliary is the consequence of a treaty of *general defensive alliance, concluded before the beginning of the war.*

We have seen some powers claiming the rights of neutrality even while they were furnishing the greatest part of their troops, and contributing principally to the resisting of the enemy and the continuation of the war; but imperious circumstances and motives of policy only can induce the enemy to treat such powers as neuter.

When two powers become allies in form, by carrying on the war in common, and with all their forces, without doubt they may and ought to be treated as enemies by the adverse party.

CHAP. VI.—*Of Neutrality.*

1. To observe a *perfect* neutrality a state must, *first*, Abstain from all participation in warlike expeditions. *Second*, It must grant or refuse nothing to one of the belligerent powers, which may be useful or necessary to such power in prosecuting the war, without granting or refusing it to the adverse party; or, at least, it must not establish an inequality, in order to favour one of the parties more than the other.

The moment a neutral power deviates from these rules, its neutrality is no longer perfect, but *limited*: and, indeed, though neutral states sometimes promise more, and enter into a sort of *conventional* neutrality, a limited neutrality is all that the laws of neutrality impose.

2. It is now generally acknowledged that a neutral power ought not to transport to either of the belligerent powers merchandises unequivocally intended for warlike purposes. The list of these merchandises, commonly called *contraband*, has been differently composed in different treaties of commerce. Sometimes this list has been swelled out with merchandises which are not evidently and unequivocally intended for the purposes of war, though they may be useful to the enemy; and at other times such merchandises have been expressly declared not contraband. This last ought to be presumed also between powers that have no treaty with each other.

Besides this, the maritime powers have begun, especially since the latter end of the 17th century, to issue declarations at the beginning of a war, advertising neutral powers that they shall look upon such and such merchandises as contraband, and forewarning them of the penalties they intend to inflict on those who shall be found conveying them to the enemy. These declarations are rather advertisements than laws; nor can their effects be by any means extended to those neutral powers with which the powers that issue them have treaties of commerce in which the matter is settled.

3. When a prize has been made, the captor cannot appropriate it to his own use till it has been condemned as a lawful prize, in a court of admiralty.

The customary, as well as conventional law, authorizes every sovereign in Europe to institute courts of admiralty and other superior tribunals, vested with full power to determine on the legality or illegality of all prizes made by his subjects.

In trials of this kind the original proprietors of the prize, or those who claim in their stead, are required to prove that the prize is not a lawful one. In other respects, it is not the laws of the country where the court is held, but existing treaties and the universal law of nations, that ought to be the basis on which all decisions of this sort should be founded.

4. During the latter wars of the late century, the neutral powers complained that the belligerent powers, and Great Britain in particular, had encroached on their rights of neutrality, either in swelling out beyond just bounds the list of contraband merchandises, or in giving the notion of a blockaded place a too extensive construction; or in vexatious

examinations of their vessels, and particularly in deviating from the principle established by the customs and treaties of the seventeenth century, according to which (as was alleged) neutral vessels save neutral goods. In consequence of these imputed encroachments, the Empress of Russia drew up in 1780, at which time she was among the neutral powers, certain principles relative to neutral commerce, which she communicated to the belligerent powers, accompanied with a declaration that she would maintain them by force of arms. Hence the system of *armed neutrality*.

5. The principles of the system of armed neutrality are, *first*, That neutral powers have a right to enjoy a free trade with the ports and roads of the belligerent powers; *second*, That neutral vessels make neutral goods, that is, that enemy's goods found in neutral vessels ought not to be confiscated; *third*, That no merchandises shall be reputed contraband which have not been declared so in treaties made with the belligerent powers, or one of them; *fourth*, That a place shall not be looked upon as blockaded, except when surrounded by the enemy's vessels in such a manner as to render all entrance manifestly dangerous; and, *fifth*, That these principles shall serve as the basis of all decisions touching the legality of prizes.

6. Almost all the powers that remained neutral at the time when this system was formed successively acceded to it; and, among the belligerent powers, France and Spain did not oppose it. Great Britain has never acknowledged it.

If this system was adopted in 1780 for the then present war only, the declarations of the parties sufficiently prove their intention to have been that it should serve as a basis for a like system in future wars; and experience has fully confirmed the conjecture.*

Chap. VII. *Of Making Peace.*

1. The enemy ought, strictly speaking, to put an end to the war as soon as he has obtained or can obtain the satisfaction demanded, a compensation for the expenses of the war, and security for the future. But it is policy that usually determines the duration of a war. Sometimes the demanded satisfaction is never obtained, and sometimes the war is carried on for vengeance or conquest's sake, after satisfaction is or may be obtained.

The first overtures for peace are sometimes made by one of the belligerent powers, and sometimes by a neutral power, their common friend. The negociations also are sometimes opened by the belligerent powers themselves, and sometimes by a neutral power that interposes its good offices, or becomes mediator. These negotiations are carried on at the court of one of the belligerent powers, at that of a mediator, or at any other place named by the parties as the place of assembly for the congress.

2. When the negotiators have come to an agreement on the points which are to serve as the basis of a treaty of peace, and certain difficulties remain to be done away which are not of importance enough to induce the parties to continue or renew the war, preliminary treaties are generally agreed upon. These treaties differ as to their form; sometimes they are mere minutes, and sometimes they have all the clauses usually found in formal treaties. In general, when signed and ratified, they are obligatory, even before the definitive treaty is concluded, and remain so if the definitive treaty should not be concluded, unless stipulated otherwise.

When the preliminary treaty is concluded, the parties continue to negotiate on the points that remain unsettled, in order to the conclusion and ratification of the definitive treaty.

3. In a treaty of peace, we may distinguish the general articles, which bear a strong resemblance to each other in all treaties of peace, from the particular articles, which, being proper to the treaties in which they are inserted, are not susceptible of comparison.

After the introduction usually follow the general articles, respecting the re-establishment of peace and friendship, the cessation of hostilities and contributions, the exchange or release of prisoners of war, and the general amnesty.

Then follow the principal particular articles, which, after having specified and renewed the treaties that are to serve as the basis of the peace, treat of the matters which occasioned the war, and particularly of what concerns possession, whether there are concessions or compensations to be made, or whether the principle of the *uti possidetis* has been adopted.

The treaty concludes with specifying the time when, and sometimes the place where, the ratifications are to be exchanged.

4. Sometimes foreign powers are called in as guarantees of a treaty. A guarantee may extend to the treaty in general, or be confined to some particular article or articles of it; in the former case it is called general, in the latter particular. It may also be for one of the contracting parties only, or for all of them.

In general a guarantee engages to maintain the treaty, by promising to lend assistance to the party who shall complain of an infraction of it, and who shall demand such assistance.

A guarantee has no right to oppose the alterations that the contracting parties may afterwards make in the treaty by mutual consent; but neither is he obliged to guarantee the treaty when so altered.

5. The treaty of peace being signed and ratified, it only remains to publish and put it in execution. The former is generally done with solemnity; the latter often meets with a great deal of difficulty, particularly when an invaded territory is to be evacuated, or provinces, &c. are to be ceded to a power that is not in possession of them at the time of making the treaty of peace. These difficulties sometimes occasion particular conventions, and even *congresses of execution*; and it is fortunate if by such means the embers of war are entirely extinguished.

Such of our readers as may wish to extend their inquiries on this subject, may consult the following works:

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* On the long and warmly disputed subject of *neutral rights*, see, 1*st*, A Collection of public acts and papers relating to the principles of Armed Neutrality. London, 1801. 2*d*, Lord Liverpool's Treatise on the conduct of Great Britain with respect to Neutral Nations. London, 1801. 3*d*, A Treatise of the relative rights and duties of Belligerent and Neutral Powers in Maritime Affairs, by Robert Ward, Esq.; and a Treatise on Contraband, by the same Author. London, 1801 4*th*, A Treatise upon the Visitation of Neutral Vessels under Convoy, &c &c. by J. F. W. Schlegel, Doctor and Professor of Law in the University of Copenhagen. London, 1801. 5*th*, Report of the Judgment on the Swedish Convoy pronounced by Sir William Scott, London, 1799. 6*th*, Remarks upon Mr. Schlegel's Work upon the Visitation of Neutral Vessels under Convoy, by Alexander Croke, Esq. L. L. D. London, 1801. 7*th*, Substance of the Speech of the Right Hon. Lord Grenville in the House of Lords, November 13, 1801, on the Motion for an Address approving of the Convention with Russia; with an Appendix, containing a Comparative View of the Treaty of Armed Neutrality, the Northern Confederacy of 1800, and the Convention with Russia. London, 1802. 8*th*, Letters of Sulpicius on the Northern Confederacy; with an Appendix, containing the Treaty of Armed Neutrality, together with other Documents relative to the subject. London, 1801. 9*th*, A Vindication of the Convention concluded between Great Britain and Russia. London, 1801.

Cumberland's *Treatise on the Law of Nature*, Latin, translated by the Rev. J. Towers, with Notes, 4to. 1750.

Grotius *De Jure Belli ac Pacis*. There is a translation in folio, 1738, with all the valuable notes of Barbeyrac.

Heineccius, *System of the Law of Nature and Nations*, translated from the Latin, with notes by Dr. Turnbull, 2 vols. 8vo. 1763.

Puffendorff's *Law of Nature and Nations*, translated from the Latin by Carew, with Barbeyrac's Notes, folio, 1749.

Burlamaqui's *Principles of Natural and Political Law*, in French, translated by Nugent, 2 vols. 8vo. 1763.

Montesquieu's *Spirit of Laws*.

Mably's *Droit Publique de l'Europe*.

Wicquefort's *Ambassadeur et ses Fonctions*.

Vattel's *Droit des Gens*, translated, with Notes, 1757. 8vo.

PART III. OF THE LAW OF ENGLAND.

Following the method of Justinian's body of the Roman Law, modern writers of digests or institutes of the codes of their respective countries have commonly arranged their subject under the three great titles of *Rights of Persons*, *Rights of Things*, and *Actions*, or the several sorts of legal process. This division is either not logical in itself, or is expressed with great inaccuracy. *All* law relates to rights of *persons* only. *Things* have no rights; and to them, therefore, as possessing rights, law can have no relation. *Actions*, also, or the different kinds of legal process, are nothing else than a particular class of *rights*, of which the several members of the community may avail themselves as much as of their rights of any other description. But if, on the other hand, Justinian, and the writers who have followed him, mean only by rights of persons, rights of things, and actions, three great classes of rights comprehending the whole subject of law, there seems no good objection to the arrangement, although the expressions they have used are sufficiently inaccurate, and liable to misapprehension.

Certain rights arise from the *status*, condition, or rank of men in society, as the *ecclesiastical* and *military* states,—from their more usual and intimate relation to one another, as *governors and governed*, *husband and wife*, &c.—and from kindred or affinity, as *parent and child*. From this *status*, relation and affinity, proceed what may be called, in a more limited and peculiar sense, the *rights of persons*.

Another class of rights is more immediately connected with *property*; and this being divisible into two great species, *real* and *personal* property, hence a correspondent distribution of this class of rights into the two subordinate divisions of real and personal. This class of rights may be denominated *rights arising from property*.

A *third* class of rights may be arranged under the title of *actions*, being the several modes of judicial process to which every member of the state has right, as the means by which he may claim or defend all or any of his other rights.

We shall accordingly, in the following abstract, observe this threefold distribution of rights. But as it may sometimes serve to place the rights both *of persons*, strictly so denominated, and those arising *from things*, in a stronger point of view, we shall occasionally regard them in a *negative* or *violated* state, or, as it is more usually expressed, under the aspect of *private wrongs*. The several modes by which these rights are acquired and transmitted will also fall to be considered. And under *Actions*, besides what is more proper to the subject, we shall introduce some notice of the different sorts of courts, their jurisdiction, &c.

A *fourth* division of our subject will relate to *Crimes*; which may be regarded as the rights conferred by nature, or derived from law, *in a state of such gross violation as occasions alarm, by occasioning insecurity*, to every member of the community. And hence this branch of the subject has by writers on the law of England usually been denominated *public wrongs*.—We shall premise a brief Introduction on the sources and component parts of the laws of England.

Introduction.

1. The municipal law of England, or the rule of civil conduct prescribed to the inhabitants of that kingdom, may with sufficient propriety be divided into two kinds; the *lex non scripta*, the unwritten or common law; and the *lex scripta*, the written or statute law.

2. The *lex non scripta*, or unwritten law, includes not only general customs, or the common law properly so called, but also the particular customs of certain parts of the kingdom; and likewise those particular laws that are by custom observed only in certain courts and jurisdictions.

When we call these parts of the law *leges non scriptæ*, we would not be understood as if all those laws were at present merely oral, or communicated from former ages to the present solely by word of mouth, but because their original institution and authority are not set down in writing as acts of parliament are, but receive their binding power, and the force of laws, by long and immemorial usage, and by their universal reception throughout the kingdom.

3. This unwritten, or common law, is properly distinguishable into three kinds. *First*, General customs, which are the universal rule of the whole kingdom of England, and form the common law in its stricter and more usual signification. *Second*, Particular customs, which for the most part affect only the inhabitants of particular districts. *Third*, Certain particular laws, which by custom are adopted and used by some particular courts of pretty general and extensive jurisdiction.

4. *First*, As to general customs, or the common law properly so called, this is that law by which proceedings and determinations in the king's ordinary courts of justice are guided and directed. This for the most part settles the course in which lands descend by inheritance; the manner and form of acquiring and transferring property; the solemnities and obligation of contracts; the rules of expounding wills, deeds, and acts of parliament; the respective remedies of civil injuries; the several species of temporal offences, with the manner and degree of punishment; and an infinite number of minuter particulars, which diffuse themselves as extensively as the ordinary distribution of common justice requires. Thus, for example, that there shall be four superior courts of record, the Chancery, the King's Bench, the Common Pleas, and the Exchequer; that the eldest son alone is heir to his ancestor; that property may be acquired and transferred by writing; that a deed is of no validity unless sealed and delivered; that wills shall be construed more favourably, and deeds more strictly; that money lent upon bond is recoverable by action of debt; that breaking the public peace is an offence, and punishable by fine and imprisonment.

All these are doctrines that are not set down in any written statute or ordinance, but depend merely upon immemorial usage, that is, upon common law, for their support.

5. *Second*, The second branch of the unwritten laws of England are particular customs or laws which affect only the inhabitants of particular districts.

These particular customs, or some of them, are without doubt the remains of that multitude of local customs before mentioned, out of which the common law, as it now stands, was collected, at first by King Alfred, and afterwards by King Edgar, and Edward the Confessor: each district mutually sacrificing some of its own special usages, in order that the whole kingdom might enjoy the benefit of one uniform and universal system of laws. But for reasons that have been now long forgotten, particular counties, cities, towns, manors, and lordships, were very early indulged with the privilege of abiding by their own customs, in contradistinction to the rest of the nation at large; which privilege is confirmed to them by several acts of parliament.

6. Such is the custom of gavel-kind in Kent, and some other parts of the kingdom, (though perhaps it was also general till the Norman conquest,) which ordains, among other things, that not the eldest son only of the father shall succeed to his inheritance, but all the sons alike; and that though the ancestor be attainted and hanged, yet the heir shall succeed to his estate, without any escheat to the lord. Such is the custom that prevails in divers ancient boroughs, and therefore called borough-English, that the youngest son shall inherit the estate in preference to all his elder brothers. Such is the custom in other boroughs, that a widow shall be entitled for her dower to all her husband's lands; whereas, at the common law, she shall be endowed of one-third part only. Such also are the special and particular customs of manors, of which every one has more or less, and which bind all the copyhold and customary tenants that hold of the said manors. Such likewise is the custom of holding divers inferior courts, with power of trying causes in cities and trading towns; the right of holding which, when no royal grant can be shewn, depends entirely upon immemorial and established usage. Such, lastly, are many particular customs within the city of London, with regard to trade, apprentices, widows, orphans, and a variety of other matters. All these are contrary to the general law of the land, and are good only by special usage, though the customs of London are also confirmed by act of parliament.

7. To this head may most properly be referred a particular system of customs used only among one set of the king's subjects, called the custom of merchants, or *lex mercatoria;* which, however different from the general rules of the common law, is yet ingrafted into it, and made a part of it, being allowed, for the benefit of trade, to be of the utmost validity in all commercial transactions; for it is a maxim of law, that "*cuilibet in sua arte credendum est.*"

8. *Third*, The third branch of the *leges non scriptæ*, or unwritten law, are those peculiar laws, which by custom are adopted and used only in certain courts and jurisdictions. And by these we understand the civil and canon laws. See *Civil* and *Canon* law.

9. Let us next proceed to the *leges scriptæ*, the written laws of the kingdom; which are statutes, acts, or edicts, made by the king's majesty, by and with the advice and consent of the lords spiritual and temporal and commons, in parliament assembled. The oldest of these now extant, and printed in our statute books, is the famous *magna charta*, as confirmed in parliament, 9 Henry III. though doubtless there were many acts before that time, the records of which are now lost, and the determinations of them perhaps at present currently received for the maxims of the common law.

10. Statutes are either *general* or *special*, *public* or *private*. A general or public act is an universal rule that regards the whole community; and of this the courts of law are bound to take notice judicially and *ex officio*, without the statute being particularly pleaded, or formally set forth by the party who claims an advantage under it. Special or private acts are rather exceptions than rules, being those which only operate upon particular persons, and private concerns: such as the Romans entitled *senatus-decreta*, in contradistinction to the *senatus-consulta*, which regarded the whole community; and of these (which are not promulgated with the same notoriety as the former) the judges are not bound to take notice, unless they be formally shewn and pleaded.

11. Statutes also are either *declaratory* of the common law, or *remedial* of some defects in it. Declaratory, where the old custom of the kingdom is almost fallen into disuse, or become disreputable; remedial, when made to supply such defects, and abridge such superfluities in the common law, as arise either from the general imperfection of all human laws, from change of time and circumstances, from the mistakes and unadvised determinations of unlearned (or even learned) judges, or from any other cause whatsoever. And this being done either by enlarging the common law where it was too narrow and circumscribed, or by restraining it where it was too lax and luxuriant, has occasioned another subordinate division of remedial acts of parliament into *enlarging* and *restraining* statutes.

12. These are the several grounds of the laws of England; over and above which, *equity* is also frequently called in to assist, to moderate, and to explain them. What equity is, and how impossible in its very essence to be reduced to stated rules, we shall not here inquire. We shall only observe, that (besides the liberality of sentiment with which the common law judges interpret acts of parliament, and such rules of the unwritten law as are not of a positive kind,) there are also peculiar courts of equity established for the benefit of the subject; to detect latent frauds and concealments, which the process of the courts of law is not adapted to reach; to enforce the execution of such matters of trust and confidence as are binding in conscience, though not cognizable in a court of law; to deliver from such dangers as are owing to misfortune or oversight; and to give a more specific relief, and more adapted to the circumstances of the case, than can always be obtained by the generality of the rules of the positive or common law. This is the business of our courts of equity, which, however, are only conversant in matters of property. For the freedom of our constitution will not permit, that in criminal cases a power should be lodged in any judge to construe the law otherwise than according to the letter. This caution, while it admirably protects the public liberty, can never bear hard upon individuals. A man cannot suffer *more* punishment than the law assigns, but he may suffer *less*. The laws cannot be strained by partiality, to inflict a penalty beyond what the letter will warrant; but in cases where the letter induces any apparent hardship, the crown has the power to pardon.

BOOK I.

Of the Rights of Persons.

Chap. I.—*Of Parliament ; and of Magistrates, supreme and subordinate.*

1. The most universal public relation by which men are connected together is that of government ; namely, as govenors and governed ; or, in other words, as magistrates and people.

2. Parliament is the legislative branch of the supreme power of Great Britain and Ireland, consisting of the king ; the lords spiritual and temporal ; and the knights, citizens, and burgesses, representatives of the commons of the realm in parliament assembled. The consent of these three states is required, to make any new law that can bind the subject.

3. The power of parliament is so transcendent and absolute, that it cannot be confined, either for causes or persons, within any bounds. It has sovereign and uncontroulable authority in making, confirming, enlarging, restraining, abrogating, repealing, reviving, and expounding of laws, concerning matters of all possible denominations, ecclesiastical or temporal, civil, military, maritime, or criminal. It is, without doubt, a court of record over which none other can have jurisdiction.

4. Every member must be above twenty-one years of age ; and before he is permitted to take his seat, must take the oath of allegiance, supremacy, and abjuration. A member has privilege of speech while in the house ; and proceedings in parliament cannot be impeached or questioned in any court or place out of parliament. Every member is privileged from arrest forty days after prorogation, and forty days before the next assembling. The person of a peer is always sacred ; but neither peer nor commoner has privilege against an indictable offence. A member who is a trader, may be served with legal process for any just debt to the amount of 100*l.* ; and unless he makes satisfaction within two months, it shall be deemed an act of bankruptcy, and thereupon a commission may issue.

5. The *peculiar* privileges of the *lords* (who sit in a separate house by themselves) are, to be attended by the sages of the law in matters of appeal, &c. ; to make proxies ; to enter protests ; and to regulate the election of the sixteen peers of North Britain. But their most distinguishing privilege is that of exercising the judicial authority as a court of appeal of the last and highest resort.

6. The *peculiar* privileges of the *commons* (who sit by themselves in another house,) relate principally to the raising of taxes, and the elections of their members.

7. With regard to the first, it is the ancient indisputable privilege and right of the House of Commons, that all grants of subsidies or parliamentary aids do begin in their house, and are first bestowed by them ; although these grants, to be effectual, require the assent of the other two branches of the legislature.

8. With regard to the election of members, three things may be considered. 1. The qualifications of the electors. 2. The qualifications of the elected. 3 The proceedings at elections.

9. As to the qualifications of the electors. And, first, those of electors of knights of the shire. 1. By statute 8 Hen. VI. c. 7, and 10 Hen. VI. c. 2, (amended by 14 Geo. III. c. 58,) the knights of the shire shall be chosen by people, whereof every man shall have freehold to the value of forty shillings by the year within the county ; which (by subsequent statutes) is to be clear of all charges and deductions, except parliamentary and parochial taxes. The knights of shires are the representatives of the landholders, or landed interest of the kingdom. Their electors must therefore have estates in lands or tenements within the county represented. These estates must be freehold, that is, for term of life at least. 2. No person under twenty-one years of age shall be capable of voting for any member. This extends to all sorts of members, as well for boroughs as counties ; as does also the next, viz. 3. No person convicted of perjury, or subornation of perjury, shall be capable of voting in any election. 4. No person shall vote in right of any freehold granted to him fraudulently, to qualify him to vote. Fraudulent grants are such as contain an agreement to recover, or to defeat the estate granted ; which agreements are made void, and the estate is absolutely vested in the person to whom it is so granted. And to guard the better against such frauds, it is farther provided, 5. That every voter shall have been in the actual possession, or receipt of the profits, of his freehold to his own use for twelve calendar months before ; except it came to him by descent, marriage, marriage-settlement, will, or promotion to a benefice or office. 6. That no person shall vote in respect of an annuity or rent-charge, unless registered with the clerk of the peace twelve calendar months before. 7. That in mortgaged or trust estates, the person in possession, under the above mentioned restrictions, shall have the vote. 8. That only one person shall be admitted to vote for any one house or tenement, to prevent the splitting of freeholds. 9. That no estate shall qualify a voter, unless the estate has been assessed to some land-tax laid at least twelve months before the election. 10. That no tenant by copy of court roll shall be permitted to vote as a freeholder. Thus much for the electors in counties.

10. As for the electors of citizens and burgesses, who are supposed to be the mercantile part or trading interest of the kingdom, the right of elections in boroughs is various, depending entirely on the several charters, customs, and constitutions of the respective places, which has occasioned infinite disputes ; though now, by statute 2 Geo. II. c. 24, the right of voting, for the future, shall be allowed according to the last determination of the House of Commons concerning it.

11. Next as to the qualifications of persons to be *elected* members of the House of Commons. Some of these depend upon the law and custom of parliament, declared by the House of Commons ; others upon certain statutes. And from these it appears, 1. That they must not be aliens born, or minors. 2. That they must not be any of the twelve judges, because they sit in the lords' house ; nor of the clergy, for they sit in the convocation ; nor persons attainted of treason or felony, for they are unfit to sit any where. 3. That sheriffs of counties, and mayors and bailiffs of boroughs, are not eligible in their respective jurisdictions, as being returning officers ; but that sheriffs of one county are eligible to be knights of another. 4. That no persons concerned in the management of any duties or taxes created since 1692, except the commissioners of the Treasury, nor certain other inferior officers enumerated in the statutes, nor any persons that hold any new office under the crown created since 1705, are capable of being elected, or sitting as members. 5. That no person having a pension under the crown during pleasure, or for any term of years, is capable of being elected or sitting. 6. That if any member accepts an office under the crown, except an officer in the army or navy accepting a new commission, his seat is void; but such member is capable of being re-elected. 7. That all knights of the shire shall be actual knights, or such

notable esquires and gentlemen as have estates sufficient to be knights, and by no means of the degree of yeomen. This is reduced to a still greater certainty, by ordaining, 8. That every knight of a shire shall have a clear estate of freehold or copyhold to the value of six hundred pounds *per annum*, and every citizen and burgess to the value of three hundred pounds; except the eldest sons of peers, and of persons qualified to be knights of shires, and except the members for the two universities, which somewhat balances the ascendant which the boroughs have gained over the counties, by obliging the trading interest to make choice of landed men; and of this qualification the member must make oath, and give in the particulars in writing at the time of his taking his seat. But, subject to these standing restrictions and disqualifications, every subject of this realm is eligible of common right.

12. The third point regarding elections is the method of proceeding. This is also regulated by the law of parliament, and the several statutes; for the various minute particulars of which we must refer our readers to Blackstone's *Commentaries*, b. i. c. 2.

13. The king is the supreme magistrate of the realm. The crown of the united kingdom is descendible, making no distinction of whole or half blood, to heirs-male or female; and when it descends upon females, the right of primogeniture prevails. The course of its descent is subject to limitation by parliament; the legal successor, upon the demise of a king, is immediately invested with all the ensigns, rights, and prerogatives of sovereign power.

14. Whenever the royal prerogatives are suspended by indisposition or other causes,—"The lords spiritual and temporal, and commons assembled, lawfully, fully, and freely represent all the estates of the people;" and it is their duty to provide the means of supplying that defect, and to appoint a regency, under such limitations as may be deemed reasonable.

15. The duties incumbent upon the king are, to govern his people according to law, to execute judgment in mercy, and to maintain the established religion, (which he is bound more especially to do by the coronation oath,) according to the laws and customs of the realm. The king is assisted in his councils by his parliament, his peers, and his privy council; and being so provided with counsellors, is supposed incapable of doing wrong, but his advisers and ministers are punishable for wickedly deceiving him.

16. The prerogatives of the king are either direct or incidental. The *direct* are such positive substantial parts of the royal character and authority, as are rooted in, and spring from the king's political person. *Incidental* bear always a relation to something else distinct from the king's person; as that no costs shall be recovered against the king; that he never can be a joint tenant; that his debt shall be preferred before that of the subject; that where his title and a subject's concur, the king's title shall be preferred; an heir must pay the king's debt, though he be not named in the bond; and in all cases the king's debt shall be satisfied before that of a subject, and for which there is a prerogative writ.—He is supreme head of the realm in matters both civil and ecclesiastical. No suit or action can be brought against him, for the courts have no jurisdiction over him: so that if any person has, in point of property, a demand upon the king, he must petition him in his court of chancery. All persons born in any part of his dominions are his subjects; or in any part of the world when under his dominion. Under the direct prerogative is comprehended also the power of rejecting bills proffered to him by the lords and commons; making treaties and alliances with foreign states; coining money; conferring titles of honour; pardoning offences, with some exceptions; sending and receiving foreign ambassadors; of making war and peace; of issuing reprisals; of granting safe conducts, &c. He is considered as *generalissimo* over all the military forces in the united kingdom; has the power of raising and regulating fleets and armies; can likewise restrain his subjects from going abroad, or recal them from foreign parts.

17. The king is also the fountain of justice, and general conservator of the peace; all jurisdictions derive their authority from him; therefore he may erect courts, prosecute offenders, pardon crimes, (except impeachments by parliament,) and issue proclamations, if not contrary to the common law, statutes or customs of the realm, and no proclamations can create an offence that was not so before. He is likewise the *fountain of honour* and of *office*; whereby he is enabled to reward those who have been merritoriously serviceable to the state. He has also the power of conferring upon any one the privilege of precedence, of converting aliens into denizens, &c. He can likewise erect corporations, is the arbiter of domestic commerce, by the establishment of markets, and the regulating of weights and measures, &c.

18. The king is head, and supreme governor of the church, regulating synods, nominating bishops, and receiving appeals in all ecclesiastical causes.

19. If an usurper obtains possession of the throne, and takes the coronation oath, the people are bound to obey him; for by statute they are compelled to obey a king *de facto*, and not a king merely *de jure*.

20. A queen *regnant*, is where a female holds the crown in her own right, and such a one has the same powers, prerogatives, rights, dignities, and duties, as if a king.

The queen *consort* enjoys divers prerogatives above other women, and is considered a public person, exempt from the king; she can purchase lands, and convey them, make leases, grant copy-holds, and do other acts of ownership, without the concurrence of her lord: she has separate courts and officers, distinct from the king's; may sue and be sued alone, without joining her husband; but at her death, both her real and personal estate go to the king, if she has not previously disposed of them by will, which she can do without license from him. She is considered in all legal proceedings as a *feme sole*.—A queen *dowager* enjoys the same privileges as a queen consort; and though an alien, is entitled to dower; but she cannot marry without the king's lisence, nor is it high treason to violate her person.

21. Subordinate magistrates of the state are, 1. Sheriffs. 2. Coroners. 3. Justices of the Peace. 4. Constables, 5. Surveyors of the highways. 6. Overseers of the poor.

22. Sheriffs are the keepers of each county, annually appointed by the king; who are said to be *vita justitiæ*, to serve process, and to return juries for the trial of men's lives, liberties, lands, and goods; *vita legis*, to execute process, and make execution; and *vita rei publicæ*, to keep the peace. A man nominated sheriff should have considerable landed property, that he may be enabled to answer the king and his people if he should be guilty of neglect. To execute his various duties, the sheriff has under him many inferior officers; as under sheriffs, bailiffs, and jailers; who must neither buy, sell, nor farm their offices, on forfeiture of £500. He has the power of calling out the *posse comitatus*, to defend his county against the king's enemies, or to pursue and take felons and traitors.

23. Coroners are permanent officers of the crown in each county, elected by the freeholders, as sheriffs were formerly; whose office is to make inquiry where any one comes to a violent death: to inquire of lands and goods, and escapes of murderers, treasure trove, wrecks, deodands, &c,; and

also in particular cases to supply the office of sheriff. He is a conservator of the peace.

24. Justices of the peace are judges of record, (for none but justices of record can take a recognizance of the peace) appointed by the king's commission within certain limits, for the conservation of the peace; the principal of these is the *custos rotulorum*, or keeper of the records of the county; and two or more justices of the peace can inquire of and determine felonies and other misdemeanors. They hold their sessions four times in the year, and do other acts committed to their charge, by a number of statutes.

25. Constables are officers of hundreds and townships, sworn and appointed at the leet,—who ought to possess honesty, knowledge, and ability, to perform the office imposed upon them. They are empowered to preserve the peace, to keep watch and ward, and to apprehend offenders.

The king is the principal conservator of the peace, and can delegate power to any one to preserve it. The lord chancellor, lord treasurer, lord high steward, the justices of the King's Bench, and master of the rolls, are all conservators of the peace, and may commit the breakers thereof, or bind them in recognizances to keep it.

26. Surveyors of the highways are officers appointed annually in every parish, to remove annoyances in and direct the reparation of the public roads.

27. Overseers of the poor are substantial house-holders, appointed annually in every parish, to relieve such impotent, old, blind, and other persons, being poor and not able to work, as are settled in each parish, by birth, by parentage, by marriage, or by forty days residence, accompanied with *notice*, or with such circumstances as are held equivalent to notice.

CHAP. II. *Of the Clergy; of the Military and Maritime States; and of the Private Relations of Husband and Wife, Parent and Child, Guardian and Ward, Master and Servant.*

1. The clergy comprehends all persons in holy orders, and in ecclesiastical offices. A clergyman cannot be compelled to serve on a jury, nor to appear at a court-leet or view of frank pledge, which almost every other person is obliged to do: but if a layman is summoned on a jury, and before the trial takes orders, he shall, notwithstanding, appear and be sworn. Neither can he be chosen to any temporal office, as bailiff, reeve, constable, or the like, in regard of his own continual attendance on the sacred functions. During his attendance on divine service, he is privileged from arrests in civil suits; in cases also of felony, a clerk in orders shall have the benefit of his clergy without being branded in the hand; and may likewise have it more than once: in both which particulars he is distinguished from a layman. But as they have their privileges, so also they have their disabilities, on account of their spiritual avocations. Clergymen, we have seen, are incapable of sitting in the House of Commons; and by statute 21 Henry VIII. c. 13. they are not (in general) allowed to take any lands or tenements to farm, upon pain of 10*l.* per month, and total avoidance of the lease; nor upon like pain to keep any tan-house, or brew-house; nor shall engage in any manner of trade, nor sell any merchandise, under forfeiture of treble the value.

2. An archbishop or bishop is elected by the chapter of his cathedral church, by virtue of a license from the crown, which is always to be accompanied with a letter missive from the king, containing the name of the person whom he would have them elect: and if the dean and chapter delay their election above twelve days, the nomination shall devolve to the king, who may by letters patent appoint such person as he pleases. This election or nomination, if it be of a bishop, must be signified by the king's letters patent to the archbishop of the province, if it be of an archbishop, to the other archbishops and two bishops, or to four bishops; requiring them to confirm, invest, and consecrate the person so elected; which they are bound to perform immediately, without any application to the see of Rome. After which, the bishop elect shall sue to the king for his temporalities, shall make oath to the king and none other, and shall take restitution of his secular possessions out of the king's hands only. And if such dean and chapter do not elect in the manner by the act appointed; or if such archbishop or bishop do refuse to confirm, invest and consecrate such bishop elect, they shall incur all the penalties of a *præmunire*.

3. An archbishop is the chief of the clergy in a whole province; and has the inspection of the bishops of that province, as well as of the inferior clergy, and may deprive them on notorious cause. The archbishop has also his own diocese, wherein he exercises episcopal jurisdiction, as in his province he exercises archiepiscopal.

4. The power and authority of a bishop, besides the administration of certain holy ordinances peculiar to the sacred order, consist principally in inspecting the manners of the people and clergy, and punishing them, in order to reformation, by ecclesiastical censures. To this purpose he has several courts under him, and may visit at pleasure every part of his diocese.

5. Archbishoprics, and bishoprics, may become void by death, deprivation for any very gross and notorious crime, and also by resignation. All resignations must be made to some superior. Therefore, a bishop must resign to his metropolitan; but the archbishop can resign to none but the king himself.

6 A dean and chapter are the council of the bishop, to assist him with their advice in affairs of religion, and also in the temporal concerns of his see. The bishop is their ordinary and immediate superior; and has, generally speaking, the power of visiting them, and correcting their excesses and enormities. Deaneries and prebends may become void, like a bishopric, by death, by deprivation, or by resignation to either the king or the bishop.

7. A parson, *persona ecclesiæ*, is one that has full possession of all the rights of a parochial church. He is called parson, *persona*, because, by his person, the church, which is an invisible body, is represented; and he is in himself a body corporate, in order to protect and defend the rights of the church, (which he personates) by a perpetual succession. A parson has, during his life, the freehold in himself of the parsonage house, the glebe, the tithes, and other dues.

8. The method of becoming a parson or vicar is much the same. To both there are four requisites necessary; holy orders, presentation, institution, and induction. The method of conferring the holy orders of deacon and priest is according to the liturgy and canons.

9. One may cease to be a parson or vicar: 1. By death. 2. By cession, in taking another benefice. 3. By consecration; for, as was mentioned before, when a clerk is promoted to a bishopric, all his other preferments are void the instant that he is consecrated. 4. By resignation. 5. By deprivation.

10. A curate is the lowest degree in the church; being in the same state that a vicar was formerly, an officiating temporary minister, instead of the proper incumbent.

11. Church-wardens are the guardians or keepers of the church, and representatives of the body of the parish. They are sometimes appointed by the minister, sometimes by the parish, sometimes by both together, as custom di-

directs. Their office also is to repair the church, and make rates and levies for that purpose; but these are recoverable only in the ecclesiastical court. They are also joined with the overseers in the care and maintenance of the poor. There are a multitude of other petty parochial powers committed to their charge by divers acts of parliament.

12. The *military state* is constituted of the whole soldiery of the country. That part which is called the militia, cannot be sent out of the United Kingdom.

13. Officers, soldiers, and mariners, who have been in his Majesty's service, are enabled, at the close of the war, to use any trade or occupation they are fit for, in any town in the kingdom, notwithstanding any custom or statute to the contrary. Soldiers or mariners in actual service, may make nuncupative wills, and dispose of their personal chattels, without the usual forms that are at other times required: The military of the country are governed by martial law

14. The *maritime state* consists of all officers and seamen employed in his Majesty's navy, who are impressed or volunteer into the service; neither soldier nor mariner can be arrested for a less sum than *L.*20; and if a seaman, after the debt is discharged, the sheriff is bound to return him safe to some officer empowered to receive sailors; upon the sheriff's failing so to do, he is liable in a penalty of *L.*100.

15. The law recognises marriage simply as a civil contract; the spiritual courts take notice of all incestuous or unscriptural marriages. By this union the husband and wife become one person in law; so that, if an estate be granted to an husband and wife, and another person, the husband and wife take but one half.

16. Marriage is voidable, when solemnized without license or publication of banns in the church of the parish where the parties dwell, in the time of divine service, three several Sundays, or holy days, and if the ceremony be performed before a less number of witnesses than two, besides the minister; it is also voidable, where the parties are a boy under fourteen years of age, or a girl under twelve years of age; by a pre-contract, if accompanied with bodily knowledge; consanguinity; affinity by marriage; and some corporeal infirmities. The common law will not allow these disabilities after either of the parties is dead. When parties contract to marry, one above the age of twenty-one years, and the other under, the one of full age is bound, but the minor is not.

17. A party, marrying by license, if a minor, and not having been married *before*, must have the consent of a father, if living; if he be dead, of a guardian *lawfully appointed;* if there be no such guardian, then of the mother, if she is unmarried; if there be no mother, then of a guardian appointed by the court of chancery. The guardian, whose consent is interposed between that of the father and that of the mother, must either be a testamentary guardian appointed by the father's will, or a guardian appointed by chancery; but the marriage of an infant, without such consent, may still be good where banns are regularly published; unless a dissent is openly declared by the parent or guardian in the church or chapel at the time of publishing; in which case the banns are void.

18. No license can be granted by any archbishop, bishop, &c. to solemnize any marriage in any other church than that of the parish wherein the parties or either one of them shall have dwelt for the space of four weeks, immediately before the granting such license; but the statute does not prevent the archbishop of Canterbury from granting *special* licenses.

19. If any of the persons whose consent is necessary be *non compos mentis*, beyond sea, or refuse to consent, and the lord chancellor shall declare it to be a proper marriage, it shall be as effectual as if such person had consented.

20. The parties contracting in marriage must be both willing and able to contract themselves, and of sound memory.

21. Conditions against marrying, generally, are void in law. A bond for the procurement of a marriage, although a good bond in law, is bad in equity.

22. It is a peculiar incident of marriages, that they are governed by the laws of the country in which they are celebrated.

23. During the civil war, marriages were frequently performed by justices of the peace; and such marriages were declared valid by 12 Car. II. c. 23.

24. A natural child, during his minority, cannot legally marry without the consent of a guardian named by the court of chancery.

25. When the marriage is consummated, the law denominates the parties *baron and feme;* the consequences are shortly as follows:

26. A man may covenant with *other persons* to stand seised to her use, or make other conveyances to her use, but cannot covenant *with his wife*, to stand seised to her use.

27. If the *feme obligee* take the obligor to husband, this is a release in law. If a man promises before his marriage to leave his wife worth a certain sum of money, in case of her surviving him, it is good.

28. In trials of any sort, husband and wife are not allowed to be evidence for or against each other.

29. A husband and wife may have sureties of the peace against each other.

30. The freehold, or right of possession of all her lands of inheritance, vests in the husband immediately upon the marriage, the right of property still being preserved to her.

31. As chattels vest wholly in the husband, equity in most cases will take care of the wife's interest when called upon, and see her properly provided for.

32. If a *feme sole* takes a husband, her debt becomes that of the husband and wife; but the husband is not liable after the death of the wife, unless there be a judgment against both during coverture.

33. Where a man marries a widow, executrix to her late husband, her evidence shall not be allowed to charge her second husband with more than she can prove to have actually come to her hands. But if a man marries an administratrix to a former husband, who in her widowhood wasted the assets of the intestate, the husband is liable to the debts of the intestate during the life of the wife; and this shall be deemed a *devastavit* in him.

34. A wife cannot convey either goods, lands, or any thing whatsoever, without the consent of her husband.

35. The husband must maintain his wife with necessaries according to his degree and estate, but if she contract above his degree or quality, he does not become chargeable.

36. When a woman leaves her husband *by her own free will*, and the separation has become notorious, whoever gives her credit does it at his peril, for the husband is not answerable unless he takes her again: or if there is a separation by consent, and the wife has a separate allowance, those who trust her do it upon her own credit.

37. The wife of a man who is *civiliter mortuus*, or of one transported for felony, may sue and be sued as a *feme sole*

38. In some cases, the command of the husband, either express or implied, will privilege a wife from punishment

for the crimes she may commit, if committed in his presence, unless they be *mala in se*, as for murder and the like.

39. A man must answer for the trespasses of his wife: if a *feme covert slander* any person, the husband and the wife must be sued for it, and execution is to be awarded against him.

40. Where a wife joins in a *fine* or *recovery*, she is bound. By the custom of some cities and boroughs, a bargain of sale by the husband and wife, where the wife is examined by the mayor or other officer, binds the wife after the husband's death. So in some places, a surrender of a copyhold by husband and wife, the wife being examined by the steward, binds the wife.

41. If a feme covert levies a fine of her own inheritance without her husband, it shall bind her and her heirs, because they are *estopped* to claim any thing in the land, and cannot be admitted to say she was covert against the *record;* but the husband may enter and defeat it, either during the coverture, to restore him to the freehold held *jure uxoris*, or after her death, to restore him to his tenancy.

42. In the civil law, the husband and wife are considered as two distinct persons, and may have separate estates, contracts, debts, and injuries; and therefore, in our ecclesiastical courts, a woman may sue and be sued without her husband.

43. If *baron* and *feme* are divorced *causa adulterii*, which is a divorce *a mensa et thoro*, they continue baron and feme: it is otherwise in a divorce *a vinculo matrimonii*, which dissolves the marriage.

44. If a *man is bound to a feme sole*, and after *marries her*, and they are divorced *a vinculo matrimonii, the obligation is revived.*

45. The most usual and direct injuries to a *husband*, are, 1. Abduction, or taking away his wife. 2 Criminal conversation with her. And, 3. Beating her—to each of which is assigned its proper technical form of legal redress.

46. Children are, 1. Legitimate, or those who are born in lawful wedlock, or within a competent time after. 2. Bastards, are those born out of lawful wedlock; and also children born above nine months after the husband has had no access to his wife. In a divorce *a mensa et thora*, if the wife breeds children they are bastards, unless access be proved: in a voluntary separation, the law will suppose access, unless the contrary be shewn. If there be an apparent impossibility of procreation on the part of the husband, the issue of the wife shall be bastards.

47. In the case of a divorce in the spiritual court *a vinculo matrimonii*, all the issue born during coverture are bastards.

48. The duties of parents enforced by law to legitimate children are, 1. Maintenance, where they are unable to work through infancy, disease, or accident. 2. Protection. 3. Education.

49. The power of parents over children, is correction and consent to marry when under age. The duties of legitimate children to parents are obedience, protection, and maintenance.

50. The rights of a bastard are such only as he can acquire; for he is incapable of inheriting any thing, the law considering him as the son of nobody; though he may gain a surname by repute, and a putative father for some purposes, that is, by a man's acknowledging it to be his child. If a man declares a child to be his in *ventre sa mere*, and dies before its birth, such child does not gain sufficient reputation by the declaration, to entitle it to take a bequest from its father; but if he had devised an estate to it generally, as to the child such an one is *enciente* with, the bequest would pass to the child.

51. Guardian and ward are, *pro tempore*, reciprocally subject to the same rights and duties as parent and child.

52. The natural and legal guardians of a child are its parents; for if an estate be left to an infant, the father is by common law the guardian, and must account to his child for the profits; but an executor is not justified in paying a legacy left a child to its father: for if the father becomes insolvent, the executor may be compelled to pay it over again. A father may by deed or will assign a guardian to his infant children.

53. Guardians for nurture are, of course, father and mother till the infant attain the age of fourteen years: and in default of father or mother, the ordinary may assign some discreet person to take care of the infant's personal estate, maintenance, and education.

54. Guardian in *socage*, is where the minor is entitled to some estate in lands, and then by the common law the guardianship devolves upon such of his next of kin to whom the inheritance cannot possibly descend; as where an estate descends from the father's family, a relative of the mother's will be appointed; so *vice versa.*

55. Guardians by *socage*, for nurture, continue only till the minor is fourteen years of age: for then, in both cases, he is presumed to have discretion to choose his own guardian.

56. Guardian by statute, is where a father appoints a guardian for his child, born or unborn, by deed or will, which he may do to any person except a Popish *recusant*, until it attain the age of one-and-twenty years.

57. A guardian is bound, when his ward comes of age, to give him an account of all that he has transacted upon his behalf, and to answer for all losses through his negligence.

58. The chief injury to a *parent* or *guardian*, is the abduction of their children or wards, of which we may here take notice that the legal remedy is by action of trespass, to recover possession of them and damages.

59. The relation between master and servant arises, where one for a stipulated sum, or an implied contract for remuneration, undertakes to do certain work or services for another.

60. First, *Menial* or *domestic servants* are persons hired without any particular time *limited*. The law construes this hiring to be for a year; and no master can put away such servant, nor such servant leave his master after being so retained, either before or at the end of his term, without a quarter's warning; but a master may turn away his servant instantly for any breach of morality. Second, *Apprentices* are persons placed under a master or mistress by deed indented, to be maintained, and instructed in some particular trade or business. They may be moderately corrected for any misbehaviour, and may be discharged on reasonable cause, either at the request of themselves or masters, made at the quarter-sessions, or by one justice with appeal to the quarter-sessions. If an apprentice with whom less than ten pounds has been given run away from his master, he is compellable to serve out his time of absence, or make satisfaction for the time, within seven years after the expiration of his original contract. Third, *Labourers* are hired by the day or week, do not live *intra mœnia* as part of the family, and are regulated by a number of statutes. Fourth, *Stewards. factors, and bailiffs*, whom the law considers as servant's *pro tempore*, with regard to such of their acts as affect their master's employ.

61. Persons having served seven years as *apprentices* to any trade, have an exclusive right to exercise that trade in any part of England.

62. A master is answerable for the acts of his servant if done by his command, either expressly given or implied, in all matters that are honest and lawful; for whatever a servant is permitted to do in the usual course of business, is equivalent to a general command; so if a man invariably deals with a tradesman in ready money, he is not answerable for what his servant takes upon trust. If a servant by his negligence, and not *wilful default*, does any damage to a stranger, while actually employed in his master's service, his master shall answer his neglect.

63. If any person gives a false character of a servant, or a false account of his former service; or if any servant shall give such false character, or shall alter a certificate of a character, he shall, upon conviction before a justice of the peace, forfeit *L.*20, with 10s. costs. In an action against a person who had knowingly given a false character of a man to the plaintiff, who was thereby induced to take him into his service, and this servant having soon after robbed his master of property to a great amount, for which he was executed, the plaintiff recovered damages against the defendant to the extent of the loss.

64. The most direct and ordinary injuries to a *master* are, 1. Retaining his servants; and, 2. Beating them;—the legal remedy of both of which classes of injury is by action on the case for damages.

BOOK II.

Of Real and Personal Estates.

Chap. I. *Of Corporeal and Incorporeal Hereditaments, Tenures. Freeholds, Estates less than Freehold, Estates in Remainder, in Reversion, &c.*

1. The objects of dominion or property are *things*, which are by the law of England distributed into two kinds; things *real*, and things *personal*. Things real, are such as are permanent, fixed, and immoveable, which cannot be carried out of their place, as lands and tenements; things personal are goods, money, and all other moveables, which may attend the owner's person wherever he thinks proper to go.

2. Hereditaments, by which is meant whatever may be *inherited*, are of two kinds, corporeal and incorporeal. Corporeal consist of such as affect the senses, such as may be seen and handled by the body: incorporeal are not the object of sensation, can neither be seen nor handled, are creatures of the mind, and exist only in contemplation.

3. Corporeal hereditaments consist wholly of substantial and permanent objects; all which may be comprehended under the general denomination of land only. For *land* comprehends, in its legal signification, any ground, soil, or earth whatsoever. It legally includes also all castles, houses, and other buildings; for they consist of two things; *land*, which is the foundation, and the *structure* thereupon: so that if I convey the land or ground, the structure or building passes therewith. Land has also, in its legal signification, an indefinite extent upwards as well as downwards. *Cujus est solum, ejus est usque ad cælum.*

4. *Incorporeal hereditaments* are collateral to, and issue out of things corporeal; such as advowsons, tithes, commons, ways, offices, dignities, franchises, corodies, annuities, rents, &c. These we shall briefly consider, and then return to corporeal hereditaments.

5. *Advowsons.*—An advowson is the right of presentation to a church; and he who has such right is called the patron of that particular church. If annexed to or in possession of the manor from whence it sprung, it is called appendant, and will pass with the manor, but if once separated, it becomes an advowson in gross, or at large, and is also either *presentative*, where the patron has the presentation; or *collative*, where the bishop and patron are one and the same person; or *donative*, where the king, or subject by his licence, founds a church or chapel, and ordains that it shall be solely in the gift of the patron.

6. *Tithes* are the tenth part of the increase of the profits of land and stock, given as a remuneration to the ministers of the gospel. They are predial, when of corn, grass, hops, and wood; mixed, as of wool, milk, pigs, &c.; personal, as of manual occupations, trades, fisheries, and the like. Animals that are *feræ naturæ* are not tithable.

No composition for tithes made since the 13th Eliz. c. 10. is good for any longer term than three lives, or twenty-one years. Land may be either wholly or partially discharged of tithes by custom, and such custom is either *de modo decimandi*, or *de non decimando*. A *modus decimandi*, is the taking of tithes in any other way than in kind; but this must be certain, invariable, and beneficial to the parson. A modus for one species of tithes will not discharge the payment of another. If a modus is so rank and large, that it could not have been made before or in the time of Richard I. it is bad.

A prescription *de non decimando*, is a claim to be entirely discharged of tithes, and is personally confined to the king and clergy.

7. *Commons.*—Common of *pasture* is the right of feeding cattle on another's land, the property in the soil or common land being in the lord. Such common may be without stint as to number and time. Common of *piscary* is the liberty of fishing. Common of *turbary* is the right of carrying away the soil. Common of *estovers* is the liberty of taking necessary wood for the use or furniture of a house or farm. A tenant may take reasonable botes or estovers, unless restrained by covenant.

8. A *right of way* may either be enjoyed solely, or by any number of persons, is held by immediate grant or prescription, and may also be given by implication; as where I purchase a piece of ground of a man situate in the midst of his land, and at the same time acquire a right to pass over or make a way through his land to that which I have so purchased.

9. *Offices.*—A man may have a right to exercise a public or private employment.

10. *Dignities.*—A man may have a property or estate therein.

11. *Franchises* are a royal privilege subsisting in the hands of a subject: as to hold court leet, manor, or lordship; to have waifs, wrecks, &c.

12. *Corodies* are a right of sustenance charged upon any particular person or estate.

13. *Annuities* are certain yearly sums chargeable only upon the person of the grantor, the security for which may be merely personal.—A rent charge is a burthen imposed upon, and issuing out of lands.

14. *Rent service* has corporeal service incident to it. *Rent charge* is where the owner of the rent has no future interest or reversion expectant in the land. *Quit-rent* (*quieti reditus*) is an ancient invariable sum arising out of copyhold lands. *Rack rent* is where an hereditament

is let at its full value.—We return to *corporeal* hereditaments.

15. And first of *tenures*, or the different sorts of holdings. The feodal constitution, although nearly in substance abolished by 12 Car. II. c. 24, still in a great measure regulates the forms by which landed property is transmitted.—*Free socage* is a tenure by any free, certain, and determinable service. This tenure is a relic of the Saxon liberty; includes *petit serjeantry*, which is holding lands of the king, by rendering him annually some small implement of war.

16. *Tenure in burgage*, is where the king or other person is lord of an ancient borough, in which the tenements are held by rent certain.—The youngest son succeeds to the burgage tenements upon the death of the father.

17. In *gavel-kind* tenure, the tenant is of age sufficient to alien his estate by feoffment at the age of fifteen years. The estate does not escheat in case of an attainder and execution for felony. The lands descend to all the sons equally.

18. *Pure villenage* was a precarious and slavish tenure, at the absolute *will* of the lord, upon uncertain services: from hence by general consent or encroachment have arisen modern copyholds, or tenure by copy of court roll; in which lands may be still held at the *nominal will* of the lord, regulated by the custom of the manor. These are subject, like socage lands, to services, relief, and escheat, and also to heriots, wardships, and fines upon descent and alienation.

19. *Privileged villenage*, or *villein socage*, is an exalted species of copyhold tenure, upon base but certain services; subsisting only in the ancient demesnes of the crown, whence the tenure is denominated the tenure in *ancient demesne*. *Copyholds of ancient demesnes* have divers immunities annexed to their tenure, as they cannot pass by any common law conveyances, but merely by surrender, and are held by copy of court-roll, according to the custom of the manor, though not at the will of the lord. The attempt to alienate such lands in any other way than through the hands of the lord, incurs a forfeiture.

20. *Frank-almoign* is a tenure by spiritual services, whereby many ecclesiastical and eleemosynary corporations now hold their lands and tenements.

21. Next of the different sorts of estates. An estate of freehold, *liberum tenementum*, is the actual *possession* of the soil or land, created by *livery* of *seisin* in common law; and then the occupier is said to be seised in his *demesne*, *as of fee.* Freeholds are either of inheritance or for life only, and the fee or right is either absolute or limited. Tenant in fee simple *absolute*, is he that has lands, tenements, or hereditaments, to hold to him and his heirs for ever. An estate in fee, *qualified* or *base*, is an estate to the holder of it and his heirs till a certain event happen, or to be defeated if such an event occur.

22. All *tenements* may be entailed. The word tenement comprehends all corporeal hereditaments whatsoever, and also all incorporeal hereditaments that savour of the reality; that is, which issue out of corporeal ones, or which concern, or are annexed to, or may be exercised within the same; as rents, estovers, commons, and the like, as also dignities and offices.

Estates tail are either *general* or *special*. Tail general, is where lands and tenements are given to one, and the *heirs of his body begotten*; so that the whole of the legal issue of such a one are capable of taking in successive order.

Tenant in *tail-special*, is where the gift is restrained to certain heirs of the donee's body, as to the *heirs of his body on Mary his wife*, or by any other person particularly named: here no other but such special issue so pointed out can inherit.

The word *heirs* is necessary to create a fee, and the word *body*, or some other word of procreation, to make a fee-tail; for without the word *heirs*, there can be no inheritance; and without some *body* or root be pointed out, from whence the issue is to spring, on whom the inheritance is to be limited, there can be no *fee-tail*. But in a bequest, words importing a perpetuity will be construed into those of inheritance.

23. Freeholds not of inheritance are, 1. *Conventional*, or created by the acts of the parties. 2. *Legal*, or created by operation of law.

24. *Conventional* is where an estate is created by grant or lease for the term of a man's life, or any number of lives. These estates may determine upon a man's civil death, if not granted for his *natural life*; as in the case of a man being attainted of treason or felony, and reprieved upon transportation for life; or if limited upon a contingency, as to a widow during widowhood, here upon the contingency happening they determine.

25. *Legal, as tenancy by the curtesy of England*, which is, when a man having married a woman seised of an estate of inheritance, and having issue by her capable of taking at her death, he shall hold the lands for his life. These lands must have been in her actual possession; (but possession is not required in the case of advowsons, &c.) The issue must be born alive; but if the mother dies prior to the birth, the husband cannot become tenant; for here the estate descended to the child. In gavel-kind lands, the husband may thus become entitled to half the lands without issue.

26 Or *tenancy in dower*, which is where a woman having married a man who is possesssd or becomes seised of an estate of inheritance, at any time during the coverture, of which her issue might by any possibility have been heir, upon the husband dying, the woman is entitled to dower, or one-third part of such lands, to hold for her natural life.

27. Estates less than freehold, are estates for *years*, at *will*, at *sufferance*, and on *condition*.

28. An *estate for years*, is where a tenant is let into the possession of premises for any determined period. If only for half a year or a quarter, the law recognizes him as a tenant for years. A person demising an hereditament is called the lessor, and he to whom the lease is made the lessee. A lease for so many years as another shall live, is void.

29. *Tenants at will*, or from year to year, hold by the wills of both parties. The lessee is here entitled to emblements or profits of the crop upon his estate determining, and is allowed reasonable ingress and egress to carry away his goods.

30. *An estate at sufferance*, is where a man lawfully enters upon an estate for a certain term, and after its expiration keeps illegal possession of it. Such a one shall pay double rent, which may be distrained for; or double the yearly value of the premises, which can only be recovered by action of debt.

31. *Estates upon condition*, are either upon condition *implied* or *expressed*. *Estates upon condition implied*, are where certain performances are connected thereto, that must necessarily be performed; as in the case of an office, private or public, which may become forfeited either by *nonuser* (neglect) or *misuser* (abuse); so in the case of estates upon condition expressed, if those conditions are legal and possible.

32. *Estates upon condition expressed*, are where an express qualification or provision is annexed to the grant

of an estate, on the breach or non-performance of which the estate so granted may be defeated; as, first, *Vivum vadium*, which is where a man borrows a sum of money of another, and grants him an estate until the profits of that estate repay him. Second, *Mortuum vadium*, or mortgage, which is where a man grants an estate in fee, or for a term of years, as a security for a sum of money lent, &c. When such an estate is created, the mortgagee may enter, but is liable to be dispossessed upon the performance of the conditions, which the mortgager may do at any reasonable time after the time specified, provided he pays all expenses; this is called the *equity of redemption*. Also a mortgagee may call upon the mortgager to redeem his estate, or in default to be for ever foreclosed from redeeming it. Third, *Estates held by statute merchant or statute staple*, which are very similar to those held in *vivum vadium*. And, fourth, *Estates held by elegit;* so called from the writ of elegit founded upon statute West. 2, by which the sheriff, after the plaintiff has obtained judgment for his debt at law, is empowered to give him some part, or the whole of the defendant's lands and tenements, until his debt and damages are fully paid.

33 *Remainder*, is an estate limited to take effect and be enjoyed after another particular estate in possession is determined; as where lands are granted for life or years to A. with remainder to B. in tail. *A contingent remainder*, is where an estate is limited to take effect, either to an uncertain person, or upon an uncertain event.

34. *An executory devise*, is such a disposition of lands by will, that no estate shall vest thereby at the death of the devisor, but only upon sòme future contingency, without any precedent particular estate to support it; as where one devises land to a *feme sole* and her heirs upon her day of marriage. Here is a freehold *in futuro*, and such a limitation would be void in a deed, but is good by way of executory devise.

35. *Reversion*, is the returning of the residue of an estate to the grantor, to commence in possession after the determination of the particular estate which he has granted out of it.

36. *Merger*, is where two estates, the one less the other greater, meet together in one and the same person, and in *one* and the same *right;* they then are said to be merged.

37. *Severalty*, is where one tenant holds in his own sole right, without any other person being joined with him.

38. *Joint-tenancy*, is where an estate is granted to two or more persons; in which case the law construes them to be joint-tenants, unless the words of the deed expressly exclude such construction. They must have a *unity* of *interest*, of *title*, of *time*, and of *possession*; they are seised *per my et per tout;* so that upon the decease of one, the interest remains to the survivor or survivors. By whatever means the jointure ceases or is severed, by either of its four constituent unities being destroyed, the right of survivorship, or *jus accrescendi*, the same instant ceases with it.

39. *An estate in coparcenary*, is where an estate of *inheritance descends* from the ancestor to two or more persons, who are then called parceners, and they all together make one heir. The properties of parceners are in most respects like those of joint tenants; they may be compelled to divide their estate by any of the parceners sueing out a writ of partition, or obtaining a decree in a court of equity

40. *An estate in common*, is where two or more persons hold lands by distinct titles, but have a unity in the possession; as one may hold in fee simple, the other in tail. Persons thus holding lands are styled tenants in common.

Chap. II. *Of the Title to Real Estates.—By Descent, Purchase, Escheat, Occupancy, Prescription, Forfeiture.*

1. There are several stages or degrees requisite to form a complete title to lands and tenements; the lowest is the mere naked possession without a shadow of right. This may happen where one forcibly, or by surprise, turns another out of the occupation: which in law is termed an actual disseisin. In all such cases the rightful owner may repossess by a variety of remedies; but if neglected by him who has the legal right, this actual possession may ripen into a perfect and indefeasible title; and, at all events, without such actual possession, no title can be completely good. A man having an *actual right of possession* may exert it whenever he pleases, by turning the disseisor out.

2. Descent is the descending of an estate from an ancestor dying *actually* seised of the estate, to the heir-at-law, which shall descend *ad infinitum*, but never lineally ascend. The rules of which are, 1. The males are admitted before the females. 2. Where there are two or more males, the eldest shall inherit, but the females all together. 3. The lineal descendants, *in infinitum*, of any person desceased, shall *represent* their ancestor, or stand in the same place as the person himself would have done had he been living. 4. On failure of *lineal* descendants, or issue of the person last seised, the inheritance shall descend to his next *collateral* kindred, being of the blood of the first purchaser, subject to the three last and the next succeeding rules. 5. And this collateral heir of the person last seised must be the next kinsman of the whole blood. 6. In collateral inheritances, the *male stock* shall be perferred, or kinsmen descending from the blood of the male ancestor shall be admitted before those from the blood of the female, unless where the *lands did in fact descend from a female.*

3. If a man becomes possessed of lands in any other form than they would have descended to him by act of law, he is said to take them by *purchase;* so where lands are devised to an heir at law saddled with the smallest limitation, he is said to take them by purchase; the consequence is, they are descendible to the owner's blood in general, and not to the blood of any particular ancestor.

4. Lands held by *escheat*, are such as revert to the lord upon the blood of the person last seised becoming extinct; upon a bastard dying intestate and without issue; and upon a man leaving no other heirs but aliens. Escheat is a subordinate species of forfeiture.

5. Occupancy is the taking possession of those things which had before no owners. The law recognises occupancy only in the case of a tenant *pour autre vie*, dying during the life of *cestui que vie*, or him for whose life any lands or tenements are granted. For where heirs are mentioned in the limitation, the heir shall take possession as a special occupant, and it shall be assets in his hands. Where there is no special occupant in whom the estate may vest, the tenant *pour autre vie* may devise it by will, but it shall be subject to the testator's debts; and in the case of intestacy, it shall go to the executors as a chattel interest.—An island rising in any part of a river shall be the property of him who owns the piscary, and has the freehold of the soil. If a river suddenly changes its course, and thereby inundates a man's ground, he may claim what the river has left; but if this happens by gradual degrees, the one who loses his soil has no remedy against him who has the dereliction in his favour. Is-

lands rising in the sea vest in the crown, as also land left suddenly dry; but if by small and almost imperceptible degrees, it shall belong to the owner of the adjacent land.

6. Prescription is a personal immemorial usage of enjoying such a right as may be created by grant, as right of way or common, the law supposing a grant to have existed. *Custom* is a local usage, and is established by being "used so long, that the memory of man runneth not to the contrary." Custom binds particular places, persons, and things concerned therein; as in the case of *gavelkind lands* and *borough-English.*

7. Forfeiture is a punishment annexed by law to some illegal act or negligence in the owner of things real. Forfeitures are occasioned, (1.) By crimes. (2) By alienations contrary to law. (3) By disclaimer. (4.) By lapse. (5.) By simony. (6) By waste.—(1) Forfeitures for crimes or misdemeanours are, 1. For high treason. 2. Misprision of treason. 3. Petit treason, or felony. 4. Assaulting a judge, or striking any one in the presence of the king's principal courts of justice. 5. Præmunire. 6. Popish recusancy. (2.) Alienations, or conveyances which induce a forfeiture, are, 1. Those in mortmain, made to corporations; whereby lands become inherent in one *dead hand*, contrary to the statute law, unless those corporations have a licence to hold in mortmain. 2. Alienations made to aliens. 3. Those made by particular tenants, when larger than their estates will warrant, and thereby putting the remainder in jeopardy; here the remainder-man is entitled to enter. (3.) *Disclaimer*, is where a man holding of a lord, and neglecting to render him due services; and upon an action being brought to recover them, and he disclaiming to hold of his lord, he incurs a forfeiture. Copyhold lands are liable to a variety of forfeitures, regulated according to the customs of the different manors. (4) *Lapse*, is a forfeiture of the right of presentation to a vacant church, by neglect of the patron to present within six calendar months from the vacancy. (5.) *Simony*, is the corrupt presentation to an ecclesiastical benefice, whereby the presentation becomes forfeited. (6.) *Waste*, is a spoil, or destruction, in any corporeal hereditament, to the prejudice of him that has the inheritance: such as removing things once fixed to the freehold of a house; reducing the number of creatures in ponds, dove-houses, warrens, &c. cutting down timber-like trees, as oak, ash, elms.

CHAP. III.—*Of Title by Alienation.—Of Alienations in general. By Deed, and the several sorts of Deeds. By Matter of Record. By Special Custom. By Devise. By Administration and Executorship.*

1. A deed is an instrument in writing, sealed, signed, and delivered by the parties; by which real or personal property may be alienated from one party, and conveyed to another: or some privilege or authority granted to a particular person, or any number of persons; but it is then more properly called a charter (*carta*) from its materials.

2. The requistes of a deed are, 1. Sufficient parties, with *legal* authority to convey, and a thing or subject-matter contracted for; all of which must be expressed by sufficient names; the parties, by their additions or residences, degree, or profession; and absolutely in *esse* at the time the deed is made. But if a man gets another name by common esteem, besides his real Christian and surname, a deed made under such acquired name will be good. 2. The *consideration* is the *quid* or *pro quo* of any contract; which must be lawful, and such as the law esteems an *equivalent*, as marriage, money, or work done. A *nudum pactum* is a bare agreement to do or pay a sum of money on one side, without a compensation on the other, which is totally void in law. 3. The matter written must be orderly and legally set forth.

3. The component parts of a deed are, 1. The *premises* in which are included the parties; the recital of deeds or facts that concern the conveyance, and the considerations upon which the deed is founded; then the thing granted. 2. The *habendum* and *tenendum* sets forth the quantity and quality of the estate granted; and this depends much upon the wording: as, *To have and to hold to him and his heirs*, creates a fee simple: *To have and to hold to him and the heirs of his body*, an estate tail: *To have and to hold to him for ever*, an estate for life only: if the conveyance is to a sole body politic or corporate, the word *successors* must be used in lieu of the word *heir.* The *reddendum* is the terms of stipulation or reservation to the grantor of a rent or other thing. 4. The *condition*, which is either express or implied. 5. The *warranty*, which is a covenant-real annexed to lands and tenements, whereby a man and his heirs are bound to warrant the same. 6 The *covenants*, whereby either of the parties stipulates for the truth of certain facts; or binds himself to perform, or give something to the party with whom he covenants.

4 *Livery of seisin*, is the corporeal delivery of the possession of a thing conveyed, which ceremony is absolutely necessary where a freehold passes at common law; for if a man die before he has made an entry upon the hereditaments, unfeoffed, his heirs shall not be entitled to enter, but the heir of him last seized; and this is one reason why a freehold cannot commence *in futuro* at common law; for if a freehold be expectant upon a term of years, *livery* must be given to the remainder-man, who is immediately seized of his freehold at the same time the termor is seized of his term. It is usual to indorse the livery of seisin on the back of the deed, specifying the manner, place, and time of making it, together with the names of the witnesses.

5. Some deeds serve to *convey* real property, some only to *charge* or *discharge* it.

6. *Original conveyances* are, 1. *Feoffments.* 2. *Gifts.* 3. *Grants.* 4. *Leases.* 5. *Exchanges.* 6. *Partitions.*—*Derivative* are, 7. *Releases.* 8. *Confirmations.* 9. *Surrenders.* 10. *Assignments.* 11. *Revocations.*

7. *Feoffment* is a conveyance of the actual possession of an hereditament; therefore it can only be adopted where livery of seisin can be had of the thing conveyed; so that a person must be in the actual *seisin*, to pass the seisin to another.

8. *A gift* is properly a conveyance of lands in *tail*, and, when founded upon no valuable consideration, is void to those that were creditors at the time of the donation, but valid as to subsequent ones.

9. *A grant* is the common law conveyance of those things of which no livery can be made; as of reversions and remainders, and other incorporeal hereditaments, all of which are said to lie in grant.

10. *A lease* is the granting possession of any tenement to a person for life, years, or at will. A lease for life, being a freehold, must pass by livery.

11. *An exchange*, is a mutual grant of *equal interests*, as an estate of inheritance for an estate of inheritance, a chattel interest for a chattel interest, &c.; entry is absolutely necessary to complete the exchange; for if either party die before entry, it is voidable by his heir; and if both die, it is *ipso facto* void.

12. *A partition*, is the division of an estate held in joint-tenancy, in coparcenary, or in common, that each tenant may hold in severalty.

13. *A release*, is the relinquishment of a right or interest

in lands or tenements to another who has an estate in *possession* in the same lands and tenements.

14. *A confirmation* is a conveyance of an estate, or right in esse, that one has in or to lands, to another that has the possession thereof, or some estate therein, whereby a voidable estate is made sure and unavoidable. It is also defined to be the approbation or assent to an estate already created.

15. *A surrender* is the yielding up of a less estate by one in possession, to him who has a greater estate in the same lands; as the surrendering of a particular estate to the reversioner or remainder-man.

16. *An assignment* is a transfer, or making over to another of the *whole right* one has in any estate.

17. *A revocation* is the execution of a power reserved by the grantor to himself, or some other person in a former deed, of calling back the estate.—A *defeasance* is a collateral deed made at the time of making some other conveyance, containing certain conditions, by the non-performance of which the estate becomes forfeited.

18. Conveyances by *statute*, depend much on the doctrine of *uses* and *trusts*, which are a confidence reposed in the terre-tenant, or tenant of the land, that he shall dispose of the profits according to the direction of *Cestui que use*, (*i. e.* of him to whose use any other man is enfeoffed of lands or tenements,) or *Cestui que trust*. The statute of uses, having transferred all uses into possession, (or rather having drawn the possession to the use,) has given birth and operation to three other species of conveyance. 1. A *covenant* to stand seised. 2. A *bargain* and *sale* enrolled. 3. A *lease* and *release*. A *covenant* to stand seised to an use is, where a person covenants to stand seised to the use of another, in consideration of blood or marriage. A *bargain* and *sale* differs from the covenant to stand seised, as it must be in consideration of money, though that consideration be only nominal; and the use so limited must be to the bargainee. As a *release* of lands can only be given to him who has the possession or seisin, it is necessary, where the freehold is to be conveyed to a stranger without the formalities of livery, that an estate for a year or other definite time be made to him, that he may be capable of receiving a release.

19. Deeds, which do not convey, but only charge real property, are, 1. *Obligations*. 2. *Recognizances*. 3. *Defeasances*. *Obligation*, or *bond*, is a deed containing a penalty, with a condition annexed, for payment of money, performance of covenants, and the like; if without a condition, it is called single, (*simplex obligatio*,) but if there be a condition, and that condition is performed, the bond becomes void. *Recognizance* is an obligation of record, which a man enters into before some court of record, or magistrate duly authorized, with condition to do some particular act; as to appear at the assizes, to keep the peace, to pay a debt previously contracted, &c. A *Defeasance* on a bond or recognizance, is a condition which, when performed, defeats or undoes it, and may be indorsed upon the back of the bond.

20. *Assurances by mattter of record*, are conveyances of lands and hereditaments, witnessed and substantiated by some court of record; these are, 1. *Private acts of Parliament*. 2 *The king's grants*. 3. *Fines*. 4. *Common recoveries*

21. *Private acts of Parliament*, are calculated to give such reasonable powers to a person in possession of an estate, as he may be barred of by the stipulations under which it is limited; as granting leases, settling a jointure &c.

22 *The king's grants* are also matters of record; these are contained in charters or letters patent directed to all his subjects. In grants by a private person, implications run strongly against the grantor; but it is the reverse where the interest of the crown is concerned.

23. A *Fine*, is an amicable composition and agreement of an actual or fictitious suit, whereby the estate in question is acknowledged to be the right of one of the parties. A fine bars the right of all strangers, unless they make claim within five years after proclamations made; except they be feme coverts, infants, prisoners, persons beyond seas, and persons of *non-sane* memory; who have five years further allowed them and their heirs to put in claims after their legal incapacities are removed.

24. *A common recovery* is an actual or fictitious suit, or action, (carried on to judgment,) for land, brought against the tenant of the freehold; who thereupon vouches another, who undertakes to warrant the tenant's title; but upon such vouchee's making default, the land is *recovered* by judgment at law against the tenant; who in return obtains judgment against the vouchee to recover lands of equal value in recompence. A recovery is an absolute bar, not only of all estates tail, but of remainder and reversions, expectant on the determination of such estates.

25. *Assurances by special custom*, are where copy-hold lands held in ancient demesne pass from one owner to another. This is effected, 1. By *surrender*, which is the yielding up of the estate into the hands of the lord to be regranted according to the custom of the manor, upon the conditions expressed in the surrender. 2. *Presentment*, which is made by the homage of such surrender; and usually made at the next court baron held, or by *custom* at any other subsequent court. 3. *Admittances*, which are of three kinds, 1. Upon the voluntary grant of the lord, when lands have escheated or reverted to him. 2. Admittances upon the surrender of another; and then the lord is esteemed merely as a conduit through which the land passes to the surrenderee. 3. Admittances upon descent; when the lord takes notice of the heir as his tenant, instantly upon the death of his ancestors.

26. A *devise* is the disposition of a person's property to take effect after death. The deed containing this intention is called the testator's will; which, to pass real estates, must be in writing, and signed by the testator, or some other person in his presence, by his express direction, and subscribed in his presence by three or four credible witnesses. If the will is only to pass copy-holds, or terms of years, and other personalities, signing only will be sufficient, without the form of witnesses.

27. The execution of a will in a court of law, is proved by calling one of the subscribing witnesses, who proves, that the testator executed his will by signing and sealing in his presence, and in the presence of the two subscribing witnesses; but where a bill is filed to establish a will, all the subscribing witnesses living must be examined, unless they are abroad, and then their hands writing must be proved, as if they were dead.

28. By the statute of wills, no person under the age of twenty-one years can devise any manors, lands, tenements, or other hereditaments; but a male infant above fourteen years old, and a female infant above twelve years, are capable of bequeathing personal property.

29. And here it may be remarked, that all things, whether real or personal, hereditable or moveable, of which a man has the absolute property, he may by the law of England devise by will. *A nuncupative* or verbal will, extends only to *personal* property. But a *codicil*, which is a supplement to a will, and may be either written or verbal under the same restrictions as regards wills, is a form under which, *if written and duly executed*, real estates may pass.

30. The construction put upon wills shall be as favourable, and as near the intention of the testator as the rules of law will admit; and where the intention is clear, too minute a stress shall not be laid on the strict and precise signification of words.

31 *An executor*, is he to whom another man commits the execution of his last will and testament. The appointment of an executor is essential to the making of a will, and it may be performed either by express words, or such as strongly imply the same; but if the testator makes an incomplete will, by not naming an executor, or if he names incapable persons, or if the executors named refuse to act; in any of these cases, the ordinary must grant administration to some person, *cum testamento annexo*. Where a person dies wholly intestate, without either making a will or naming executors, then general letters of administration must be granted by the ordinary to such administrator as the statutes of 31st E. III. c. 11, and 21st Hen. VIII. c. 5, direct. The office of an executor and administrator are very much the same, except that an executor is bound to perform a will, which an administrator is not, unless where a testament is annexed to his administration, and he can do nothing before letters of administration are granted; but an executor may do many acts before he proves the will; as, commence an action, assent to a legacy, &c.

32. If a stranger takes upon himself to act as an executor, he is called in law an executor of his own wrong, *de son tort*; but, locking up the goods, or burying the corpse of the deceased, will not amount to such an intermeddling. He cannot bring an action in right of the deceased, but actions may be brought against him.

33. By law, the appointment of an executor vests in him beneficially all the personal estate of the testator not otherwise disposed of; but wherever courts of equity have seen *on the face of the will* sufficient to convince them, that the testator did not intend the executor to take the surplus, they have turned the executors into trustees for those to whom the law would cast the surplus in case of a complete intestacy, *i. e.* the next of kin; as where the executors are expressly called executors *in trust*, or any other expression occur, shewing the office only to be intended them, and not the beneficial interest. So a *pecuniary* legacy to a sole executor affords a sufficient argument to exclude him from the residue; as it is absurd to suppose a testator to give expressly *a part* of the fund to the person whom he intended to take the whole. If the testator give the *residuum* to a person who dies in his life-time, in consequence of which this bequest is lapsed, the executor, though he has no legacy, shall be a trustee for the next of kin, because the testator has expressed a manifest intention not to give it to the executor.

34. Of *injuries to real property*, the following may be noted as the principal; *First*, Dispossession, or ouster from the freehold. *Second*, Trespass. *Third*, Nuisance. *Fourth*, Waste. *Fifth*, Subtraction. *Sixth*, Disturbance.

35. *Ouster* is the dispossessing another of his lands or hereditaments, and may arise by the following causes, as 1. Abatement, which is the entry of a stranger after the death of the ancestor, before the heir or devisee. 2. Intrusion, which is the entry of a stranger after a particular estate is determined, before him in remainder or reversion. 3. Disseisin, which is the wrongful putting out of him that is seised of a freehold estate. 4 Discontinuance, which is where one having an estate-tail makes a larger estate than by law he is entitled to do, in which case the estate is good so far as his power extends who made it, but no farther. 5. Deforcement, which is where the entry of the present tenant or possessor was originally lawful, but whose detainer is now become unlawful, *i. e.* such a detainer of the freehold from him that has the right of property, but never had any possession under that right, as falls within none of the injuries already mentioned. *Dispossession* or *ouster* of chattels real, may arise from the amotion of him who holds an estate by statute merchant, recognizance, elegit, or years, for securing a certain sum of money, by the borrower raising the sum for which it is holden before the estate is determined by lapse of time.

36. The unwarrantable entering upon another man's soil the law entitles a *trespass*, and a man must have a property in the soil, and actual possession thereof by entry, to enable him to bring an action of trespass. By statute 6th Anne, c. 18, if a guardian or trustee for any infant, a husband seised *jure uxoris*, or a person having any estate or interest determinable upon a life or lives, shall, after the determination of their respective interests, hold over, and continue in possession of the lands or tenements, without the consent of the person entitled thereto, they are adjudged to be trespassers.

37. *Nuisance* is that which worketh hurt, inconvenience, or damage; and is either public or private. Nuisance to corporeal hereditaments are, such as a man's building a house so near mine that my ancient window is closed up, or the water from the roof of his house falls upon mine; by keeping animals, or carrying on any noisome trade, from which a stench arises so as to render the air unwholesome; neglecting to scour a ditch, &c. So, where any one neglects to do, or does any act which inconveniences or damage another, it is a nuisance. Nuisances to incorporeal hereditaments are, such as a man's obstructing another that has a right of way, either by stopping it up or placing impediments to his annoyance; or if one sets up a fair or market within seven miles of my private fair or market, whereby I am injured.

38. *Waste* is the despoiling houses, lands, or woods, to the prejudice of him who has a right of common, or of a remainderman or reversioner who has an inheritance in expectancy; for if such a one has only a remainder for life, he is not entitled to sue for waste; or even during the continuance of an intermediate estate of freehold to take effect before his expectancy. Accident by fire is no waste, and no person is answerable for damages that may arise therefrom, except upon special agreement.

39. *Subtraction* is the non-performance of suit, duty, custom, or service, by whom it is due.

40. *Disturbance* is the hindering or disquieting any one in the lawful enjoyment of an incorporeal hereditament.—All these several injuries to real property are redressed by appropriate legal remedies, the technical particulars of which cannot here be detailed.

Chap. IV.—*Of Things Personal. Title to Things Personal. 1. By Occupancy and Prerogative. 2. By Succession. 3. By Custom. 4. By Marriage. 5. By Forfeiture. 6. By Judgment. 7. By Grant. 8. By Contract. 9. By Bankruptcy.*

1. Things personal are comprehended under the general name of chattels; and are, 1. Chattels *real*. 2. Chattels *personal*.

2. *Chattels real* are *immoveable*; as interests in lands and tenements, that are bounded by a definite time of duration; as estates for years, estates at will, and estates upon condition.

3. *Chattels personal* are things *moveable*, which may be transferred from place to place. Property in chattels personal in possession, is where a man has not only the right of enjoyment, but has also the actual possession; and such possession he can have in all inanimate things, as goods,

plate, money, vegetable productions when severed from the ground, garments, &c. none of which can be divested out of the owner's possession but by his own consent, and if without his consent, he sustains an evident injury, which it is the business of the law to prevent or remedy.

4 But with regard to animals, which have in themselves a power of motion, the law makes a material difference. Animals are classed into such as are *domitæ*, and such as are *feræ naturæ*; in such as are *domitæ naturæ*, as horses, kine, sheep, poultry, and the like, a man may have an absolute property; for these will not stray from a man's house or person, unless by accident or fraudulent enticement; in either of which cases the owner does not lose his *right* of property, until they have been sold in market overt; but in such animals as are *feræ naturæ*, a man can have no absolute property.

A *qualified* property in animals *feræ naturæ* is *per industriam hominis*, by a man's reclaiming them by art, or by confining them within his own immediate power, so that they cannot escape and use their natural liberty; such as deer in a park, hares or rabbits in an enclosed warren, doves in a dove-house, pheasants or partridges in a mew, hawks that are fed and commanded by their owner, and fish in a private pond or in trunks. Bees are also *feræ naturæ*, and are not the property of any person until they are hived, and not then, if they are pursued by the person from whose hive they swarmed, for they are his as long as he can pursue or keep them in sight. A man, indeed, may have a qualified property in almost every thing personal that can be enjoyed, even in air, light, and water; for if a man obstructs another's *ancient* windows, corrupts the air of his house or gardens, pollutes his water, or unpens and lets it out; or if he diverts an ancient watercourse that used to run to the other's mill or meadow; the law will animadvert thereon as an injury, and protect the party injured.

6. Property in *action* is where a man has not occupation, but merely a bare right to occupy the thing in question, the possession whereof may, however, be recovered by suit or action of law: it is then called a *chose in action*, as money due on bond; and these *choses* may either be *express*, as a contract to pay a certain sum; or *implied*, as, where a convenanter fails to perform an act engaged to be done, he shall pay damages to him who sustains an injury by the breach of covenant.

7. *Occupancy* gives the first occupant a right to those few things which have still no legal owner. 1. Such as the goods of an alien enemy, restricted, however, to captors authorized by the king's proclamation, and to goods brought into the country by an alien enemy after a declaration of war without a safe conduct. 2. Any thing found, which does not come under the description of *waifs*, *estrays*, *wreck*, or *treasure trove*. 3. The benefit of the elements, light, air, and water, as far as they are *previously* unoccupied, or may be occupied without injury to another; as where I have an ancient window overlooking my neighbour's ground, he may not erect any blind to obstruct the light, &c. 4. Animals *feræ naturæ*, under the restrictions of the game laws. 5. Property arising by *confusion of goods*; as where one intermixes his money, corn, or hay, with that of another, the law gives the entire property, without any account, to him whose original dominion (or property) is invaded. 6. Literary property, wherein, however, the author has an exclusive right of printing and reprinting his works for the term of fourteen years, and at the end of that term, if the author himself be living, the right shall then return to him for another term of the same duration; and a similar privilege is extended to the inventors of prints and engravings for the term of eight-and-twenty years, besides an action for damages, with double costs. And many subsequent statutes have been enacted to guard the rights of literary property.

8. *Succession*, is where a chattel interest is given to corporations aggregate of many, as dean and chapter, mayor and commonalty; in which one body of men may, by succeeding another body, acquire a property in all the moveables of the corporations; for in the judgment of law a corporation never dies. And in sole corporations which represent a number of persons, as the master of an hospital, &c. they have the same power as corporations aggregate, to take personal property or chattels in succession. But in sole corporations which represent no others than themselves, as bishops, parsons, and the like, no chattel interest can regularly go in succession; and, therefore, if a lease for years be made to the bishop of Oxford and his successors, in such case his executors or administrators, and not his successors, shall have it.

9. Custom is the acquiring property by the custom or local usage of some particular place; as in the case of, 1. *Heriots*, which are a customary tribute of goods and chattels, payable to the lord of the fee on the decease of the owner of the land. 2. *Mortuaries*, which are a sort of ecclesiastical heriots, being a customary gift due to the minister in many parishes on the death of his parishioners, now regulated by statute. 3. *Heirlooms*, which are personal chattels, that, contrary to the nature of chattels, descend by special custom to the heir, along with the inheritance, and are in general such things as cannot be taken away without dismembering the freehold.

10. By *marriage*.—The chattels of the wife are vested in the husband, in the same degree of property, and with the same powers, as the wife (when sole) had over them, provided he reduces them to possession, by exercising some act of ownership. In real estates, he only gains a title to the rents and profits during coverture, (unless he takes them afterwards also by the *curtesy*.) but in the case of a chattel real, as a lease for years, the husband shall receive the rents and profits of it, and may sell, surrender, or dispose of it during coverture. If he survive his wife, such chattels are to all intents and purposes his own. Yet if he has made no disposition thereof in his lifetime, and dies before his wife, he cannot dispose of them by will, but they shall remain in her possession. So also in *choses* in action; as debt upon bond, contracts, &c. these the husband cannot have, unless he reduce them to possession; but in case the husband survive the wife, the law is very different with respect to *chattels real* and *choses in action*; for he shall have the *chattels real* by survivorship, but not *choses in action*.

11. *Forfeiture*.—The forfeiture of goods and chattels takes place upon *conviction* of the following crimes: 1. *High treason*, or *misprision* of *treason*. 2. *Petit treason*. 3. *Felony in general*, including *felo de se*. 4. *Manslaughter*. 5. By conviction of *excusable homicide*. 6. By *outlawry* for treason or felony. 7. By conviction of *petit larceny* 8 By *flight* in treason or felony, even though the party be afterwards acquitted of the fact. 9 By *standing mute* when arraigned of felony. 10 By *drawing a weapon on a judge*, or *striking* any one *in the presence of the king's courts*. By *præmunire*. 11. By *pretended prophecies*, upon a second conviction. 13. By *owling*, (exporting wool.) 14. By *artificers residing abroad*. 15 By *challenging to fight* on account of money lost or won at gaming. All these forfeitures commence from the time of conviction, and not from the time of committing the fact, as in forfeitures of real property. Yet a fraudulent conveyance of them, to defeat the interest of the crown, is made void by statute 13. E. c. 5.

12. *Judgment*.—By judgment consequent on a suit at law, a man may not only *recover*, but may also *originally*

acquire a right to personal property; as where a man agrees to buy a horse at a stated sum, the *vendor*, or person selling, has a right to the sum agreed upon as soon as the contract is made; and the law gives him a remedy by which he may *recover* the possession of that right. In *popular* actions, commenced to recover penalties given by particular statutes to those who will sue for them, no one has an acquired right, but may *originally acquire* a right to the penal sum in question, on judgment; and it it is not in the power of the crown to release an informer's interest whenever he has begun such suit.

13. *Grant.*—A grant or gift is a voluntary conveyance of a chattel personal in possession, without any, or merely a nominal, consideration, as five shillings; and in leases by always reserving a rent, though it be but a pepper corn; any of which considerations will convert the gift more properly into a grant. These gifts or grants may be made either in writing or by word of mouth, attested by sufficient evidence, of which delivery of possession is the strongest and most essential proof: but such deeds of gift made to the use of the owner are void; and if made to any other person, with intent to defraud creditors, are also void.

14. *Contract.*—This is an agreement, upon *sufficient* consideration, to do or not to do a particular thing, which may be either express or implied, either executed or executory. *Express* contracts are, where one agrees to buy a load of hay or any thing else for a stated price; an *implied* contract is, where one employs another to do a certain work for him. Here the law implies; that he undertook to pay him for his labour; so where one takes up goods of a tradesman, without a stated price, he is bound to pay the value of them. *Executed*, is where one agrees to change his horse, or to do any other act with another, and does it immediately. *Executory*, is where a contract is to be consummated at a future period. And in all contracts, where one fails on his part of the agreement, he shall pay the other party such damages as he has sustained by such neglect or refusal.

15. The most usual species of personal contracts are, 1. *Sale* or *exchange*, which is a transmission of property from one man to another, in consideration of some price or recompense in value; for there is no sale without a recompense; there must be a *quid pro quo.* If it be a commutation of goods, it is more properly an *exchange*; but if it be a transferring of goods for money, it is called a *sale.* 2. *Balement*, which is a delivery of goods in trust, upon a contract expressed or implied, that the trust shall be faithfully executed on the part of the bailee; as if cloth be delivered, or (in legal phrase) bailed, to a tailor to make up a suit of clothes, he has it upon an implied contract to render it again when made, and that in a workmanly manner. If money or goods be delivered to a common carrier, to convey from Oxford to London, he is under a contract in law to pay or carry them to the person appointed. 3. *Hiring* or *borrowing*, which is a contract, whereby the possession of chattels is transferred for a particular time, on condition that the identical goods (or sometimes their value) be restored at the time appointed, together with (in case of hiring) a stipend or price for the use.

16. Any contract whereby a determinate sum of money becomes due to any person, and is not paid, but remains in action merely, is a contract of debt: And these debts are, 1. Of record; as where they arise upon judgment, statutes merchant and staple, &c. and are evidenced by a court of record. 2. Special contracts, or such as whereby a sum of money becomes or is acknowledged to be due, by deed or instrument under seal. 3. Debts by simple contract, which possess neither of the two last qualities, and are proved either by real evidence or notes unsealed. *Bills of exchange and promissory notes*, are simple contract debts.

17. *Bankruptcy.*—A bankrupt is defined to be a trader, who does certain acts to defraud his lawful creditors, or secretes himself to avoid their demands. Those who may become bankrupts, are persons *using the trade of merchandise;* and the acts whereby they may become bankrupt are, 1. Where one endeavours to avoid his creditors, or evade their just demands, as by denying himself; but this denial is not sufficient if the debtor is sick in bed, or engaged with company, or if the denial is made to one who comes in behalf of a creditor, and not the creditor himself. 2. Departing the realm with intent to defraud creditors. 3. One procuring himself to be arrested. 4. Suffering himself to be out-lawed, with a view to defraud his creditors. 5. Departing from his dwelling-house, or otherwise absenting himself from his creditors. 6. Making any fraudulent conveyance of his lands or goods, or in fact, committing any act with intent to baffle the demands or claims of *bona fide* creditors.

18. The proceedings on a commission of bankrupt are, 1. By petition to the lord chancellor by one creditor to the amount of 100*l.* or by two to the amount of 150*l.* or by three or more to the amout of 200*l.*; such debts must be proved by affidavit, upon which the chancellor grants a commission to such persons as to him seem good, who are then styled commissioners of bankrupt. When the commissioners have met, they are first to receive proof of the person's being a trader, and having committed some act of bankruptcy, and the amount of the petitioning creditor's debt; and then to declare him a bankrupt, if proved so, and to give notice thereof in the gazette. They at the same time appoint three meetings; at one of which an election must be made of assignees, or persons to whom the bankrupt's estate shall be assigned, for the benefit of the creditors; and no creditor shall be permitted to vote in the choice of assignees, whose debt on the balance of accounts does not amount to 10*l*; and at the third meeting at farthest, which must be on the forty-second day after the advertisement in the *gazette*, (unless the time be enlarged by the lord chancellor) the bankrupt, upon notice personally served upon him, or left at his usual place of abode, must surrender himself personally to the commissioners.

19. If a bankrupt has made an ingenuous discovery of all his effects, and has conformed in all respects to the law, and the creditors, or four parts in five of them in number and value, (but none of them creditors for less than 20*l.*,) will sign a certificate to that purpose, and it be allowed by the chancellor, or two judges by him appointed for that purpose, he shall have a decent and reasonable allowance for his future support, and to put him in a way of honest industry. And he shall be clear from all debts owing by him at the time he became a bankrupt, even though judgment shall have been obtained against him, and he lie in prison upon execution for such debts.

20. The *injuries* by which personal property may be affected are so various and multiplied, as well as the technical forms by which they may be redressed, that we cannot here attempt even an enumeration of them.—We refer to the following book for a view of the mode by which redress is obtainable against injuries in general.

BOOK III.

Of Suits or Actions.

1. Wrongs or injuries, which are an infringement of the

civil rights of individuals, are remedied, either, 1. By the acts of the parties. or, 2. By the operation of law. Redress by the latter of these modes, (of which only we are here to speak) is by suit or action in the courts of justice.

2 A *court* is a place wherein justice is judicially administered. by officers delegated by the crown for that purpose; being either a court of record, or not of record. A court of record, is where the acts and judicial proceedings are enrolled in parchment: these rolls are called the records of the court, and are of such high and supereminent authority, that their truth is not to be called in question; nor shall any plea, or even proof, be admitted to the contrary. All courts of record are the king's courts, in right of his crown and royal dignity; and therefore no other court has authority to fine and imprison; so that the very erection of a new jurisdiction, with the power of fine and imprisonment, makes it instantly a court of record. A court not of record, is the court of a private person, such as the courts baron, &c.

3. *The Court of Piepoudre, curia pedis pulverizati*, is the lowest and at the same time the most expeditious court of justice known to the law of England. It is a court of record incident to every market or fair, of which the steward of him who owns or has the toll of the market is the judge; and its jurisdiction extends to administer justice for all commercial injuries done in that fair or market, and not in any preceding one; so that the injury complained of must be done, heard, and determined, before the determination of the fair or market. A writ of error lies, in the nature of an appeal to the courts of Westminster, which are bound to issue writs of execution in aid of its process after judgment, where the person or effects of the defendant are not within the limits of this inferior jurisdiction.

4. *A court baron* is incident to every manor, is not a court of record, and is holden by the steward within the said manor, and is of two natures; the one a customary court appertaining to the copy holders; the other a court of common law. This may hold a plea of any personal actions where the damages do not amount to forty shillings. Proceeding may be removed from hence into the county court, by a precept from the sheriff, called a *tolt*; and also into the superior courts, by the king's writ of *pone*.

5. *An hundred court*, is only a larger court baron, being held for all the inhabitants of a particular hundred, instead of a manor. It is no court of record; causes are liable to removal from hence, and may also be reviewed by writ of false judgment.

6. *A county court*, is incident to the jurisdiction of the sheriff, and is not a court of record; it may hold pleas of debt or damage under the value of forty shillings, but by special writ called a *justicies*, the sheriff is empowered. for the sake of dispatch, to do the same justice in his county court, as might otherwise be had at Westminster. Proceedings may also be removed from hence into the king's superior court, by writ of *pone* or *recordari*.

7. *The court of common pleas, or common bench.*— The judges of this court are at present four in number, one chief, and three *puisne* justices, created by the king's letters-patent, who sit every day in the four terms to hear and determine all matters of law arising in civil causes, whether real, personal, or mixed and compounded of both. These it takes cognizance of, as well originally, as upon removal from the inferior courts before mentioned. A writ of error, in the nature of an appeal, lies from this court into the court of King's Bench.

8. *The court of King's Bench* is the supreme court of common law in the kingdom, consisting of a chief justice and three *puisne* justices, who are by their office the sovereign conservators of the peace, and supreme coroners of the land. Though the king used to sit here, and still is supposed so to do, he did not, neither by law is he empowered, to determine any cause, or motion, by the mouth of his judges. This court may follow the king at his pleasure.

This court keeps all inferior jurisdictions within the bounds of their authority, and may either remove their proceedings, to be determined *there*, or prohibit their progress below. It superintends all civil corporations in the kingdom. It commands magistrates and others to do what their duty requires of them, in every case where there is no other specific remedy. It protects the liberty of the subject by speedy and summary interposition. It takes cognizance both of criminal and civil causes; the former, in what is called the crown side, or crown office, the latter in the plea side of the court. But on the plea side, or civil branch, it has an original jurisdiction and cognizance of all actions of trespass, or other injury alleged to be committed "*vi et armis*;" of actions for forgery of deeds, maintenance, conspiracy, deceit, and actions on the case, which allege any falsity or fraud; but no action of debt, or detinue, or other mere civil action, can, by common law, be prosecuted by any subject in this court by original writ out of chancery; though an action of debt given by statute, may be brought in the King's Bench as well as in the Common Pleas.

This is also a court of appeal, into which may be removed, by writ of error, all determinations of the court of Common Pleas, and of all inferior courts of record in England, and to which also a writ of error lies from the court of King's Bench in Ireland. Yet even this is not the *dernier resort* of the subject, for if he is not satisfied, he may remove his suit by writ of error into the House of Lords or Court of Exchequer, according to the nature of it.

9. *The Court of Exchequer* is inferior in rank, not only to the court of King's Bench, but to the Common Pleas also; but is an ancient court of record, of law, and equity. The preliminary business of this court was to bring actions to recover debts due to the crown; but as by a fiction almost all sorts of civil actions are now allowed to be brought in the King's Bench, in like manner, by another fiction, all kinds of personal suits may be prosecuted in the Court of Exchequer.

10. *The High Court of Chancery*, in which the lord chancellor presides, consists, like the court of exchequer, of two distinct tribunals; the one ordinary, being a court of common law; the other extraordinary, being a court of equity. This latter court is now become the court of the greatest judicial consequence; and from this court of equity, as from the other superior courts, an appeal lies to the House of Peers. But there are these differences between appeals from a court of equity, and writs of error from a court of law, 1. That the former may be brought upon any interlocutory matter; the latter upon nothing but a definitive judgment. 2. That on writs of error, the House of Lords pronounces the judgment; on appeals, it gives direction to the court below to rectify its own decree.

11, *The Court of Exchequer Chamber*, has no original jurisdiction, but is only a court of appeal, to correct the errors of other jurisdictions, and to determine causes by writs of error from the common law side of the Court of Exchequer. From all the branches of this court a writ of error lies to,

12. *The House of Peers*, which is the supreme court of judicature in the kingdom, to rectify any injustice of the law committed by the courts below, and in all dubious cases referring themselves to the opinion of the judges, who are summoned by writ to advise them.

13. *The courts of assize and nisi prius* are composed of two or more commissioners, who are sent twice in every year round the kingdom (except London and Middlesex, where courts of *nisi prius* or *sittings* are holden in and after every term, before the chief or other judges of the several superior courts, and excepting the four northern counties, where the assizes are holden once a year,) to try by a jury of the respective counties the truth of such matters of fact as are then under dispute in the courts of Westminster-Hall. They usually make their circuits in the respective vacations after Hilary and Trinity terms.

14. *Ecclesiastical courts* (which were separated from the temporal courts by William the Conqueror,) or courts Christian, are, 1. The court of the arch-deacon, which is the lowest court in the whole ecclesiastical polity; from whence an appeal lies to that of the bishops. 2. The court of the bishops' consistory, which is held in their several cathedrals, for the trial of all ecclesiastical causes arising within their respective dioceses; whence an appeal lies to the archbishop of each province respectively. 3. The court of arches, which is a court of appeal belonging to the archbishop of Canterbury; whence an appeal lies to the king in chancery (that is, to a court of delegates appointed under the king's great seal) as supreme head of the church. 4. The court of peculiars, which is a branch of and annexed to the court of arches; whence also an appeal lies to the king in chancery. 5. The prerogative court, which is established for trial of all testamentary causes, where the deceased has left *bona notabilia* within two different dioceses; the judge is called the judge of the prerogative court, from whom an appeal lies to the king in chancery. 6. The court of delegates (*judices delegati*) which is the great court of appeal in all ecclesiastical causes, appointed by the king's commission under his great seal, and issuing out of chancery, to represent his royal person, and hear all appeals made to him. 7. A commission of review, which is a commission sometimes granted in extraordinary cases, to revise the sentence of the court of delegates.

15. Of *courts military*, the only one is governed by the laws of chivalry; but even this one seems now in disuse. *Courts martial* are annually established by act of parliament, being only temporary.

16. *Maritime courts* are, 1. The court of admiralty, which has jurisdiction over offences committed upon the seas, or in parts out of the reach of the common law. 2. The court of delegates; and, 3. The lords of the privy council, and others authorized by the king's commission for prize causes.

17. *Courts of a private or special jurisdiction* are, 1. The forest courts, including the courts of *attachments*, *regard*, *sueinmote*, and *justice-seat*, all of which are now in disuse. 2. The court of commissioners of sewers, whose jurisdiction is to overlook the repairs of sea banks and sea walls, the cleansing of rivers, public streams, &c. 3. The Marshalsea and the palace court, having jurisdiction twelve miles round the king's palace. 4. The courts of the principality of Wales. 5. The court of the duchy of Lancaster. 6. The courts of the counties palatine, and other royal franchises. 7. The stannary courts of Cornwall and Devon, to administer justice among the miners. 8. The courts of London, and other corporations; to which may be referred the courts of requests, or courts of conscience, and the modern regulations of certain courts baron, and county courts. 9. The courts of the two universities, which enjoy the sole jurisdiction, in exclusion of the king's courts, over all civil actions and suits whatsoever, when a scholar or privileged person is one of the parties, except in such cases as where the right of freehold is in question.

18. *Injuries to the rights of persons* are redressed by *suits* or *actions*, which are defined to be the legal demand of one's right, and these are, 1. Personal. 2. Real. 3. Mixed.

19. (1.) *Personal actions* are, where a satisfaction is claimed of damages for some injury done either to person or personal property.

20. (2.) *Real actions* concern real property only, such as lands, rents, commons, and other hereditaments.

21. (3.) *Mixed actions* partake of the nature of both, such as actions for waste, brought by him who has the inheritance in remainder, or reversion, to recover the land upon which the waste has been committed, and treble damages, in pursuance of the statute of Gloucester.

22. The general and orderly parts of a suit in the courts of common law are, 1. The original writ. 2. The process. 3. The pleadings. 4. The issue or demurrer. 5. The trial. 6. The judgment and its incidents. 7. The proceedings in nature of appeals. 8. The execution.

23. (1.) *The original writ* must be regulated according to the circumstances upon which the action is founded, either *detinue*, *trover*, *trespass vi et armis*, &c. An original writ is from the court of chancery, directed to the sheriff of the county wherein the injury is committed, or supposed so to be, requiring him to command the wrong-doer either to do justice to the complainant, or else to appear in court and answer the accusation against him. Whatever the sheriff does in pursuance of this writ, he must return or certify to the court, together with the writ itself, it being the king's warrant for the judges to proceed to the determination of the cause.

24. (2.) The *process* is the means of compelling the defendant to appear in court to answer to the original writ. This is called original process, when founded upon the original writ, to distinguish it from mesne or intermediate process, which issues pending a suit, as to summon juries, witnesses, &c.

The primary step in process is to give notice to the party to obey the original writ. This notice is given, except in trespasses real or presumed against the peace, by *summons*. If the defendant disobeys this monition, the practice now is, to sue out a *capias* in the first instance upon the supposed return of the sheriff; and if the sheriff return *non est inventus*, or that he is not in his bailiwick, a *testatum capias* issues, directed to the sheriff of whatever county he is supposed to be in. And where an action is brought in one county, and the defendant lives in another, it is usual to make out a *testatum capias* at first, supposing a *capias* and an *original* to have issued. But where the plaintiff wishes to proceed to outlawry, process must be gone regularly through; and upon a *non est inventus* being returned, then shall an *alias* issue, and after that a *pluries:* and if a *non est inventus* is returned upon all these, a writ of *exigent facias* issues, to which is returned *quinto exactus.* The defendant shall then be outlawed by the coroners of the county; and if after outlawry he appears, he may be arrested by *capias utlagatum.* These are the established rules of proceeding in the common pleas, in which the other courts vary but little.

If the defendant appears and puts in sureties for his future attendance, which sureties are called *common bail*, being the same two imaginary persons that were pledges for the plaintiff's prosecution, John Doe and Richard Roe; or if the defendant does not appear upon the return of the writ, or within four (or in some cases eight) days after, the plaintiff may enter an appearance for him, and proceed thereupon as if the defendant had entered his appearance himself.

If it be for a debt contracted, and the plaintiff make oath that the defendant truly owes him 15*l.* or upwards, over and above and exclusively of any costs, charges, or expences that may have been incurred in the endeavour to recover the same, (except where the debt arose upon any bill or promissory note, for in that case the sum of 10*l.* is sufficient,) and that there had been no offer to pay in bank notes, he may arrest him, and compel him to put in substantial or special bail. The arrest must be by corporally seizing or touching the body; after which the bailiff is justified in breaking open doors to take his prisoner.

Persons exempt from arrest are, peers of the realm, peeresses by birth or marriage, members of parliament, corporations, clerks, attornies, and all other persons attending the courts of justice. These must be sued by bill of privilege. Clergymen performing divine service, members of convocation when in attendance, suitors and witnesses attending courts of record, and the king's servants, are also exempt. An arrest must not take place in the presence of the king, or in the verge of his royal palace, or where his justices are sitting. No arrest can be made upon a Sunday, except for treason, felony, and a breach of the peace.

When the defendant is regularly arrested, he must either go to prison, or put in special bail to the sheriff. Upon return of the writ, or four days after, if the defendant do not appear and justify bail *above*, that is, by the bailers swearing themselves to be householders, and of sufficient substance, the plaintiff may take an assignment of the bail below from the sheriff, and bring an action thereupon, and if that bail be bad, the sheriff is responsible.

25. (3.) *Pleadings* are the mutual altercations between the plaintiff and defendant, delivered in writing into the proper office; under which are comprised, 1. The declaration, or count on which the cause of complaint is set forth. 2. The defence, which is either to action, or a dilatory plea, such as questioning the jurisdiction of the court, the ability of the plaintiff, he being an alien, outlaw, infant, &c. A plea to action is either by silence, and thereby suffering judgment to go by default; or traversing, that is, by acknowledging some part, and denying the rest. The defendant may plead a set off, by stating that the plaintiff owes him a sum of money, and deducting such sum from the plaintiff's demand, and paying the remainder into court, which is done by motion: and if the plaintiff do not recover more than the sum paid in, he shall pay the defendant's costs. Pleas that *totally* deny the cause of complaint, are either the *general issue*, or special pleas in bar, which deny at once the whole declaration; as *nil debet* to a debt; *non est factum* to a bond; in real actions, a general release, or a fine; in personal actions, an accord, arbitration, nonage, statute of limitations, &c. An *estoppel* is likewise a special plea in bar; this happens where a man has done some act, or executed some deed, that stops or precludes him from averring any thing to the contrary.

In all pleadings, it is necessary to observe, 1. That they be single, and without duplicity. But a man, with leave of the court, may plead two or more distinct matters or single pleas; as in an action of assault and battery, not guilty, *son assault demesne*, and the statute of limitations. 2. That the plea be direct and positive; and not argumentative. 3. That it have convenient certainty of time, place, and persons. 4. That it answer the plaintiff's allegations in every material point. 5. That it be so pleaded as to be capable of trial. When the plea of the defendant is thus put in, if it does not amount to an issue, or total contradiction, but only evades the allegation, the plaintiff may plead again, and in his replication may totally traverse the defendant's bar, by denying the facts adduced. To the replication, the defendant may rejoin, or put in an answer called a *rejoinder*. The plaintiff may answer the rejoinder by a *sur-rejoinder;* upon which the defendant may *rebut*, and the plaintiff may answer him by a *sur-rebutter*.

26. (4.) *Issue and demurrer.* Issue, is where the parties in a course of a pleading come to a point affirmed on one side and denied on the other, which, if it be matter of law, is called demurrer, and confesses the fact to be true, but denies that the plaintiff has any legal remedy; a demurrer may also arise from informality in the course of pleadings. The party thus demurring, if it be special, must set forth where such deficiency lies, and the opposite party must aver it to be sufficient, which is called a *joinder* in demurrer; and then the parties are at issue in point of law, which issue in law is determined by the judges of the court wherein such action is brought. An issue of fact is where the fact only, and not the law, is disputed. And where he that denies or traverses the fact pleaded by his antagonist has tendered the issue thus, "and this he prays may be inquired of by the country;" it may be immediately subjoined by the other party, "and the said A. B. doth the like." Which being done, the issue is said to be joined; the action is then to be tried by the country (*per patriam*,) that is by jury.

27. (5.) *Trial and the several species of trial.* Trial is the examination of any fact put in issue. The trial of an issue of law, or demurrer, is by the opinion of the judges of the court. The trial of an issue of fact is, 1. By record. 2. By inspection. 3. By witnesses. 4. By wager of *battel*. 5. By wager of law. 6. By jury.

Trial by the record is had where the matter of record is pleaded in action; as a fine, judgment, or where such a manor is held of ancient demesne, &c. and the opposite party plead "*nul tiel record*," that there is no such record.

Trial by inspection or examination, is had when the matter in question is the evident object of the senses; wherein the judges of the record shall decide upon their own investigation. Trial by certificate is allowed, when the fact in question lies out of the cognizance of the court; as whether such a one was absent in the king's army; this shall be tried by certificate under seal. Whether defendant be a citizen of London, here the certificate of the sheriff of London is sufficient.

The trial by witnesses without the intervention of a jury, is the only method of trial known to the civil law, and is used only upon the writ of dower, when the direct issue is whether the husband be dead; and in a few collateral circumstances, as whether a juror, or tenant to a real action, was duly summoned,

Trial by wager of battel, in civil cases, is only had on a writ of right; but in lieu thereof the tenant may have, at his option, the trial by the grand assize.

Trial by wager of law, is only had where the matter in issue may be supposed to have been privately transacted between the parties themselves without the intervention of witnesses, and may happen upon action of debt, detinue, account, and the like. He that has waged, or given security to make his law, brings with him into court eleven of his neighbours as *compurgators;* he is there admonished of the consequence and iniquity of perjury: he then swears to the fact, upon which his compurgators swear to his veracity.

Trial by jury, in civil causes, is either *extraordinary* or *ordinary.* The former mode is now seldom used. We confine ourselves therefore to the latter. A jury is composed of twelve men, being equals or peers to the parties litigant. The cause being in court, the jury is sworn in, unless challenged by the party. Challenges are of two sorts: challenges to the array, and challenges to the polls. Challenges to the array are at once an exception to the whole pannel, which may be quashed from any appearance of the impannelling. If either party be an alien, he may challenge the array, and have one half denizens, and the other foreigners, for more impartial trial. Challenges to the polls in *capita* are exceptions to particular jurors, the principal of which are, for suspicion of bias or partiality, and for some crimes or misdemeanors that affect the juror's credit, as conviction of perjury, treason, felony, conspiracy, having been pilloried, or in any other manner rendered infamous.

The jury being impannelled, the pleadings are opened by the party who holds the affirmative; the counsel briefly states what has been transacted in the court above, the parties, and the nature of the action, and upon what point the issue is joined: he next states the nature of the case and the evidence intended to be produced. When this evidence is gone through, the advocate on the other side opens the adverse case, and supports it by evidence; and then the party which began is heard in reply.

Evidence to a jury in written proofs, are records or writtings, and deeds of sufficient antiquity; modern deeds and other writings must be attested and verified by parole evidence; no hearsay evidence will ever be admitted. One witness, if credible, is sufficient evidence; and in some cases the party himself takes what is called the *suppletory oath*, and is then allowed to give evidence, and if that evidence does not implicate himself, it is accounted good.

When the evidence is gone through, the judge sums up the whole to the jury, and gives them his opinion in matters of law arising upon that evidence. When the jury are agreed, the foreman delivers their verdict. In some difficult cases the jury give a special verdict; that is, they state the fact, but leave it to the court to judge of the law.

28. (6.) Next follows the *judgment* of the court upon what has previously passed. Judgment may be here suspended or finally arrested, for it cannot be entered till the next term, and that upon notice to the other party. So that in case of any defect in point of fact, or law, or excessive damages, the party may have relief in the court above, or by obtaining a new trial; which is the rehearing of the cause before another jury, but with as little prejudice to either party, as if it had never been heard. Judgments are either interlocutory or final; interlocutory, when given in the middle of a cause, upon some plea, proceeding, or default; which is only intermediate, and does not finally determine the suit. Costs, or expences, follow judgment, and shall be paid, after taxation, by the vanquished party.

29. (7.) *Proceedings in nature of appeals are*, 1. Writs of deceit, which may be brought in the court of Common Pleas to reverse a judgment there had by fraud or collusion in a real action. 2. Writ of *audita querela*, to discharge a defendant upon some matter having arisen since judgment: where the party would be entitled to an *audita querela*, the court, upon motion, will give a summary relief. 3. Writ of error, which lies from the inferior courts of record in England, into the King's Bench, to correct judgments erroneous in point of law, and not helped by the statutes of *amendments* and *jeofails*. The parties bringing a writ of error must, except in some peculiar cases, find substantial pledges for prosecution.

30. (8.) *Execution.* If judgment be not superseded or reversed, the next and last step is the execution, or putting in force that judgment.

31. *Proceedings in the courts of equity.* The proceedings in the court of Chancery correspond nearly to the practice in the court of Exchequer, the two great courts of equity. In describing, therefore, the procedure of the former, we sufficiently describe that of the latter. The business of equity is almost infinite, but is chiefly to give relief in matters of fraud, accident, and trust; *secundum conscientiam et arbitrium boni viri.* Proceedings are by bill, setting forth the circumstances of the case at length, "and that orator is wholly without remedy at common law," praying therefore relief, and also process of subpœna against defendant, to compel him to answer upon oath all the matter charged in the bill; if it be to stay, waste, or to stop proceedings at law, an injunction is also prayed. The bill must call all necessary parties, however remotely interested, before the court, otherwise no decree can be made to bind them, and must be signed by counsel.

32. When the bill is filed in the office of the six clerks, an injunction may be prayed, which may stay execution on excessive judgment; and if the defendant does not put in his answer within the stated time allowed, an injunction issues of course. If for waste or other urgent injuries, then, upon filing the bill, and a proper case supported by affidavit, the court will grant an injunction immediately, to continue until defendant has put in his answer. It is then determined upon argument, whether the injunction shall be taken off or not.

33. If the defendant upon service fails to appear within the time limited, and plead, demur, or answer to the bill, he is then said to be in contempt; and the court will attach him by writ, commanding the sheriff to take up the defendant, and bring him into court. If *non est inventus* is returned, then an attachment with proclamations issue, summoning the defendant upon his allegiance personally to appear and answer. Upon *non est inventus* being returned, a commission of rebellion is awarded against him; upon *non est inventus* being again returned, the court sends a serjeant at arms in quest of him; and if the defendant eludes him, then a *sequestration* issues to seize all his personal estate, and the profits of his real estates, and to detain them, subject to the decision of the court. After an order for sequestration has issued, the plaintiff's bill is to be taken *pro confesso*, and decree to be made accordingly. If the defendant is taken upon any of these proceedings, he is committed to the Fleet, till he puts in his appearance or answer. The process against *a body corporate* is by *distringas*, to distrain them by their goods and chattels, in order to compel them to obey the summons. If a *peer* be a defendant, the chancellor sends a letter *missive* to him; and if he neglect to appear, he may be served with a pubpœna; and if he still continue in contempt, a sequestration issues without any of the *mesne* process of attachment. The same process issues against *a member of the House of Commons*, except only that the lord chancellor sends him no letter missive.

If a defendant absconds, as is believed, to avoid being served with a subpœna, a day is appointed for him to appear to the bill of the plaintiff, which appointment is to be inserted in the London Gazette, and read in the parish church where the defendant last lived, and fixed up at the Royal Exchange; and if the defendant does not appear upon that day, the bill shall be taken *pro confesso*.

34. If a defendant appears and takes a copy of the bill,

he is next to *demur*, *plead*, or *answer*. If on demurrer the defendant prevails, the plaintiff's bill shall be dismissed. If the demurrer is overruled, the defendant is ordered to plead. A plea may either be to the jurisdiction or to the person; as that the plaintiff is an outlaw, &c. or in bar; as an act of parliament, fine, release, or former decree. The The truth of this plea the defendant is bound to prove, if put upon it by the plaintiff. In bills containing various matter, a man may plead as to part, demur as to part, and answer as to the residue: no exceptions to formal *minutiæ* will be allowed; for the parties, upon discovery of any errors, may correct them. An answer is the usual defence to a bill; it is given upon oath, or honour of a peer or peeress. Answers in amicable suits are usually taken without oath, by consent of the plaintiff.

35. If the plaintiff finds sufficient matter confessed in the defendant's answer to ground a decree upon, he may proceed to the hearing of the cause upon bill and answer only; but in that case, he must take the defendant's answer to be true in every point. But if the issue be joined upon the contradiction of facts, such facts are proved by the examination of witnesses, and their depositions are taken in writing. For such purpose interrogatories are framed in writing, which, and which only, are to be asked of the witnesses: such interrogatories must be short and pertinent. For those witnesses who live in the country, a commission to examine is granted to four persons, two named on each side; and a commission may be had to examine persons residing beyond sea.

36. The chancellor's decree is either interlocutory or final. It seldom happens that the first decree is final; for if any matter of fact is strongly controverted, the fact is usually directed to be tried at the bar of the King's Bench, or at the assizes upon a feigned issue. And if a question of mere law arises, it is the practice of this court to refer it to the opinion of the judges of the King's Bench, or Common Pleas, upon a case stated for that purpose. When all issues are tried and settled, and all references to the master ended, the cause is again brought to hearing upon the matters of equity reserved, and a final decree is made; the performance of which is enforced, if necessary, by commitment of the person, or sequestration of the party's estate. And if by this decree either party think himself aggrieved, he may petition the chancellor for a rehearing. But after the decree is once signed and enrolled, it cannot be reheard or rectified but by bill of review, or by appeal to the House of Lords.

37. A bill of review may be had upon apparent error in judgment, or discovery of new matter or evidence.

38. An appeal to the House of Lords is effected by petition to the house.

BOOK IV.

OF CRIMES.

I. Where only the rights of an individual are infringed, coupled with no violence, it is a civil injury; where the rights of society are invaded by the commission of violence, it is a crime or misdemeanor. The king, being the supreme head of the community, is the person injured upon any infraction of the public rights, and therefore is, in all cases of public crimes and misdemeanors, the proper prosecutor. Misdemeanors comprehend all indictable offences not amounting to *felony*. A crime, or misdemeanor, may arise either from the omission or commission of any act, in violation of public law; as where a man digs a ditch across a highway, he is guilty of a public misdemeanor; and if any injury thereby happens to an individual, he is compellable to make satisfaction for the civil injury, and indictable for the public offence. The law considers it not so flagrant an enormity to attempt an unlawful action, as the absolute perpetration; and the violence of passion, or temptation by hunger, may in some degree extenuate a crime. Circumstances may also tend to aggravate an offence; as where a servant robs his master, or stealing *privately* from one's person the value of twelve-pence, is a capital offence; but even the carrying off a load of corn from an open field is punished merely with transportation.

II. All persons are capable of committing crimes, unless there be in them a defect of will; for, to constitute a legal crime, there must be both a vicious will and a vicious intention; and such vicious intention or *overt act* is demonstrated by some evident premeditation. So where an act is the effect of idiotism, infancy, lunacy, chance medley, compulsion, or necessity, there cannot be a vicious intent. *Infants under the age of discretion*, ought not be punished by any criminal prosecution whatever. The discretion that accompanies the perpetration or secretion of a crime will determine how far the infant possessed discretionary powers. Under the age of seven years an infant cannot be guilty of felony. In some cases of omission and commission, the law privileges an infant, if such action arise from his legal incapacity, but not for such acts as a breach of the peace when above the age of fourteen years. Persons of *non-sane memory* cannot be tried for what they have done in sound memory, and if after trial they become mad, judgment cannot be pronounced upon them; or if they become deranged after judgment, execution shall be stayed, and a jury shall determine, where there is any doubt, whether a party be *compos* or not. *Drunkenness* is a voluntary madness, and is consequently an aggravation of an offence. The parties stand excused of accidents by *chance medley*, arising from the performance of some lawful act; but there is no excuse where accidents happen from the performance of an illegal act. The law seems to protect the *wife* in all felonies committed by her *in company with her husband*, except for murder and man-slaughter. *Theft from necessity or starvation* cannot be justified by the law of England; for in this country the poor laws are established, to ameliorate the condition of the distressed. The law will not presume the king capable of doing any thing inconsistent with his station and dignity; it therefore considers him incapable of committing any crime.

III. A principal in a crime is he who commits the fact, or is present at aiding, or in any way maliciously abetting the commission. An accessary is he who doth not commit the fact, nor is present at the commission, but is in some sort concerned therein either before or after. In high treason there are no accessaries, but all are principals. In petit treason, murder, and felonies, with or without benefit of clergy, there may be accessaries. There are no accessaries in petit larceny, and all crimes under the degree of felony either before or after the fact. An accessary *before* the fact is one who, being absent when the crime is committed, has procured, counselled, or commanded another to commit it. An accessary *after* the fact is where a person, knowing a felony to have been committed, receives, relieves, comforts, or assists the felon with the means of escape, to the hinderance of public justice. The receivers of stolen goods are accessaries, (where the felony admits of accessaries,) and may be prosecuted for the misdemeanor, even if the principal be not taken; and if convicted, in some cases transported for fourteen years.

IV. *Offences against divine law.* 1. An apostate, or any one writing, printing, or teaching doctrines that have a tendency to invalidate the Christian faith, shall neither have the benefit nor protection of the law; is liable to be imprisoned for the second offence for three years, and rendered incapable of being guardian, executor, legatee, or purchaser of lands.

2. Offences against the established church, such as *reviling its ordinances*, is punished by fine and imprisonment. A minister speaking derogatorily of the common prayer, shall be imprisoned one year for the first offence, and for life for the second: if beneficed, be imprisoned six months for the first offence, and forfeit a year's value of his benefice; for the second offence, lose his benefice, and suffer one year's imprisonment; for the third, imprisoned for life. And if any person, in plays, songs, or other open words, speak in derogation of the said book, or prevent the reading of it, he is subject to pecuniary penalties. The penalties for Protestants dissenting, are suspended by the toleration act during their compliance with the conditions therein enacted; and any one disturbing such congregation shall be bound over to keep the peace, and forfeit 20*l.*

3. The penalties for Popery are more severe; for they not only differ in religious opinion, but acknowledge a foreign power superior to the sovereignty of the kingdom, consequently cannot be put upon the footing of good subjects. But by 31 Geo. III. c. 32, all Roman Catholics, who renounce by oath the Pope's civil power, and abhorrence of the doctrines of destroying and not keeping faith with heretics, and deposing or murdering princes excommunicated by authority of the see of Rome, shall not be prosecuted under the severe statutes enacted against Popery. And by virtue of this statute, any of them may practise as a barrister, attorney, or notary. Roman Catholics cannot sit in either house of parliament, because every member must take the oath of supremacy; nor can they vote at elections, for all votes must be given upon a similar oath.

4. Blasphemy in prophanely scoffing at the holy Scriptures, or exposing them to contempt and ridicule, are offences punishable at common law.

5. Every labourer, sailor, or soldier, swearing or cursing, shall forfeit one shilling; every other person under the degree of gentleman, two shillings; and every gentleman or person of superior rank, 5 shillings, to the poor of the parish. These penalties are doubled and trebled according to the number of times they are committed; and, in default of payment, commitment to the house of correction for ten days: the conviction must take place within eight days of the offence before a justice of the peace. If any person, in any stage play, interlude, or show, profanely use any of the names of the holy Trinity, he shall forfeit 10*l.*

6. Any person pretending a knowledge in the occult sciences or witchcraft, is punishable with a year's imprisonment and the pillory.

7. Religious impostors, such as falsely pretend an extraordinary commission from heaven, are punishable with corporal correction and imprisonment.

8. Profanation of the Lord's Sabbath, such as selling merchandise, or frequenting any play or interlude upon any holy day, infers a forfeit of three shillings and fourpence to the poor. Any one working upon such days shall forfeit 5 shillings; nor shall any drover, carrier, or the like, travel upon such days, under pain of 20 shillings. Any baker exercising his occupation, except between the hours of nine and one o'clock, shall forfeit 10 shillings for the use of the poor.

9. Drunkenness is also punished with the forfeiture of 5 shillings, or set in the stocks for six hours.

10. The offence of notorious lewdness, as exposition of person, or frequenting houses of ill fame, is punished by fine and imprisonment.

V. *Offences against the law of nations* are, 1. The *violation* of *safe conduct*, or *passports* expressly granted by the king or his ambassadors to the subjects of a foreign power in time of mutual war; or committing acts of hostilities against such as are in amity, league, or truce with the nation, which by the law of England is high treason, and restitution shall be made to the party injured.

2. The rights of ambassadors are cognizable by the common law, and it will immediately stop all legal process sued out against them, or their domestic servants; so that all persons executing such process are deemed violators of the laws of nations, and shall suffer such punishment as the lord chancellor and the chief justices, or any two of them, shall think proper to inflict.

3. Piracy, or robbery, and depredations upon the high seas, is felony in a subject. Mutineers, or those *aiding* or making a revolt on board ship, are considered pirates. The widows of seamen slain when protecting a vessel against the attack of pirates, are entitled to a bounty; and seamen wounded in such defence, shall be entitled to a pension from Greenwich Hospital.

VI. Another great branch of offences, relates to the *supreme executive magistrate;* of these *high treason* is the principal. This crime, (so far as distinguished by 25th Edw. III. c. 2,) is, 1. "Where any one doth compass or imagine the death of our lord the king, of our lady his queen, or their eldest son and heir." In this description it is held, that a queen regnant is included, but not her husband. Even an usurper, who has got possession of the throne, comes within the meaning of the statute; for allegiance is due to him also for his temporary protection of the public rights; and all subjects are excused from any penalty or forfeiture who assist and obey a king *de facto.* *Compassing or imagining the death of the king*, is even the mind or will to accomplish his death, and not an actual perpetration; the malicious intent must be demonstrated by some *overt act*, to constitute high treason. Endeavouring to imprison the king, is an overt act of treason. 2. Violating with or without force the queen consort, the king's eldest daughter unmarried, or the wife of his eldest son. 3. Levying war against the king in his realm. 4. Comforting, assisting, or giving information to the king's enemies. 5. Counterfeiting the king's great or privy-seal. 6. Counterfeiting the king's gold and silver money, or importing counterfeit coin. 7. Killing the chancellor, treasurer, king's justices of any of the benches, justices of assize, and all other justices assigned to hear and determine causes, being in their places doing their offices.

2. High treasons, created subsequent to 25th Ed. III. are, 1. Such as relate to Papists in certain circumstances; as the repeated defence of the Pope's jurisdiction; the returning from beyond sea of a natural-born Popish priest, unless driven in by stress of weather; the renouncing of one's natural allegiance and reconciliation to the Pope. 2. Any person falsely counterfeiting, or importing and uttering counterfeit, such coin of gold or silver, *as is not the proper coin of this realm*, (counterfeiting the coin of the realm being already provided against, by 25th Ed. III.) but shall be current within this realm by consent of the crown; or forging the sign manual, privy signet, or privy-seal; or clipping, washing, rounding, or filing the current money of the realm; or having in his possession implements for coining, or falsifying the current coin of the realm; shall be deemed guilty of high treason. And, 3. Writing or printing in derogation of the act of settlement, or of the power of parliament to limit the descent of the crown, shall also be deemed high treason.

3. The punishment of high treason, in males, is to be, 1. Drawn. 2. Hanged. 3. Embowelled alive. 4. Behead-

ed. 5. Quartered. 6. The head and quarters to be at the king's disposal. But in cases relating to the coin, only to be drawn, and hanged till dead. In the case of *females*, this last is the punishment for every species of high treason.

VII. *Felonies injurious to the king's prerogative*, form another class of crimes more immediately affecting the supreme executive magistrate. Felony, in the general acceptation of the English law, comprises every species of crime which occasions at common law the forfeiture of lands and goods; and to which capital or other punishment may be superadded, according to the degree of guilt. Felonies immediately injurious to the king's prerogative are, 1. The second offence of wilfully uttering counterfeit coin, and various other offences relating to the coin. 2. To assault, strike, wound, or attempt to kill any privy-counsellor in the execution of his office. 3. The enlisting into a foreign service, or the procuring men so to enlist, without the king's license. 4. Embezzling or destroying the king's warlike stores to the value of 20 shillings. 5. Desertion from his majesty's army and navy in time of war; seducing any person to desert from that service, or inciting mutiny therein. 6. Taking or administering an illegal oath.

VIII. Other offences of the same nature are punished by *præmunire*. The penalty of præmunire was originally intended as a barrier to the aggrandizing encroachments of the papal power; but since attached as a punishment to a number of offences; the most remarkable of which is, the being present at, or wilfully solemnizing any forbidden marriage of such of the descendants of the body of George II. as are by act of parliament prohibited to contract in matrimony without the consent of the crown. A person convicted of præmunire, is out of the king's protection, his lands and tenements, goods and chattels, are forfeited to the king; and his body remains in prison at the king's pleasure.

IX. *Misprisions* comprehend a further class of offences against the king and his government. They may be either negative, which consist in the concealment of something that ought to be revealed; or positive, consisting in the actual commission of something that ought not to be done. 1. Under the negative is comprehended; 1. *Misprision of treason*, or the bare knowledge and concealment of treason; for, by giving the least countenance to a traitorous proceeding, the party becomes guilty of high treason. The punishment of misprision of treason is, loss of the profits of lands during life, forfeiture of goods, and imprisonment for life. 2. Misprision of *felony*, or the concealment of a felony which a man knows, but never assented to; and 3. The *concealing of treasure trove*, which belongs to the king or his grantees; in both of which misprisions the penalty is fine and imprisonment.

2. Misprisions, which are merely positive, are denominated *contempts*, or *high misdemeanours*. 1. Mal-administration of public trusts and employments is punished by parliamentary impeachment, issuing in banishment, imprisonment, fines, or perpetual disability. 2. Contempts against the king's prerogative, such as refusing to aid him by advice in his councils, or person in his wars, or neglecting to join in the *posse comitatis*. Penalty, fine, and imprisonment, at the discretion of the king's courts of justice. 3. Contempts and misprisions against the king's person and government, as speaking or writing against them, or doing any thing that may tend to lessen him in the esteem of his subjects. Penalty, fine, imprisonment, and pillory. 4. Contempts against the king's title, are by denying his right to the crown in common discourse. Penalties, fine, imprisonment, and disability, being nearly equal to the punishment of *præmunire*. 5. Contempts against the king's palaces or courts of justice are high misprisions, such as maliciously striking another in the king's palace, whereby blood is drawn. Penalty, perpetual banishment, and fine at the king's pleasure, and loss of the offender's right hand. Striking in the king's superior courts of justice in Westminster-hall, or at the assizes, is not only a contempt of the king's majesty, but is also a disturbance of the public justice; therefore, the mere assaulting a judge, by drawing a weapon, is punished with the loss of the right hand, imprisonment for life, and forfeiture of goods and chattels, and of the profits of his lands during life. A *rescue* from any of these courts subjects the party to the like penalty. Using reproachful words, or contemptuous behaviour to a judge when in execution of his office, is punished with fine and imprisonment. Also, injurious treatment to those who are immediately under the protection of the court, and in execution of their office, or in any manner tampering with a witness, subjects the offender to the same punishment.

X. *Offences against public justice* are, 1. *Vitiating or falsifying records*, or personating others in courts of justice; it is felony without benefit of clergy.

2. A *gaoler* making his prisoner *bear false witness*, or become an *approver*, or an *appellor*, against his will. Penalty, judgment of felony.

3. *Obstructing the execution of lawful process*, or abusing any officer in his endeavours to execute his duty therein, so that he receives bodily hurt. Penalty, felony and transportation for seven years; and persons in disguise, joining in, or abetting any riot to oppose such process, are felons without benefit of clergy.

4. An *escape* of a person arrested upon criminal process, before he is put in hold. Penalty, fine and imprisonment. An officer negligently permitting a felon to escape, is considered guilty of an offence of equal degree with that of the felony committed, and is liable to be punished accordingly, if the felon be retaken and convicted; if not, to be fined and imprisoned.

5. *Breach of prison*, or any place of security, when lawfully committed for treason or felony, is felony at common law; and to break prison, when confined for any other inferior charge, is punished with fine and imprisonment as a high misdemeanor.

6. *Rescue* is the forcibly and knowingly freeing a person from an arrest or imprisonment; and is of equal magnitude as the guilt of a gaoler voluntarily permitting a prisoner to escape; consequently liable to similar punishment.

7. *Returning from transportation* before the expiration of the term for which the offender was transported, or ordered to transport himself. Penalty, felony without benefit of clergy.

8. *Taking a reward under the pretence of helping the owner to his stolen goods;* the offender shall suffer the same punishment as the felon is liable to who stole the goods, unless he give evidence against the principal felon.

9. *Receiving stolen goods, knowing them to be stolen*, is a high misdemeanor; such offender may be dealt with as an accessory to the theft and felony, if the principal felon be first taken and convicted.

10. *Theft-bote*, is where a party robbed not only knows the felon, but takes his goods again, or other amends, upon agreement not to prosecute. Penalty, fine and imprisonment. Even to advertise a reward for the return of things stolen, with no questions asked, or words to the same purport, subjects the advertiser and the printer to a forfeiture of *L*.50 each.

11. *Common barratry* is the stirring up suits or quarrels,

either at law or otherwise. Penalty, fine and imprisonment. If any one who has been convicted of forgery, perjury, subornation of perjury, or common barratry, shall practise as an attorney, solicitor, or agent in any suit, the court, upon complaint and proof, shall direct the offender to be transported for seven years.

12. *Maintenance* is an officious intermeddling or assisting in a suit that in no way belongs to one. Penalty, fine and imprisonment.

13. *Champerty* (*campi-partitio*) is a bargain with the defendant or plaintiff to divide the land or other matter sued for between them, if either prevail at law; which is also punished with fine and imprisonment.

14. *Compounding of information* upon penal statutes. Penalty, fine, pillory, and rendered incapable of ever after suing upon any popular action.

15. *Conspiracy* to indict an innocent man of felony, who is accordingly indicted and acquitted, is a farther abuse and perversion of public justice, and is punished by fine, imprisonment, and pillory. Also sending *threatening letters* to extort money or other valuables, upon which the same punishment follows.

16. *Perjury* is where one swears wilfully, absolutely, and falsely, to an oath administered by those having lawful authority so to do. Subornation is the procuring another to take a false oath. For the latter offence, the penalty is perpetual infamy, and a fine of 40*l.*, on the suborner; and in default of payment, imprisonment for six months, and to stand with both ears nailed to the pillory. For perjury, six months imprisonment, perpetual infamy, and a fine of 20*l.*, or to have both ears nailed to the pillory.

17. *Bribery*, or the giving a reward to influence a judge, or other person concerned in the administration of justice, is punished in inferior officers by fine and imprisonment, as also those who offer a bribe, though not taken. But judges forfeit treble the bribe, are punished at the king's will, and discharged from the king's service for ever.

18. *Embracery* is an attempt to influence a jury corruptly to one side, by promises, persuasions, entreaties, money, entertainments, and the like. Penalty, fine and imprisonment: and for the jury, perpetual infamy, imprisonment for a year, and forfeiture of tenfold the value of the bribe.

19. *False verdict of juries* is punished by attaint.

20. *Negligence of public officers*, as sheriffs, coroners, constables, and the like. Penalty, fine and imprisonment.

21. *Oppression of magistrates.*

22. *Extortion by officers.* Penalty, in both cases, imprisonment, fine, and sometimes forfeiture of the office.

XI. *Felonious breaches of the peace* are,

1. The riotous assembling of twelve persons, or more, and not dispersing within an hour after proclamation made for that purpose, or opposing the reading of such proclamation by force.

2 Appearing armed, in disguise, or with blackened faces.

3. Extorting money by sending threatening letters; each of which three offences is felony, without the benefit of clergy.

4. *Maliciously* to damage or destroy any *banks*, *sluices*, or other works on a navigable river. To destroy any turnpike, gate, or fence, toll-house or weighing-engine thereunto belonging, erected by authority of parliament. Penalty, transportation for seven years.

5. *Affrays*, or the fighting in public of two or more persons in some public place, and these affrays are more heinous according to the aggravation used, or the sacredness of the place wherein they are committed. Penalty, fine and imprisonment.

6. *Riots*, *routs*, and *unlawful assemblies*, must have three persons to constitute them, and assembled to do some unlawful act, as to pull down enclosures, &c. Penalty, fine and imprisonment.

7. *Tumultuous petitioning.* By 13 Car. II. st. i. c. 5. it is enacted, "that not more than twenty names shall be signed to any petition to the king, or either house of parliament, for any alteration of matters established by law in church or state, unless the contents thereof be previously approved in the county, by three justices, or the majority of the grand jury at the assizes or quarter sessions; and in London, by the lord mayor, aldermen; and common council; and that no petition shall be delivered by a company of more than ten persons, on pain in either case of incurring a penalty not exceeding 100*l.*, and three months imprisonment."

8. *Forcible entry and detainer*, as violently taking or keeping possession of lands and tenements, with menaces, force, and arms, without the authority of law. Penalty, fine and restitution, without inquiring into the merits of the title; for the law only recognises a peaceable entry.

9. *Riding or going armed* with dangerous or unusual weapons. Penalty, forfeiture of arms and imprisonment.

10. *Spreading false news* to create discord. Penalty, fine and imprisonment.

11. *False and pretended prophecies*, with intent to disturb the peace. Penalty for the first offence, fine of 10*l.* and one year's imprisonment; for the second, forfeiture of goods and chattels, and imprisonment during life.

12. *Challenge to fight* is an excitement to commit a felony, therefore is a misdemeanor.

13. *Libels* are the malicious defamation of any person, which becomes more heinous when a magistrate is the object ridiculed, either by printing, writing, signs, or pictures, in order to provoke him to wrath, or expose him to public hatred, contempt, and ridicule. Penalty, fine and corporal punishment. And for the greater facility in discovering persons who attempt publicly to defame others, it is enacted, "that every printer shall print upon the front of every paper which is printed on one side only, and upon the first and last leaves of every publication which contains more than one leaf, his name and place of abode; and in case of omission, shall forfeit for every copy published, 20*l.*; and every person who prints for profit shall keep one copy of every paper so printed, on which shall be written or printed the name and place of abode of the person by whom such printer shall be employed, and shall produce the same to any justice of the peace, who shall within the space of six months require to see the same, and upon neglect or refusal shall forfeit *L* 20.

XI *Offences against public trade* are,

1. *Owling*, which is the transporting wool or sheep out of the kingdom. Penalty, forfeiture of both sheep and vessel, and *L*.3 for every sheep, imprisonment for three months, and three shillings for every pound of wool, fuller's earth, or pipe clay.

2. *Smuggling*, or importing goods without paying the duties imposed thereon. Penalties, fine, loss of goods; and when accompanied with any forcible act, or even in disguise, felony without benefit of clergy.

3. *Fraudulent bankruptcy*, or any act that tends to defraud the creditors of a bankrupt. Penalty, felony without clergy.

4 *Usury* is the exterting more than 5*l.* per cent. per annum for the loan of money. Penalty, such usurious contracts vitiated, and the lender shall forfeit treble the sum so lent.

5 *Cheating* or *cozening* another by artful means. Penalty, fine, imprisonment, and pillory.

6. *Forestalling* the market, is also an offence against public trade.

7. *Regrating*, or buying corn and selling it again in the same market, for the purpose of enhancing the price.

8. *Engrossing* is also the buying up large quantities of corn or other victuals, with intent to sell again. Penalty for each of these three offences, fine and imprisonment.

9. *Monopolies and combinations* to raise the price of provisions, or commodities, or rate of labour. Penalty, fine and imprisonment; pillory for the second offence, and increased fine; for the third, pillory, loss of one ear, and perpetual infamy.

10. *Exercising a trade without having served an apprenticeship*, or otherwise *become free*. Penalty, fine of 40 shillings per month.

11. *Seducing artificers* to reside abroad, or transporting them, or engines for the manufacture of woollen, cotton, linen, or silk, and the residing abroad of such artificers. Penalty, fine, imprisonment, forfeiture, incapacity of bearing any public office.

XIII. *Offences against the Public Health* are,

1. When persons *infected with the plague*, or dwelling in any *infected house*, being commanded to keep within such house by the mayor or constable, or other head officer of the place, shall disobey the injunction, they shall be punished as vagabonds, by whipping; and if they have upon them any infectious sore, are guilty of felony. Ships coming from any country, visited with any infectious disease, are liable to be placed under quarantine for forty days; and persons coming from a ship, while under quarantine, are subject to fine and imprisonment.

2. *Selling unwholesome provisions*, or brewing unwholesome liquors, &c. come under the same class of offences. The penalty is amercement, pillory, imprisonment; and for the fourth offence, abjuration of the town wherein the offence was committed.

XIV. *Offences against the Public Police and Economy* are,

1. *Clandestine marriages*. To solemnize a marriage except where banns are usually published without license, and to solemnize marriage in such place without due publication of banns, is felony; and the person so solemnizing liable to transportation for fourteen years; the marriage also being void. To destroy or falsify a marriage register, is felony without clergy.

2. *Bigamy*, or *polygamy*, is the having more wives than one at the same time; such second marriage is void. Penalty, transportation.

3. *Idle soldiers* or *mariners*, wandering about the country, are esteemed vagabonds, and come within the meaning of the vagrant act.

4. Also *Egyptians*, or *gypsies*, and impostors, shall be deemed rogues and vagrants.

5. *Common nuisances* are, 1. Such annoyances as render highways or bridges impassable, either by obstructions, or from the want of necessary reparations. Persons so offending are proceeded against by indictment, and are liable to fine, besides reparation. 2. All disorderly inns or alehouses, bawdy-houses, gaming-houses, stage-plays, unlicensed booths and stages for rope-dancers and mountebanks, are also declared public nuisances; and may, upon indictment, be suppressed, and the owners fined. 3. Letting off fire works, or making and selling them. Penalty, fine. 4. The keeping or carrying too large a quantity of gunpowder at one time. Penalty, fine and forfeiture.

6. *Persons losing at play* more than *L.*100 at any one time, are not compellable to pay the same; and the winner shall forfeit treble the value, one moiety to the king, the other to the informer. All bonds and other securities, given for money won at play, or for money lent at the time to play with, shall be utterly void. If any person at any sitting loses *L.*10 or upwards at play, he may sue the winner, and recover it back by action of debt; and if he do not sue, any other person may recover treble the sum so lost; and in case of cheating, five times the sum won shall be forfeited, the winner rendered infamous, and besides be subject to whipping. No plates or matches under *L.*50 shall be run for by horses, except at Newmarket, under heavy penalties.

7. *Killing or destroying game*, or keeping engines for that purpose, or having the possession of game, not being duly qualified, is prohibited under a variety of penalties and forfeitures.

Hitherto we have spoken of offences that affect the society generally. We proceed to consider those which affect it through the medium of injuries committed more immediately against individuals.

XV. 1. Homicide, the greatest injury that can be done to the *person* of an individual, is, 1. Justifiable. 2. Excuseable. 3. Criminal.

(1.) *Justifiable homicide* must arise from *necessity*, without any will, intention, or desire, and without negligence; as where a proper officer, in the endeavour to take a felon, is prevented, he is thereupon justified in using violence to make the caption; and if homicide should thereby ensue, either to the prisoner, or those opposing the process of justice, the officer stands excused; or if a man be killed in the attempt to murder, rob, or break open a house *in the night*, it is justifiable homicide; as also where a woman or her relatives slay another to preserve her chastity.

(2.) *Excusable homicide* is either *per infortuniam* or *se defendendo*. *Per infortuniam*, as where one doing *a lawful act* without any intention of hurt, unfortunately kills another. *Se defendendo*, or chance-medley, as where one kills another in his own defence, that is, after he has retreated so far as he possibly can from the wrath of his antagonist; and this must be at the very time of the assault.

(3.) *Criminal* or *felonious homicide*, is the killing a human creature without justification or excuse. 1. *A felo de se* is one who deliberately puts an end to his existence; and he that advises another so to do, is an accessary before the fact, if the murder absolutely takes place. A *felo de se* is ignominiously buried, a stake driven through his body, and his goods and chattels forfeited. 2. *Manslaughter* is the unlawful killing another, without malice either expressed or implied. As, where two persons suddenly fight, and one kills the other; this must arise from the heat of the moment, and sudden impulse of the passions. Penalty, felony, with benefit of clergy, forfeiture of goods and chattels, and fine. But mortally *stabbing* is punished as murder, though done upon sudden provocation. 3. *Murder*, is where "a person of *sound memory and discretion unlawfully killeth any reasonable creature in being, and under the king's peace, with malice aforethought, either expressed or implied*;" or does any act, the evident consequence of which will be the death of some one. The seconds, as well as principals, in a deliberate duel, which terminates fatally, are all deemed murderers in law. Punishment, death, the body anatomized, and the forfeitures of felony. *Petit-treason*, is where a servant kills his master; the wife her husband; or an ecclesiastic his superior. Punishment, to be drawn, and hanged, with the other penalties of murder.

2. *Mayhem*, is the violently depriving another of the use of such of his members as may render him less able to fight or defend himself; and even the lying in wait unlawfully, with malice aforethought, to cut off or disable any limb or member of any person, *with intent* to maim or

to disfigure him, is felony without clergy; or any one maliciously shooting at, stabbing, or cutting another, *with intent* to murder, rob, maim, disfigure, or disable him, or *with intent to aid the escape* of any person stabbing or cutting, is guilty of a felony without clergy.

3. *The forcible abduction and marriage*, or stealing of an heiress, is where a person for lucre takes any woman, whether maid, widow, or wife, contrary to her will, and afterwards she is married to such misdoer, or by his consent to another, she having substance either in goods or lands, or being an heiress. The offender, with his procurers and accessaries, are guilty of felony without clergy.

4. *Marrying* any woman-child under the age of *sixteen* years, against the will of her father, mother, guardians, or governors, incurs the penalty of imprisonment for five years, and the forfeiture of the woman's lands during the life of the husband to her next of kin.

5. *Rape*, or the forcible carnal knowledge of a woman *against her will*, and the abuse of a female child under the age of ten, *with or without consent*, is felony without clergy.

6. *The infamous crime against nature*, committed either with man or beast, is likewise felony without clergy.

7. *Assault*, *battery*, *wounding*, and *kidnapping*, or the forcibly taking away the king's subjects, are punished by fine, imprisonment, and pillory.

XVI. Of offences against the *habitations* and *property* of individuals, we may enumerate, 1. *Arson ab ardendo*, which is the malicious and wilful burning of the house or out-house of another man; and is felony without benefit of clergy. The wilful firing one's own house *in a town* is punishable with fine, imprisonment, and pillory; and if with intent to defraud any person, felony without clergy.

2. *Burglary*, is the forcible entry into a mansion or dwelling-house, church, or wall or gate of a town by night, with a felonious intent. If there be day light enough to discern a man's face, it is no burglary. The breaking open an out-house that is attached to a dwelling-house, or within the same common fence, is burglary. But the breaking open a shop that is let apart from a house of which it is parcel, is no burglary, unless some person usually sleep there; penalty, felony, without benefit of clergy, for abettors, accessaries, and principals.

3. *Larceny*, is the felonious taking and carrying away the goods of another; and it is either,

(1.) *Grand* larceny, where the property taken is above the value of twelve pence; which is felony, in some cases within, in others without clergy.

(2.) *Petit* larceny, where the value is twelve pence only, which is also felony, but not capital, being punished with whipping or transportation; or,

(3.) *Mixed* or compound larceny, which is that wherein the taking is accompanied with the aggravation of being either, 1. From the house, or, 2. From the person. Larcenies from the *house*, by day or night, are felonies without clergy, when they are, 1. Above twelve pence, whether the house be properly a dwelling-house, church, booth, &c. any person being therein. 2. When the value is five shillings, the house being *broke open*, though no person be therein. 3. Larcenies of forty shillings, from a house without breaking, and though no person be therein. 4. Larcenies of five shillings from a shop, warehouse, outhouse, &c. whether broken or not, and though no person be therein. Larceny from the person, is, 1. By privately stealing from the person of another above the value of twelve pence. 2. By robbery, or the felonious and forcible taking from the person of another, goods or money of any value, by putting him in fear. These are also felonies without clergy. As attempt to rob is felony.

4. *Malicious mischief*, such as the destroying dykes, public navigations, bridges, &c.; breaking open any house or shop to destroy goods in the loom, or utensils used in manufacturing such goods; burning any barn or stack of corn or grain; killing any horses, sheep, or other cattle; cutting down trees or hop-binds; setting fire to a coal-mine, &c. are felonies without clergy; and if the offender be not convicted, the hundred shall be charged with the damages. Likewise the burning, or in any manner causing or advising the destruction of any ship, with intent to defraud the insurers, is felony without clergy.

5. *Forgery* is the fraudulent making or altering a writing to the prejudice of another's right, which is felony without clergy. Forging the superscription of a letter to evade the payment of postage, subjects the offender to transportation for fourteen years.

So much for the different species of crimes: we next consider the trial of them.

XVII. The *criminal courts* are, first, those of a public and general jurisdiction; secondly, those of a private and special jurisdiction.

1. *Public courts* are, 1. The High Court of Parliament, which is the supreme court in the kingdom, and proceeds by impeachment. 2. The court of the Lord High Steward of Great Britain, which is a court held in the recess of parliament, constituted for the trial of peers, for treason or felony, or misprision, upon indictment found by a grand jury of freeholders, transmitted from the assizes or court of King's Bench by writ of *certiorari*, to be determined before his grace the steward and the peers. 3. The court of King's Bench takes cognizance of all criminal causes, from high treason down to the most trivial misdemeanor or breach of the peace. The judges of this court are the supreme coroners of the kingdom. 4. The court of Chivalry. 5. The court of Admiralty, held before the lord high admiral of England or his deputy, who is styled the judge of the admiralty. These five courts may be held in any part of the kingdom. The following are of a local jurisdiction. 6. The courts of *oyer* and *terminer*, and general gaol-delivery, which are held before the king's commissioners, (usually two judges of the courts of Westminster,) twice in every year, in every county in the kingdom except the four northern ones, where they are held only once; but in London and Middlesex they are held eight times. In cases of urgency, the king issues a special or extraordinary commission of *oyer* and *terminer*, and *goal delivery*, confined to those offences which stand in need of immediate inquiry and punishment. 7. The court of the *General Quarter Sessions* is held once in every quarter of the year, to try small felonies, and all trespasses whatever. 8. The *Sheriff's tourn*, or rotation, is a court of record, and held twice every year. 9. The *Courtleet*, or *view of frankpledge*, is a court of record, held once a-year within a particular hundred, lordship, or manor, before the steward of the leet. 10. The court of the *coroners*, held where a person comes to a sudden or violent end, *super visum corporis*. 11. The court of the *clerk of the market*, incident to every fair and market in the kingdom.

2. *Courts of a Special Jurisdiction*, or private courts, are, 1. The court of the Lord Steward, Treasurer, or Comptroller of the King's Household, which has cognizance of offences committed within the limits of any of the palaces and houses of the king. 2. The University courts.

3. Prosecutions, or proceedings in criminal courts, are either summary or regular. *Summary* proceedings, are such as are directed by particular acts of parliament, whereby a man may be convicted without the intervention of a jury; as for frauds upon the excise, contempt of court, &c.

4. The first step in *regular* proceedings is by *arrest*, which is the apprehending a person for such an offence as will at least justify holding him to bail: and in general, an arrest may be made four ways; 1. By warrant, which may be granted in extraordinary cases by the privy-council, or secretaries of state; but ordinarily by justices of the peace, either directed to a peace officer or private person. 2. By *officers without warrant*, as where any one commits a felony or breach of the peace in their presence. 3. By a *private person* who is present when any felony is committed. 4. Upon *hue* and *cry* raised upon a felony committed. Divers acts of parliament have given rewards to those who apprehend delinquents and prosecute them to conviction.

5. *Commitment* must be upon good grounds of suspicion, or the prisoner must be discharged; and if he be committed upon good grounds of suspicion, he must be sent to prison, or give bail (if the offence is not of a capital nature) for his appearance to answer the charge against him. If the offence be not bailable, or the party cannot find bail, he is committed to the county goal by *mittimus* from the justice.

6. The *accusation* of offenders is, 1. By presentment, which is the notice taken by a grand jury of any offence from their own knowledge or observation; as upon inquisitions of *felo de se*, of flight in persons accused of felony, of *deodands*, &c. 2. By *Indictment*, which is a written accusation of one or more persons for a crime or misdemeanor, preferred to a grand jury, who are previously instructed in the articles of their inquiring by a charge from the judge who presides upon the bench. 3. By *information*, which may be at the suit of the king and a subject, upon a penal statute, or at the suit of the king only, differing from indictments in this, that it is exhibited by the informer or the king's officer for misdemeanors only, and not on the oath of the grand jury.

7. If the offender appears or is in custody, the next step is to *arraign* him; that is, calling him to the bar of the court, to answer to the matter of the indictment. If he stands mute, the court will impannel a jury to inquire whether it is by the visitation of God; for if that is the case, the trial shall proceed as if he had pleaded not guilty; but upon his standing obstinately mute, he is considered as convicted, and judgment and execution shall be thereupon awarded, as if he had made an actual confession of the indictment.

8. Plea, or defensive matter alleged by the prisoner, may be, 1. A plea to the jurisdiction; as where an indictment is taken before a court that hath no cognizance of the offence. 2. Demurrer to the indictment, which is where the fact alleged is allowed to be true; but the prisoner joins issue upon some point of law in the indictment, by which he insists that the fact as stated is no felony, treason, or whatever the crime is alleged to be. 3. A plea in abatement which is principally for a misnomer, or false addition to the prisoner; and if the fact is found by a jury, the indictment shall be abated. 4. Special pleas in bar, as *autrefoits acquit*, or a former acquittal. 5. The plea of *autrefoits convict*, or a former conviction for the same identical crime, though no judgment was ever given, or perhaps will be, (being suspended by the benefit of clergy or other cause,) is a good plea in bar to an indictment. 6. The plea of *autrefoits attaint*, or a former attainder. 7. Plea of pardon, which, if pleaded before sentence is passed, prevents the corruption of the blood. 8. The general issue or plea of not guilty, which brings the point of guilt or innocence immediately to issue. In this case, the clerk of the arraigns asks the prisoner how he will be tried? if he answers "by God and my country," the trial shall proceed; but if he refuses to answer in these words, or stands obstinately mute, conviction as in the case of refusing *to plead* will follow.

9. The old methods of trial, founded upon superstition, are now superceded by the trial *per patriam*, or by *jury*; and by the *peers of Great Britain* in the court of parliament, or in the court of the lord high steward.

10. In all cases of high treason, petit treason, and misprision of treason, and offences against the coin of the realm, two lawful witnesses are required to convict a prisoner, unless he shall willingly and without violence confess the same. But in almost every other accusation one positive and unobjectionable witness is sufficient.

11. If the jury find the prisoner *not guilty*, he is then for ever quit and discharged of the accusation. But if the jury find him *guilty*, he is then said to be *convicted* of the crime whereof he stands indicted.

12. After trial and conviction, the judgment of the court regularly follows, unless suspended or arrested by some intervening circumstance, as the *benefit of Clergy*, which is a mollified remnant of Popish abuse. After conviction, if for a clergyable offence, the culprit, instead of burning in the hand as formerly, is either transported or employed for a definite term upon some work of public utility. By the same privilege, the offender regains the possession of his lands as if he had never been convicted; but upon a *second* conviction of any clergyable offence, he can have no benefit of clergy. All clerks *actually in orders*, are discharged on praying the benefit of the statute without any infamous punishment, and this *as often* as they offend. And all lords of parliament and peers of the realm shall be discharged in like manner for their *first* offence.

13. *Judgment* immediately follows conviction for those crimes which are either too high or too low to be included within the benefit of clergy; but before judgment is passed, the prisoner is asked whether he has any thing to offer why judgment should not be awarded against him? If he has nothing to offer, the court must pronounce that judgment which the law has annexed to the crime; a consequence of which is *attainder*, whereby a man becomes dead in law, his real and personal estate is in some cases forfeited to the king, and if attainted for treason his blood becomes corrupt; but if the culprit dies before he is attainted, neither forfeiture nor corruption of blood takes place.

14. Judgment may be *reversed*, 1. By matter *dehors* or foreign to the record, without *a writ of error;* as where the judgment was given by persons who had no good commission to proceed against the person condemned. 2 By *writ of error*, which lies from all inferior criminal jurisdictions to the court of King's Bench, and from the King's Bench to the House of Lords. 3. By act of parliament. 4. By the king's pardon, which may be either absolute, commonly called a *free* pardon; or conditional, as that the convict shall be transported, or undergo some other species of punishment inferior to that to which he has been sentenced. Reprieve is only a temporary suspension of the execution of judgment for some supervening or equitable cause, as pregnancy, insanity, &c.

15. The *execution of judgment* must in all cases be performed by the legal officer, the sheriff, or his deputy, and in strict conformity to the terms of the warrant of execution.

The following are the most approved *institutionary* writers on the law of England; Coke's *Institutes of the Laws of England, with Notes*, by Hargrave and Butler, 7. vols. 8vo. 1809. Woodeson's *Systematical View of the Laws of England*. 3 vols. 8vo. 1792. Wood's *Institutes of Do.* 1772. Sullivan's *Lectures on Do.* quarto, 1775. Wynne's

Eunomus, or Dialogues concerning the Law and constitution of England, 4 vols. 8vo. 1774. And above all, Blackstone's *Commentaries on Do.* with Mr. Christian's *Notes*, 4 vols. 8vo. latest edition. To which may be added, De Lolme *On the Constitution of England*; and the late Professor Millar's *Historical View of the English Constitution, from the time of the Saxons to the Revolution* 1688; *with Dissertations connected with the History of the government from the Revolution to the present time*, 4 vols. 8vo. 1803. Besides what the reader will find in some of these authors on the subject of *crown* or *criminal* law, he may further consult, Hale's *Pleas of the Crown*, with *Notes* by Mr. Dougherty, 2 vols. 8vo. 1800, Hawkin's *Do. with the Additions and Notes of* Mr. Leach, 4 vols. 8vo. 1795 Foster's *Reports and Discourses on some Branches of the Crown Law.* Leache's *Cases in Crown Law*, 2 vols. 8vo. 1800. And East's *Treatise of the Pleas of the Crown*, vols. i. and ii. (being all yet published) 8vo. 1803.

PART IV. OF THE LAW OF SCOTLAND.

In presenting a view of the law of Scotland we shall retain, as nearly as the genius of the two systems will admit, the distribution observed in our abstract of the law of England. We will only remark, that the law relating to the king, parliament, &c. or what is commonly understood by the *public* law of the realm, being in most respects the same in both quarters of the island, we shall here touch upon it only in so far as there is any peculiarity in the law of Scotland, referring our readers to Book I. of the foregoing Part, and to the several articles distributed under our general alphabet.

Introduction.

Of the Sources, or component Parts, of the Law of Scotland.

1. The municipal law of Scotland, like that of England, and indeed of all other countries which have any fixed institutions, consists partly of *statutory* or *written* law, which has the express authority of the legislative power; and partly of *customary* or *unwritten* law, which derives force from the presumed or tacit consent of that power.

2. Under the statutory or written law is comprehended, first, *Acts of parliament*, not those only which were made in the reign of James I. of Scotland, and from thence down to the union with England in 1707, but such of the British statutes enacted since the union as concern this part of the united kingdom.

3. The remains of the ancient written law of Scotland were published by Sir John Skene, clerk-register, in the beginning of the last century, by license of parliament. The books of *Regiam Majestatem*, to which the whole collection owes its title, seems to be a system of Scotch law written by a private lawyer at the commencement of David I.; and though no express confirmation of that treatise by the legislature appears, yet it is admitted to have been the ancient law of the Scots, by express statutes 1471, c. 47—1487. c. 115. The borough laws, which were enacted by the same king David, and the statutes of William, Alexander II. David II. and the three Roberts, are universally allowed to be genuine. The Scottish parliaments once and again appointed commissioners to revise and amend the *Regiam Majestatem*, and the other ancient books of their law, and to make their report: but as no report appears to have been made, nor consequently any ratification by parliament, none of these remains are received, as of proper authority, in the Scotch courts; yet they are of excellent use in proving and illustrating ancient customs.

4. The written law comprehends, second, the *Acts of Sederunt*, which are ordinances for regulating the forms of proceeding before the Court of Session in the administration of Justice, made by the judges, who have a delegated power from the legislature for that purpose, 1540, c. 93. Some of these acts touch upon matter of right, which declare what the judges apprehend to be the law of Scotland, and what they are to observe afterwards as a rule of judgment.

5. The civil and canon laws, though they are not perhaps to be deemed proper parts of the written law of Scotland, have undoubtedly had the greatest influence in that kingdom. The powers exercised by the Scottish Sovereigns and judges have been justified upon no other ground than that they were conformable to the civil or canon laws, 1493, c. 51—1540, c. 69, &c. And a special statute was deemed necessary upon the Reformation, to rescind such of their constitutions as were repugnant to the Protestant doctrine, 1567, c. 31. From that period the canon law has been little respected, except in questions of tithes, patronages, and some other articles of ecclesiastical right. But the Roman continues to have great authority in all cases where it is not derogated from by statute or custom, and where the genius of the law suffers it to be applied, 1493, c. 51—1540, c. 70—1587, c. 31.

5. The unwritten or customary law of Scotland is that, which, without being expressly enacted by statute, derives its force from the tacit consent of king and people; which consent is presumed from the ancient custom of the community, as the laws of primogeniture and succession, the legitim, terce, courtesy, &c. No precise time can be fixed as necessary for constituting this sort of law, because some things require in their nature longer time, and a greater frequency of acts to establish them than others. Custom, as it is equally founded in the will of the lawgiver with written law, has therefore the same effects. Hence, as one statute may be explained or repealed by another, so a statute may be explained by the uniform practice of the community, and even go into disuse by a posterior contrary custom. But this power of custom to derogate from prior statutes is generally confined by lawyers to statutes concerning private right, and does not extend to those which regard public policy.

7. A uniform tract of the judgments or decisions of the Court of Session is commonly considered as part of the customary law; and without doubt, where a particular custom is thereby fixed or proved, such custom of itself constitutes law; but decisions, though they bind the parties litigating, have not in their own nature the authority of law in similar cases; yet, where they continue uniform, great weight is justly laid on them. Neither can the *judgments* of the House of Peers of Great Britain reach farther than to the parties in the appeal, since in these the peers act as judges, not as lawgivers. Nevertheless, where a similar judgment is repeated in the court of the last resort, it must have the strongest influence upon the determinations of inferior courts.

BOOK I.

Of the Rights arising from the state or condition of Men in Society, and from their more intimate relation, or more usual connection with one another; usually called Rights of Persons.

Title I.—*Of Ecclesiastical Persons.*

1. Upon the abolition of the Pope's authority at the Reformation, the *regular* clergy were totally suppressed; and in place of all the different degrees which distinguish the *secular* clergy, the Scots had only at first parochial presbyters or ministers, and superintendants, who had overseeing of the church within a certain district. Soon thereafter the church government became Episcopal, by archbishops, bishops, &c. 1606, c. 2; and after some intermediate turns is now Presbyterian, by kirk-sessions, presbyteries, synods, and general assemblies.

2. He who founded or endowed a church, was entitled to the right of patronage of it, or *advocatio ecclesiæ;* whereby, among other privileges, he might present a churchman to the cure in case of a vacancy. The *presentee*, after he was received into the church, had a right to the benefice *proprio jure;* and if the church was parochial, he was called a *parson.* The Pope claimed the right of patronage of every kirk to which no third party could shew a special title; and since the Reformation, the crown, as coming in place of the Pope, is considered as the universal patron where no right of patronage appears in a subject. Where two churches are united which had different patrons, each patron presents by turns.

3. Where a fund is gifted for the establishment of a second minister, in a parish where the care is thought too heavy for one, the patronage of such benefice does not belong to the donor, but to him who was patron of the church; unless either where the donor has reserved to himself the right of patronage in the donation, or where he and his successors have been in the constant use of presenting the second minister without challenge from the patron. The right of presenting incumbents was, by 1690, c. 23, taken from patrons, and vested in the heritors and elders of the parish, upon payment to be made by the heritors to the patron, of 600 merks; but it was again restored to patrons, 10 Ann, c. 12. with the exception of the presentations sold in pursuance of the former act.

4. That kirks may not continue too long vacant, the patron must present to the Presbytery, (formerly to the bishop,) a fit person for supplying the cure within six months from his knowledge of the vacancy, otherwise the right of presentation accrues to the presbytery *jure devoluto.* Since the final abolition of Episcopacy at the Revolution, a judicial act of admission by the presbytery, proceeding either upon a presentation, or upon a call from the heritors and elders, or upon their own *jus devolutum*, completes the minister's right to the benefice.

5. Soon after the Reformation, the Popish churchmen were prevailed upon to resign in the sovereign's hands a third of their benefices; which, by 1567, c. 10, was appropriated, in the first place, for the subsistence of the reformed clergy. To make this fund effectual, particular localities were assigned in every benefice to the extent of a third, called the *assumption of thirds;* and for the farther support of ministers, Queen Mary made a grant in their favour of all the small benefices, not exceeding 300 merks, which was confirmed by 1572, c. 52. Bishops, by the act which restored them to the whole of their benefices, 1606, c. 2, were obliged to maintain the ministers within their dioceses, out of the thirds; and in like manner the laic titulars, who got grants of the teinds, became bound, by their acceptation of them, to provide the kirks within their erections in competent stipends.

6. But all these expedients for the maintenance of the clergy having proved ineffectual, a commission of Parliament was appointed in the reign of James VI. for planting kirks, and modifying stipends to ministers out of the teinds, 1617, c. 3 to which a power was soon superadded, of dividing large parishes and erecting new churches, by 1621, c. 5: a second commission was appointed, 1633, c. 19, not only for modifying stipends, but for the valuation and sale of teinds. After the Restoration, several new commissions were granted by Parliament, with more ample powers of dismembering and annexing churches as they should find just, 1661, c. 61, &c.; but the powers of all these were, by 1707, c. 9, transferred to the Court of Session, with this limitation, that no parish should be disjoined, new church erected, or old one removed to a new place, without the consent of three fourths of the heritors, computing the votes not by their numbers, but by the valuation of their rents within the parish. The judges of the Session, when sitting in that court upon the causes so devolved upon them, are considered as a commission of Parliament, and have their proper clerks, macers, and other officers of court, as such. Their judgments in that capacity may be appealed to the House of Lords as in ordinary cases. And the powers and duties of this commission have been lately defined and regulated by 48 Geo. III. c. 138.

7. The lowest stipend that could be modified to a minister by the first commission, 1617, c. 3, was 500 merks, or five chalders of victual, unless where the whole teinds of the parish did not extend so far; and the highest was 1000 merks, or ten chalders. The Parliament, 1633, c. 8, raised the *minimum* to eight chalders of victual, and proportionally in money; but as neither the commission appointed by that act, nor any of the subsequent ones, was limited as to the *maximum*, the commissioners have been in the practice of augmenting stipends considerably above the old *maximum*, where there is sufficiency of free teinds, and the cure is burdensome, or living expensive.

8. Few of the reformed ministers were, at first, provided with dwelling-houses; most of the Popish clergy having, upon the first appearance of the Reformation, left their manses in feu, or in long tacks: Ministers, therefore, got a right, by 1563, c. 72, to as much of these manses as would serve them, notwithstanding such feus or tacks. When there was no parson's or vicar's manse, one was to be built by the heritors, at the sight of the bishop, (now the presbytery,) the charge not exceeding 1000*l.* Scots, nor below 500 merks, 1649, c. 45—1663, c. 21. Under a manse are comprehended stable, barn, and byre, with a garden; for all which it is usual to allow half an acre of ground. Every incumbent is entitled, at his entry, to have his manse put into good condition.

9. All ministers, where there is any *landward* or *country parish*, are, over and above their stipend, entitled to a glebe, which comprehends four acres of arable land, or sixteen sowms of pasture ground where there is no arable land, (a sowm is what will graze ten sheep, or one cow,) and is to be designed or marked by the bishop or presbytery, out of such kirk-lands within the parish as lie nearest to the kirk, 1593, c. 165—1606, c. 7. As the benefit intended by these acts to the clergy must have been lost where there were no kirk-lands in the parish, it was provided, by 1644, c. 31, that, in default of kirk-lands, the glebe should be designed out of temporal lands: and this act, though falling under the act recissory of Charles II, seems to have been considered as still in force by 1663, c.

21, which takes it for granted, that all ministers, except those in certain royal boroughs, have right to glebes. A right of relief is competent to the heritors whose lands are set off for the manse or glebe, against the other heritors of the parish.

10. Ministers, besides their glebe, were entitled to grass for a horse and two cows, by 1649, c. 45, which is revived, by 1663, c. 21; and if the kirk-lands, out of which the grass may be designed, either lie at a distance, or are not fit for pasture, the heritors are to pay to the minister 20*l.* Scots yearly, as an equivalent. Ministers have also freedom of foggage, pasturage, fuel, feal, divot, loaning, and free ish and entry, according to use and wont, 1593, c. 165—1663, c. 21. What these privileges are, must be determined by the local custom of the several parishes. Besides the above mentioned burdens which are imposed upon heritors, the parishioners were obliged to provide communion cups and lavers, 1617, c. 6, and to repair the kirk and kirk-yard dikes, 1572, c. 54—1597, c. 232; but these burdens are now for the most part undertaken by the heritors.

Title II.—*Of Husband and Wife.*

1. Persons, when considered in a private capacity, are chiefly distinguished by their mutual relations; as husband and wife, tutor and minor, father and child, master and servant. The relation of husband and wife is constituted by *marriage*, which is *the conjunction of man and wife vowing to live inseparably till death.*

2. Marriage is truly a contract, and so requires the consent of parties. Idiots, therefore, and furious persons cannot marry. As no person is presumed capable of consent within the years of pupillarity, which, by our law, lasts till the age of fourteen in males, and twelve in females, marriage cannot be contracted by pupils; but if the married pair shall cohabit after puberty, such acquiescence gives force to the marriage. Marriage is fully perfected by consent; which, without consummation, founds all the conjugal rights and duties. The consent requisite to marriage must be *de præsenti.* A promise of marriage (*stipulatio sponsalitia,*) though it was guarded by certain penalties in the Roman law, *l. 5. c. de spons*, may, by ours, be safely resiled from, as long as matters are entire; but if any thing be done by one of the parties, whereby a prejudice arises from the non-performance, the party resiling is liable in damages to the other. The canonists, and after them our courts of justice, explain a *copula* subsequent to a promise of marriage into actual marriage.

3. It is not necessary that marriage should be celebrated by a clergyman. The consent of parties may be declared before any magistrate, or *simply before witnesses.* And though no formal consent should appear, marriage is presumed from the cohabitation, or living together at bed and board, of a man and woman who are generally reputed husband and wife. One's acknowledgment of his marriage to the midwife whom he called to his wife, and to the minister who baptized his child, was found sufficient presumptive evidence of marriage, without the aid either of cohabitation or of *habite and repute.*

The father's consent was, by the Roman law, essential to the marriage of children *in familia.* But by our law, children may enter into marriage without the knowledge, and even against the remonstrances of a father.

4. Marriage is forbidden within certain degrees of blood. The Romans reckoned a degree for every person generated; by which rule, a father and a son are in the first, brothers in the second, and first cousins in the fourth degree of consanguinity. The canon law computes by the persons generated upon one side only, which, in the direct line of ascendants and descendants, comes to the same account with the Roman computation; but, in the traverse or collateral line, makes a considerable variation from it. By 1567, c. 15, which adopts the law of Moses, *Levit.* c. 18, into ours, seconds in blood, and all remoter degrees, may lawfully marry. By seconds in blood are meant first cousins, according to the computation of the canon law, which was at that time the common way in Scotland of reckoning degrees. Marriage in the direct line is forbidden *in infinitum;* as it is also in the collateral line, in the special case where one of the parties is *loco parentis* to the other, as grand-uncle, great-grand-uncle, &c. with respect to his grand-niece, &c. The same degrees that are prohibited in consanguinity are prohibited in affinity; which is the tie arising from marriage betwixt one of the married pair and the blood relations of the other. Marriage, also, where either of the parties is naturally unfit for generation, or stands already married to a third person, is *ipso jure* null.

5. To prevent bigamy and incestuous marriages, the church has introduced proclamation of banns; which is the ceremony of publishing the names and designations (addition) of those who intend to intermarry, in the churches of the parishes where the bride and bridegroom reside, after the congregation is assembled for divine service, that all persons who know any objection to the marriage may offer it. Not bishops only, but presbyteries, assumed formerly a power of dispensing with proclamation of banns on extraordinary occasions, *Act Ass.* 1638, *Sess.* 23, 21, which has not been exercised since the Revolution. When the order of the church is observed, the marriage is called *regular;* when otherwise, *clandestine.* Clandestine marriage, though it be valid, has statutory penalties annexed to it, affecting not only the parties, but the celebrator and witnesses, 1661, c. 34—1695, c. 12—1698, c. 6: and, over and above, the parties were punished with the loss of certain conjugal rights; the husband lost his *jus mariti*, and the wife her *jus relictæ*, by 1672, c. 9. This last act, which also inflicted penalties against the then non-conforming clergy, was rescinded in the lump with other acts for conformity by 1690, c. 27; in respect of which the penalties of the act 1672 against clandestine marriages were found to be taken off. Fountainhall, 11th Dec. 1705, *Carruthers.*

6. By marriage, a society is created between the married pair, which draws after it a mutual communication of their civil interests, in as far as is necessary for maintaining it. As the society lasts only for the lives of the *socii*, therefore rights that have the nature of a perpetuity, which our law styles heritable, are not brought under the partnership or communion of goods, as a land estate, or bonds bearing a yearly interest: it is only moveable subjects, or the fruits produced by heritable subjects during the marriage, that become common to man and wife.

7. The husband, as the head of the wife, has the sole right of managing the goods in communion, which is called *jus mariti.* This right is so absolute, that it bears but little resemblance to a right of administering a common subject; for the husband can, in virtue thereof, sell, or even gift at his pleasure, the whole goods falling under communion; and his creditors may affect them for the payment of his proper debts; so that the *jus mariti* carries all the characters of an assignation by the wife to the husband, of her moveable estate. It arises *ipso jure* from the marriage, and therefore needs no other constitution.

8. From this right are excepted paraphernal goods, which, as the word is understood in our law, comprehends the wife's wearing apparel, and the ornaments proper to her person, as necklaces, ear-rings, breast or arm jewels, &c.

These are neither alienable by the husband, nor affectable by his creditors.

9. The right of the husband to the wife's moveable estate is burdened with the moveable debts contracted by her before marriage: And as his right is universal, so is his burden; for it reaches to her whole moveable debts, though they should far exceed her moveable estate. Yet the husband is not considered as the true debtor in his wife's debts. In all actions for payment, she is the proper defender; the husband is only cited for his interest, that is, as curator to her, and administrator of the society goods. As soon, therefore, as the marriage is dissolved, and the society goods thereby suffer a division, the husband is no farther concerned in the share belonging to his deceased wife; and consequently is no longer liable to pay her debts, which must be recovered from her representatives, or her separate estate.

10. The husband, by marriage, becomes the perpetual curator of the wife. From this right it arises, 1. That no suit can proceed against the wife till the husband be cited for his interest: And if she is married during the dependence of a process against her before an inferior court, and if the husband dwells within another territory, he must be called by letters of supplement, which are granted of course by the Court of Session. 2. All deeds done by a wife, without the husband's consent, are null; neither can she sue in any action without the husband's concurrence. When the husband refuses, or by reason of forfeiture, &c. cannot concur, or where the action is to be brought against the husband himself for performing his part of the marriage-articles, the judge will authorize her to sue in her own name. To prevent the necessity of applying for the court's authority, care is generally taken in marriage-contracts to name certain trustees, at whose instance execution may pass against the husband. The effects arising from this curatorial power discover themselves even before marriage, upon the publication of banns; after which the bride, being no longer *sui juris*, can contract no debt, nor do any deed, either to the prejudice of her future husband, or even to her own. But it is not enough for this purpose that the banns have been published at the bridegroom's parish church; the notification must be also made at the bride's, in order to interpel persons from contracting with her.

11. If the husband should either withdraw from his wife, or turn her out of doors, or if, continuing in family with her, he should by severe treatment endanger her life, the commissaries will authorize a separation *a mensa et toro*, and give a separate alimony to the wife, suitable to her husband's estate, from the time of such separation, until either a reconciliation or a sentence of divorce

12. A wife, while she remains in family with her husband, is considered as *præpositi negotiis domesticis*; and, consequently, may provide things proper for the family; for the price whereof the husband is liable, though they should be misapplied, or though the husband should have given her money to provide them elsewhere.

A husband, who suspects that his wife may hurt his fortune by high living, may use the remedy of inhibition against her, by which all persons are interpelled from contracting with her, or giving her credit: After the completing of this diligence, whereby the *præpositura* fails, the wife cannot bind the husband, unless for such reasonable furnishings as he cannot instruct that he provided her with *aliunde*. As every man, and consequently every husband, has a right to remove his managers at pleasure, inhibition may pass at the suit of the husband against the wife, though he should not offer to justify that measure by an actual proof of the extravagance or profuseness of her temper.

13. As to the rights granted by the wife, affecting her estate; she has no moveable estate, except her paraphernalia; and those she may alien or impignorate, with consent of the husband as curator, otherwise not. She can, even without the husband, bequeath by testament her share of the goods in communion; but she cannot dispose of them *inter vivos*, for she herself has no proper right to them while the marriage subsists. A wife can lawfully oblige herself, in relation to her heritable estate, with consent of her husband; for though her person is in some sense sunk by the marriage, she continues capable of holding a real estate; and in such obligations, her estate is considered, and not her person A husband, though he is curator to his wife. can, by his acceptance or intervention, authorize rights granted by her in his own favour; for a husband's curatory is not intended only for the wife's advantage, but is considered as a mutual benefit to both.

14. By the law of Scotland, agreeably to the rules of our holy religion, marriage cannot be dissolved till death, except by divorce, proceeding either upon the head of adultery, Math. xix. 8, 9. Mark x. 11. or of wilful desertion, 1 Cor. vii. 15

15. Marriage is dissolved by death, either within year and day of its being contracted, or after year and day. If it is dissolved within year and day, all rights granted in consideration of the marriage become void, and things return to the same condition in which they stood before the marriage. The tocher returns to the wife, or those from whom it came; and all the interest, either legal or conventional, arising to the wife in the husband's estate, returns to the husband or his heirs.

16. Upon the dissolution of a marriage after year and day, the surviving husband becomes the irrevocable proprietor of the tocher; and the wife, where she survives, is entitled to her jointure, or to her legal provisions of terce, and *jus relictæ*. If a living child be procreated of the marriage, who has been heard to cry, the marriage has the same effect as if it had subsisted beyond the year. The disputes that might arise from the dissolution of a marriage within the year are generally prevented by a clause in marriage-contracts, that the interest of the husband and wife shall continue, though the marriage should be dissolved sooner without a living child.

17. Divorce is such a separation of married persons, during their lives, as looses them from the nuptial tie, and leaves them at freedom to intermarry with others. Marriage being by the canonists numbered among the sacraments, is reckoned a bond so sacred that nothing can dissolve it. In the case of adultery itself, they allow only a separation from bed and board; and even by our law, neither adultery nor wilful desertion are grounds which must necessarily dissolve marriage; they are only handles, which the injured party may take hold of to be free. Cohabitation, therefore, by the injured party, after being in the knowledge of the acts of adultery, implies a passing from the injury; and no divorce can proceed which is carried on by collusion betwixt the parties, lest, contrary to the first institution of marriage, they might disengage themselves by their own consent. As by divorce the nuptial tie itself is loosed, the guilty person as well as the innocent may contract second marriages; but in the case of divorce upon adultery, marriage is by special statute prohibited betwixt the two adulterers, 1600, c. 20, a doctrine borrowed from the Roman law.

18 Where either party has deserted from the other for four years together, that other may, by 1573. c. 55, sue for adherence before the commissaries, whose

decree the session may enforce by letters of horning. If these have no effect, the church is to proceed first by admonition, then by excommunication; all which previous steps are declared to be a sufficient ground for pursuing a divorce. In practice, the commissaries pronounce sentence in the adherence after one year's desertion; but four years must intervene between the first desertion and the decree of divorce. By the instructions, 1666, c. 2, the inferior commissaries can only judge in the previous action of adherence; the divorce must be carried before the commissaries of Edinburgh.

19. The legal effects of divorce on the head of desertion, are particularly defined by 1573, c. 55, by which the party offending forfeits the tocher and the *donationes propter nuptias*, (as to which see *Nov.* 117. c. 8. § 2.) By these, when applied to our law, must be understood the provisions that the wife is entitled to, either by law or by paction, in consideration of the tocher; and the meaning of the act is, that the offending husband shall restore the tocher, and forfeit to the wife all her provisions, legal and conventional; and on the other hand, the offending wife shall forfeit to the husband her tocher, and all the rights that would have belonged to her in the case of her survivance. This, Lord Stair, I. 4. § 20, judges to be also the rule in divorce upon adultery, as it was by the Roman law. But by a decision 1762, *Justice*, founded on a tract of ancient decisions recovered from the records, the offending husband was allowed to retain the tocher.

TITLE III.—*Of Tutors and Curators, Parent and Child, Master and Servant.*

1. The stages of life principally distinguished in law, are *pupillarity*, *puberty* or *minority*, and *majority*. A child is in pupillarity from the birth till 14 years of age if a male, and till twelve if a female. Minority *begins* where pupillarity *ends*, and continues till majority, which by the law of Scotland is the age of twenty-one years complete, both in males and females; but minority, in a large sense, includes all under age, whether pupils or *puberes*. Because pupils cannot in any degree act for themselves, and minors seldom with discretion, pupils are put by law under the power of tutors, and minors may put themselves under the direction of curators. Tutory is *a power and faculty to govern the person, and administer the estate of a pupil.* Tutors are either *nominate*, *of law*, or *dative*; which answers to the *tutores testamentarii*, *legitimi*, and *datavi*, of the Roman law.

2. A tutor *nominate*, is he who is named by a father in his testament or other writing, to a lawful child. As the right of naming tutors proceeds from the fatherly power, those who are named by a mother or stranger are not proper tutors; their powers are limited to the special estate left to the pupil; and therefore their being named cannot hinder the pupil from getting one who may defend his person, and manage his other estate. The nomination of tutors being entirely pendent on the will of the father, may be altered at his pleasure, even though it should have been engrossed in a writing in its nature irrevocable, as a disposition. A tutor nominate is not obliged to give caution for the faithful discharge of his office, because his fidelity is presumed to have been sufficiently known to the father.

3. If there be no nomination by the father, or if the tutors nominated do not accept, or if the nomination falls by death or otherwise, there is a place for a *tutor-of-law*; so called, because he succeeds by the mere disposition of law. This sort of tutory devolved by the ancient Roman law, and devolves also by ours, upon the next agnate; but the word *agnate* is differently understood in our law and in theirs. Agnates, in the sense of the Roman law, were those whose propinquity was connected by males only; in the relation of cognates, one or more females were interposed. We understand by agnates, all those who are related by the father, even though females intervene; and by cognates, those who are related by the mother.

4. Where there are two or more agnates equally near to the pupil, he who is entitled to the pupil's legal succession falls to be preferred to the others, because it is presumed that he will be the most diligent in preserving the estate. But as the law suspects that he may not be over careful to preserve a life which stands in the way of his own interest, this sort of tutor is excluded from the custody of the pupil's person, which is commonly committed to the mother, while a widow, until the pupil be seven years old; and on default of the mother to the next cognate. The tutor-of-law must be at least twenty-five years of age. He is served or declared by a jury of sworn men, who are called upon a brief issuing from the chancery, which is directed to any judge having jurisdiction. He must give security before he enters upon the management.

5. If no tutor-of-law demands the office, any person, even a stranger, may apply for *a tutory-dative*. But, because a tutor-of-law ought to be allowed a competent time to deliberate whether he will serve or not, no tutory-dative can be given till the elapsing of a year from the time at which the tutor-of-law had first a right to serve, *i. e.* till a year after the death of the deceased, if the father has named no tutors; and if he has named tutors, who have accepted, not till a year after the nomination falls by the death or incapacity of the nominees. It is the king alone, as the father of his country, who gives tutors-dative, by his Court of Exchequer; and no gift of tutory can pass in Exchequer without the citation or consent of the next of kin to the pupil, both by the father and mother; nor till the tutor gives security, recorded in the books of Exchequer. There is no room for a tutor-of-law, or tutor-dative, while a tutor-nominate can be hoped for. And tutors-of-law, or dative, even after they have begun to act, may be excluded by the tutor-nominate, as soon as he offers to accept, unless he has expressly renounced the office. If a pupil be without tutors of any kind, the Court of Session will, at the suit of any kinsman, name a factor (*steward*) for the management of the pupil's estate, who must conduct himself by the rules laid down, Act S. 13 Feb. 1730.

6. After the years of pupillarity are over, the minor is considered as capable of acting by himself, if he has confidence enough in his own capacity and prudence. The only two cases in which curators are imposed upon minors are, 1. When they are named by the father in *liege poustie*, (or in a state of health), in consequence of 1696, c. 8. 2. Where the father is himself alive; for a father is *ipso jure*, without any service, administrator, that is, both tutor and curator of law to his children, in relation to whatever estate may fall to them during their minority. This right in the father does not extend to grand-children, nor to such even of his immediate children as are forisfamiliated: Neither has it place in subjects which are left by a stranger to the minor, excluding of the father's administration. If the minor chooses to be under the direction of curators, he must raise and execute a summons, citing at least two of the next of kin to appear before his own judge-ordinary, upon nine days warning. At the day and place of appearance, he offers to the judge a list of those whom he intends for his curators: Such of them as resolve to undertake the office, must sign their acceptance, and give caution; upon which an act of curatory is extracted.

7. These curators are styled *ad negotia*, to distinguish them from another sort called curators *ad lites*, who are au-

thorised by the judge to concur with a pupil or minor in actions of law, either where he is without tutors and curators, or where his tutors or curators are parties to the suit. This sort is not obliged to give caution, because they have no intermeddling with the minor's estate: They are appointed for a special purpose; and, when that is over, their office is at an end. Women were, by the Roman law, debarred from the offices both of tutory and curatory, except in special cases: With us they are capable, under the following restrictions: 1. The office of a female tutor or curator falls by her marriage, even though the nomination should provide otherwise; for after she is herself subjected to the power of a husband, she is incapable of having any person under her power. 2. No woman can be tutor *of law*; for that sort is marked out, purely on the score of blood, without any regard to personal qualities. Papists are declared incapable of tutory or curatory by 1700, c. 3. Where the minor has more tutors and curators than one, who are called in the nomination to the joint management, they must all concur in every act of administration: Where a certain number is named for a quorum, that number must concur: Where any one is named *sine qua non*, no act is valid without that one's special concurrence. But if they are named without any of these limitations, the concurrence of the majority of the nominees then alive is sufficient.

8. In this, tutory differs from curatory, that as pupils are incapable of consent, they have no *person* capable of acting, which defect the tutor supplies: But a minor *pubes* can act for himself. Hence the tutor subscribes alone all deeds of administration; but in curatory, it is the minor who subscribes as the proper party; the curator does no more than consent. Hence, also, the persons of pupils are under the power either of their tutors or of their nearest cognates; but the minor, after pupillarity, has the disposal of his own person, and may reside where he pleases. In this sense the rule of the Roman law may be understood, *tutor datur personæ, curator rei*. In most other particulars, the nature, the powers, and the duties of the two offices, coincide. Both tutors and curators must, previous to their administration, make a judicial inventory, subscribed by them and the next of kin, before the minor's judge-ordinary of his whole estate, personal and real; of which one subscribed duplicate is to be kept by the tutors or curators themselves, another by the next of kin on the father's side, and a third by the next of kin on the mother's. If an estate belonging to the minor shall afterwards come to their knowledge, they must add it to the inventory within two months after their attaining possession of it. Should they neglect this, the minor's debtors are not obliged to make payment to them; they may be removed from their offices as suspected, and they are entitled to no allowance for the sums disbursed by them in the minor's affairs, 1672, c. 2; which last penalty does not reach to the expence laid out upon the minor's entertainment, or upon his lands and houses. *Act. S 25th Feb.* 1693, nor to sums expended in completing his titles, 18th July, 1707, *Yeaman*

9. Tutors and curators have power to sue for and levy the minor's rents, interest, and even principal sums, if his necessities call for it; to grant acquittances to the debtors, and to name factors or stewards, with reasonable salaries. They may remove tenants, and grant leases of the minor's lands, to endure as long as their own office; but not under the former rental, without either a warrant from the Court of Session, or some apparent necessity: but though they can use all diligence against the minor's debtors, the minor's creditors can use no execution against them for payment of the debts due by the minor; for these are the minor's proper debts, and it cannot be known till accounting, whether the tutors or curators have in their hands any funds belonging to the debtor: Yet they may be charged for the performance of facts in their own power, *e. g.* to make a subject forthcoming, to renew investitures to the heirs of vassals, &c.

10. They have power to sell the minor's moveables, without which his personal estate would frequently be lost to him. They were by the Roman law denied the power of aliening land estates without the authority of a judge; but that law obtains with us only in the case of tutors, for the alienation of heritage by a minor, with consent of his curators, is valid *sine decreto prætoris*.

11. It is the duty of tutors and curators to take proper care of the minor's person and education, and to disburse the expence necessary for that purpose. Tutors ought not to employ a yearly sum exceeding the interest of the minor's stock, or the rent of his estate, for his education and maintenance; but curators may encroach on the stock itself, where it is small, or even employ the whole of it if less will not do, for putting the minor in a way of business. It is also their duty to employ the minor's rents and interests profitably.

12. Though no person is obliged to accept the office of tutor or curator, yet, having once accepted, he cannot throw it up or renounce it without sufficient cause. But if he should be guilty of misapplying the minor's money, or fail in any other part of his duty, he may be removed by the *actio*, or rather *accusatio, suspecti tutoris*, which was by the Roman law, *popularis*, but with us can be pursued only by the minor's next of kin, or by a co-tutor or co-curator. The offices of tutory and curatory expire also by the pupil's attaining the age of puberty, or the minor's attaining the age of twenty-one years complete; and by the death either of the minor or of his tutor or curator.

13. Deeds either by pupils or by minors having curators, without their consent are null; but they oblige the grantors, in as far as relates to sums profitably applied to their use. A minor under curators can indeed make a testament by himself; but whatever is executed in the form of a deed, *inter vivos*, requires the curator's consent. Deeds by a minor who has no curators, are as effectual as if he had had curators, and signed them with their consent: he may even alienate his heritage, with the interposition of a judge.

14. Minors may be restored against all deeds granted in their minority that are hurtful to them. Deeds in themselves void, need not the remedy of restitution; but where hurtful deeds are granted by a tutor in his pupil's affairs, or by a minor who has no curators, as these deeds subsist in law, restitution is necessary: And even where a minor having curators, executes a deed hurtful to himself with their consent, he has not only action against the curators, but he has the benefit of restitution against the deed itself, both by the Roman law, and by ours.

15. The persons of pupils are protected from imprisonment in civil debts, by 1696, c. 41.

16. Curators are given, not only to minors, but in general to every one who, either through defect of judgment, or unfitness of disposition, is incapable of rightly managing his own affairs. Curators may be also granted to lunatics, and even to persons dumb and deaf, though they be of sound judgment, when it appears that they cannot exert it in the management of business.

17. The law concerning the state of *children* falls next to be explained. Children are either born in wedlock, or out of it. All children born in lawful marriage or wedlock are presumed to be begotten by the person to whom the mother is married, and consequently to be lawful

children. This presumption is so strongly founded, that it cannot be defeated but by direct evidence that the mother's husband could not be the father of the child, *e. g.* where he is impotent, or was absent from the wife till within six lunar months of the birth. The canonists indeed maintain, that the concurring testimony of the husband and wife, that the child was not procreated by the husband, is sufficient to elide this legal presumption for legitimacy; which doctrine is adopted by *Craig*, 371, § 20. and *Lord Stair*, II. 3. § 42: but it is an agreed point, that no regard is to be paid to such testimony, if it be made after they have owned the child to be theirs, *St.* IV. 45. § 20. A father has the absolute right of disposing of his children's persons, of directing their education, and of moderate chastisement; and even after they become *puberes*, he may compel them to live in family with him, and to contribute their labour and industry while they continue there towards his service; which power of compulsion lasts, in Lord Stair's opinion, 1. 5. § 13, after their majority. Children, though in family with their father, are capable of receiving sums in gift or legacy, either from strangers, or from the father himself, which thereby become their property. A child who gets a separate stock from the father for carrying on any trade or employment, even though he should continue in the father's house, may be said to be emancipated or forisfamiliated, in so far as concerns that stock; for the profits arising from it are his own. Forisfamiliation, when taken in this sense, is also inferred by the child's marriage, or by his living in a separate house, with his father's permission or good will, *St.* I. 5. § 13. Children, after their full age of twenty-one years, become according to the general opinion their own masters; and from that period are bound to the father only by the natural ties of duty, affection, and gratitude. The mutual obligations between parents and children to maintain each other are explained afterwards, Book II. Tit. 6. § 2.

18. Children born out of wedlock are styled *natural children or bastards.* The state of these persons, while they are alive, must be tried by the commissaries; but all actions by the King or his donatory for fixing bastardy on persons deceased must, like other declaratory actions, be brought before the session. For the effects of bastardy, see afterwards, B. II. Tit. 11. § 11. Bastards may be legitimated, or made lawful, either, 1. By the subsequent marriage of the mother of the child with the father. And this sort of legitimation, though it was not received by our ancient customs, does, by our present practice, entitle the child to all the rights of lawful children. The subsequent marriage which produces legitimation, is considered by the law to have been entered into when the child legitimated was begotten; and hence, if he be a male, he excludes by his right of primogeniture the sons procreated after the marriage, from the succession of the father's heritage, though these sons were lawful children from the birth. Hence, also, those children only can be legitimated, who are begotten of a woman whom the father might at that period have lawfully married. Bastards are legitimated by letters of legitimation from the sovereign.

19. As to the power of *masters* over their *servants:* Though servants could not, by our old law, be sold by their masters as their property, yet the condition of those called *nativi*, or bondmen, was in most respects as hard as that of the Roman *servi.* But all servants have now, of a long time, enjoyed the same rights and privaleges with other subjects, unless in so far as they are tied down by their engagements of service. Servants are either *necessary* or *voluntary.* Necessary, are those whom law obliges to work without wages; of whom immediately. *Voluntary* servants engage without compulsion, either for mere subsistence, or also for wages. Those who earn their bread in this way, might formerly have been compelled to enter into service by the justices of the peace, who had power to fix the rate of their wages, by 1617, 8 § 14—1661, c. 38; which statutes are now repealed by 53d Geo. III. c. 40.

20. Colliers, coal-bearers, and salters, and other persons necessary to the collieries and salt-works, as they are particularly described, 1661, c. 56, were, like the *adscriptitii glebæ* of the Roman law, tied down, by our former law, to perpetual service at the works to which they had once entered. Upon a sale of the works, the right of their service was transferred to the new proprietor. All persons were prohibited to receive them into their service, without a testimonial from their last master; and if they deserted to another work, and were redemanded within a year thereafter, he who had received them was obliged to return them within twenty-four hours under a penalty, 1606, c. 11. But by the stat. 15. Geo. III. c. 28, and 39th Geo. III. c. 56, all colliers, coal-bearers, and salters, are now emancipated from servitude; and it is declared, that none shall be bound to a colliery or salt-work in any other way than as a common servant or labourer.

21. The *poor* make the lowest class or order of persons. Indigent children may, by 1617, c. 10, be compelled to serve any of the king's subjects without wages till the age of thirty years. Vagrants and sturdy beggars may also be compelled to serve any manufacturer, by 1663, c. 16. And because few persons were willing to receive them into their service, work-houses are, by 1672, c. 18, ordained to be built for setting them to work. The poor who cannot work, must be maintained by the parishes in which they were born, 1535, c. 22; and where the place of their nativity is not known, that burden falls upon the parishes where they have had their most common resort for the three years immediately preceding their being apprehended, or their applying for the public charity, 1663, c. 16—1698, c. 21. Where the contributions collected at the churches to which they belong are not sufficient for their maintenance, they are, by 1672, c. 18. to receive badges from the minister and kirk-session; in virtue of which, they may ask alms at the dwelling-houses of the inhabitants of the parish.

BOOK II.

OF THE RIGHTS ARISING FROM PROPERTY, USUALLY CALLED RIGHTS OF THINGS.

TITLE I.—*Of Heritable, as distinguished from Moveable Rights.*

1. For the better understanding the doctrine of this title it may be observed, that though, by the Roman law, the person or persons next of blood to one dying intestate succeeded to the right of his whole estate, of whatsoever subjects it might have consisted; yet, by the law of Scotland, and indeed of most nations of Europe, since the introduction of feus, wherever there are two or more in the same degree of consanguinity to the deceased, who are not all females, such rights as are either properly feudal, or have any resemblance to feudal rights, descend by law wholly to one of them, who is considered as the proper heir of the deceased; the others, who have the name of next of kin or executors, must be contented with that portion of the estate

which is of a more perishable nature. Hence has arisen the division of rights to be explained under this title; the subjects descending to the heir are styled *heritable*, and those that fall to the next of kin *moveable*.

2. All rights of or affecting lands, under which are comprehended houses, mills, fishings, teinds, and all rights of subjects that are *fundo annexa*, whether completed by seisin or not, are heritable *ex sua natura*. On the other part, every thing that moves itself, or can be moved, and in general whatever is not united to land, is moveable; as household furniture, corns, cattle, cash, arrears of rent and of interest, even though they should be due on a right of annual rent; for though the arrears last mentioned are secured on land, yet being already payable they are considered as cash. Bygone feu duties, like other arrears, are moveable, and consequently belong to the superior's executors. In rights bearing a tract of future time, *i. e.* rights which cannot be fulfilled at once, and which carry a yearly profit to the creditor while they subsist, *e. g.* an annuity for a certain term of years, though the arrears due before the creditor's death are moveable, yet the rights themselves are heritable, both because they yield an annual profit, and because nothing falls under executory but what is instantly payable, and can be gathered in and distributed among those that have interest in it. So that admitting them not to be heritable *ex sua natura*, the heir is the only person that can take them. Leases of land are heritable, both as they have a tract of future time, and as statute has given to them in certain respects the effect of real rights of land.

3. Debts (*nomina debitorum*) when due by bill, promissory note or account, are moveable. When constituted by bond, they are moveable as to succession, but heritable as to the fisk and the relict, that is, though by the general rule moveable rights fall under the communion of goods consequent upon marriage, and the moveables of denounced persons fall to the crown or fisk by single escheat, yet bonds bearing interest do neither, but are heritable in both respects. When constituted by bond having a clause of infeftment, they are heritable.

4. Where lands are voluntarily sold, either by a formal disposition, or even by a minute of sale, the price, if it be not heritably secured, must as a moveable subject go to the seller's executors. But in judicial sales for the behoof of creditors, the debts continue heritably secured on the price till payment or the conveyance to the purchaser; and therefore, in so far as they are not paid to the creditor himself, they must go to his heir.

5. All questions, whether a right be heritable or moveable, must be determined according to the condition of the subject at the time of the ancestor's death. If it was heritable at that period it must belong to the heir; if moveable it must fall to the executor, without regard to any alterations that may have affected the subject, in the intermediate period between the ancestor's death and the competition.

Title II.—*Of the Constitution of Heritable Rights, of Holdings, and of the respective Rights of the Superior and Vassal.*

1. *Heritable* rights are governed by the feudal law, which owed its origin, or at least its first improvements, to the Longobards, whose kings, upon having penetrated into Italy, the better to preserve their conquests, found it their interest to make grants to their principal commanders of great part of the conquered provinces, to be again subdivided by them among the lower officers, under the conditions of fidelity and military service.

2. In feudal questions we are governed, in the first place, by our own statutes and customs; where these fail us, we have regard to the practice of neighbouring countries, if the genius of their law appears to be the same with ours; and should the question still remain doubtful, we may have recourse to the written books of the feus, as to the original plan on which all feudal systems have proceeded.

3. This military grant got the name, first of *beneficium*, and afterwards of *feudum*; and was defined, *A gratuitous right to the property of lands, made under the conditions of fealty and military service, to be performed by the grantor to the receiver, the radical right of the lands still remaining in the grantor.* Under lands in this definition, are comprehended all rights or subjects so connected with land, that they are deemed a part thereof; as houses, mills, fishings, jurisdictions, patronages, &c. Though feus in their original nature were gratuitous, they soon became the subject of commerce; services of a civil or religious kind were frequently substituted in place of military; and now, of a long time, services of every kind have been entirely dispensed with in certain feudal tenures. He who makes the grant is called the *superior*, and he who receives it the *vassal*. The subject of the grant is commonly called the *feu*, though that word is at other times in our law used to signify one particular tenure. The interest retained by the superior in the feu is styled *dominium directum*, or the *superiority*; and the interest acquired by the vassal *dominium utile*, or the *property*. The word *fee* is promiscuously applied to both.

4. Allodial property is opposed to feus, by which is understood, property enjoyed by the owner independently of a superior. All moveable goods are allodial; but with us no lands are allodial except those of the king's own property, his superiorities, and manses and glebes, the right of which latter is completed by the presbytery's designation, without any feudal grant.

5. A vassal, though he has only the *dominium utile*, can sub-feu his property to a sub-vassal by a subaltern right, and thereby raise a new *dominium directum* in himself, subordinate to that which is in his superior, and so *in infinitum*. The vassal who thus sub-feus, is called the sub-vassal's *immediate superior*, and the vassal's superior is the sub-vassal's *mediate superior*.

6. Every heritable subject capable of commerce may be granted in feu. From this general rule is excepted, 1. The annexed property of the crown, which is not alienable without a previous dissolution in parliament. 2. Tailzied lands, which are devised under condition that they shall not be aliened. 3. An estate *in hereditate jacente* cannot be effectually aliened by the heir apparent (*i. e.* not entered); but such alienation becomes effectual upon his entry, the supervening right accruing in that case to the purchaser.

7. The feudal right, or as it is called *investiture*, is constituted by *charter* and *seisin*. By the *charter*, we understand *that writing which contains the grant of the feudal subjects* to the vassal, whether it be executed in the proper form of a charter or of a disposition. Charters by subject-superiors are granted, either, 1. *A me de superiore meo*, when they are to be holden, not of the grantor himself, but of his superior. This sort is called a public holding, because vassals were in ancient times publicly received in the superior's court, before the *pares curiæ* or co-vassals. Or, 2. *De me*, where the lands are to be holden of the grantor. These were called sometimes *base* rights, from *bas*, lower, and sometimes *private*, because before the establishment of our records they were easily concealed from third parties: the nature of all which will be more fully explained in the following Title. An *original* charter

is that by which the fee is *first granted*; a charter *by progress* is a *renewed* disposition of that fee. The constituent parts of a charter are, the narrative or recital, which expresses the causes inducing the grant; the dispositive clause, in which the subjects made over are described by such characters as may sufficiently distinguish them; and here also the order of succession and limitation of the fee is expressed; the clause of *tenendas*, declaring the particular tenure by which the lands are to be holden; the clause of warrandice, by which the grantor obliges himself that the right conveyed shall be effectual to the receiver; and the precept of seisin, which is the command of the superior or grantor of the right to his bailie, for giving seisin or possession to the vassal or his attorney, by delivering to him the proper symbols of that possession.

8. A seisin is the instrument or attestation of a notary, that possession was actually given by the superior or his bailie to the vassal or his attorney; and it sometimes gets the name of *infeftment*, though that word in its proper sense signifies the whole feudal right. For a long time, the appending of the bailie's seal to the superior's charter or preprecept, and sometimes his separate declaration that he had given seisin, completed the vassal's right, without the attestation of a notary. But afterwards a notorial instrument came to be considered as a necessary solemnity, not suppliable either by a proof of natural possession, or even of the special fact, that the vassal was duly entered to the possession by the superior's bailie.

9. All seisins and other real rights mentioned in 1617, c. 16, must be registered within sixty days after their date, either in the general register of seisins at Edinburgh, or in the register of the particular shire appointed by the acts, which, it must be observed, is not in every case the shire within which the lands lie. Unregistered seisins are ineffectual against third parties, but they are valid against the grantors and their heirs.

10. The attestation of the keeper of the records on the back of the seisin that it was registered, was deemed a sufficient registration 1686, c. 19. But as this weakened the security intended from the records to singular successors, the actual booking of seisins, and of other writings presented for registration, is now required, 1696, c. 18. Seisins regularly recorded are preferable, not according to their own dates, but the dates of their registration.

11. Seisin necessarily supposes a superior by whom it is given; the right, therefore, which the sovereign, who acknowleges no superior, has over the whole lands of Scotland, is constituted *jure coronæ* without seisin. In several parcels of land that lie contiguous to one another, one seisin serves for all, unless the right of the several parcels be either holden of different superiors, or derived from different authors, or enjoyed by different tenures under the same superior.

12. A charter not perfected by seisin, is a right merely personal, which does not transfer the property; and a seisin of itself bears no faith without its warrant. It is the seisin and charter joined together that constitutes the feudal right, and secures the receiver against the effect of all posterior seisins, even though the charters on which they proceed should be prior to his; and still more against all qualities burdening his author's right, contained in latent personal declarations or back-bonds, which have not been rendered litigious before his seisin.

13. No quality, which is designed as a lien or real burden on a feudal right, can be effectual against singular successors, if it be not inserted in the investiture.

14. Feudal subjects are chiefly distinguished by their different manners of holding, which were either *ward*, *feu*, *blanch*, or *burgage*.—*Ward-holding*, which is now abolished by 20 Geo. I. c. 50, was that which was granted for military service.

15. *Feu-holding*, is that whereby the vassal is obliged to pay to the superior a yearly rent in money or grain, and sometimes also in services proper to a farm; as ploughing, reaping, carriages for the superior's use, &c. *nomine feudi firmæ*.

16. *Blanch-holding* (not unlike the *feudum francum* of the Lombards) is that whereby the vassal is to pay to the superior an elusory yearly duty; as a penny money, a rose, a pair of gilt spurs, &c. merely in acknowledgment of the superiority, *nomine albæ firmæ*.

17. *Burgage-holding*, is that by which boroughs royal hold of the sovereign the lands which are contained in their charters of erection.

18. Feudal subjects granted to churches, monasteries, or other societies for religious or charitable uses, are said to be *mortified*, or granted *ad manum mortuam*; either because all casualties must necessarily be lost to the superior, where the vassal is a corporation which never dies; or because the property of these subjects is granted to a dead hand, which cannot transfer it to another. In lands mortified in times of Popery to the church, whether granted to prelates for the behoof of the church, or *in puram eleemosynam*, the only services prestable by the vassal were, prayers and singing of masses for the souls of the deceased, which approaches more to blanch-holding than ward. The purposes of such grants having been upon the Reformation declared superstitious, the lands mortified were annexed to the crown. But mortifications to universities, hospitals, &c. were not affected by that annexation; and lands may at this day be mortified to any lawful purpose, either by blanch or by feu-holding.

19. The right of the *superior* continues unimpaired, notwithstanding the feudal grant, unless in so far as the *dominium utile*, or property, is conveyed to his vassal: His infeftment in the lands subsists, and his heir is entitled to be vested, not in the superiority only, but in the lands themselves, of which his ancestor had made over the property. Hence he can sue all real actions concerning the lands, against every person but the vassal, or those deriving right from him. The superiority carries a right to the services and annual duties contained in the reddendo of the vassal's charter. The duty payable by the vassal is a *debitum fundi*, i. e. it is recoverable, not only by a personal action against himself, but by a real action against the lands. The services with which he is charged, if they are annual, as ploughing, cutting of corns or hay, &c. must be exacted within the year. The services of personal attendance, by hosting, hunting, watching, and warding, due by vassals, are abolished, 1. Geo. II. st. 2. c. 54; and in lieu of them, the superior is entitled to a certain annual payment, to be fixed by the Court of Session, if the parties themselves cannot settle it.

20. Besides the constant fixed rights of superiority, there are others, which, because they depend upon uncertain events, are called *casualties*. The casualties proper to a *ward-holding*, while that tenure subsisted, were, *ward*, *recognition*, and *marriage*. By the late statutes, 20 and 25 Geo. II. for abolishing ward-holdings, the tenure of lands holden ward of the crown, and of the prince, is turned into blanch, for payment of one penny Scots yearly, *si petatur tantum*; and the tenure of those holden of subjects, into feu for payment of such yearly feu-duty in money, victual, or cattle, in place of all services, as shall be fixed by the Court of Session.

21. The only casualty, or rather forfeiture, proper to *feu-holdings*, is the loss or tinsel of the feu-right, by the

neglect of payment of the feu-duty for two full years. 1597, c. 246.

22. The casualties common to all holdings, are *non-entry, relief, liferent, escheat, disclamation*, and *purpresture*. *Non-entry*, is that casualty which arises to the superior out of the rents of the feudal subject, through the heir's neglecting to renew the investiture after his ancestor's death. This casualty was introduced, that the superior, while he was without a vassal, might be enabled to provide himself with a proper person to serve him; the heir, therefore, as soon as by entering he becomes capable of serving his superior, returns, by our customs, to the full enjoyment of his feu.

23. The heir, from the death of the ancestor till he be cited by the superior in a process of general declarator of non-entry, loses only the *retoured duties* of his lands; and he forfeits these, though his delay should not argue any contempt of the superior, because the casualty is considered to fall as a condition implied in the feudal right, and not as a penalty of transgression. But where the delay proceeds not from the heir, but from the superior, nothing is forfeited, not even the retoured duties.

24. The heir, after he is cited by the superior in the action of general declarator, is subjected to the full rents till his entry, because his neglect is less excusable after citation. The retoured duties due before citation are *debita fundi*, which the superior, as creditor, may recover by a poinding of the ground; but the right which he has to the full duties that fall after citation, does not accrue to him as creditor, but as *interim dominus* of the rents; in which character he can make the rents effectual by a petitory action against tenants and intromitters, improperly called a special declarator.

25. *Relief* is that casualty which entitles the superior to an acknowledgment or consideration from the heir for receiving him as vassal. It is called relief, because by the entry of the heir his fee is relieved out of the hands of the superior. The superior can recover this casualty, either by a poinding of the ground, as a *debitum fundi*, or by a personal action against the heir, who, if the lands hold of the crown, is subjected by his taking a precept of seisin from the chancery, though he should not infeft himself upon it. In blanch and feu-holdings, where this casualty is expressly stipulated, a year's blanch or feu-duty is due in name of relief, besides the current year's duty, payable in name of blanch or feu-farm.

26. *Escheat* (from *escheoir, to happen or fall*.) anciently signified any casualty or forfeiture, by which a right fell from the proprietor, or accrued to another; but it has been since restricted to that special forfeiture which falls through a person's being denounced rebel. It is either single or liferent.—Single escheat, though it does not accrue to the superior, must be explained in this place, because of its coincidence with liferent.

27. After a debt is constituted, either by a formal decree, or by registration of the ground of debt, (which, to the special effect of execution, is in law accounted a decree) the creditor may obtain letters of horning, issuing from the signet, commanding messengers to charge the debtor to pay or perform his obligation within a day certain. Where horning proceeds on a formal decree of the Session, the time indulged by law to the debtor is fifteen days; if upon a decree of the commission of teinds, it is ten: Where it proceeds on a registered obligation, which specifies the number of days, that number must be the rule; and if no precise number be mentioned, the charge must be given on fifteen days, which is the term of law, unless where special statute interposes; as in bills, upon which the debtor may be charged on six days.

28. The messenger must execute these letters, (and indeed all summonses) against the debtor, either personally or at his dwelling-house. If payment be not made within the days mentioned in the horning, the messenger, after proclaiming three oyesses at the market-cross of the head borough of the debtor's domicil, and reading the letters there, blows three blasts with a horn, by which the debtor is understood to be proclaimed rebel to the king for contempt of his authority; after which he must affix a copy of the execution to the market-cross. This is called the publication of the diligence, or a denunciation at the horn. Persons denounced rebels have not a *persona standi in judicio*; they can neither sue nor defend in any action. Persons cited to the Court of Justiciary may be also denounced rebels, either for appearing there with too great a number of attendants, or, if by failing to appear, they are declared fugitives from the law. By the act abolishing ward-holdings, the casualties both of single and liferent escheat are discharged when proceeding upon denunciation for civil debts; but they still continue when they arise from criminal causes. All moveables belonging to the rebel at the time of his rebellion (whether proceeding upon denunciation or sentence in a criminal trial,) and all that shall be afterwards acquired by him until relaxation, fall under single escheat.

29. The rebel, if he either pays the debt charged for, or suspends the diligence, may procure letters of relaxation from the horn, which, if published in the same place, and registered fifteen days thereafter, in the same register with the denunciation, have the effect to restore him to his former state.

30. The rebel, if he continues unrelaxed for year and day after rebellion, is construed to be civilly dead: And, therefore, where he holds any feudal right, his superiors, as being without a vassal, are entitled each of them to the rents of such of the lands belonging to the rebel as hold of himself during all the days of the rebel's natural life, by the casualty of liferent escheat; except where the denunciation proceeds upon treason or proper rebellion, 1535, c. 32, in which last case the liferent falls to the king.

31. *Disclamation*, is that casualty whereby a vassal forfeits his whole feu to his superior, if he disowns or disclaims him without ground, as to any part of it. *Purpresture* draws likewise a forfeiture of the whole feu after it, and is incurred by the vassal's encroaching upon any part of his superior's property, or attempting by building, enclosing, or otherwise, to make it his own. In both these feudal delinquencies, the least colour of excuse saves the vassal.

32. Under the *dominium utile* which the *vassal* acquires by the feudal right, is comprehended the property of whatever is considered as part of the lands, whether houses, woods, enclosures, &c. above ground; or coal, limestone, minerals, &c. under ground.

33. There are certain rights naturally consequent on property, which are deemed to be reserved by the crown as *regalia*, unless they be specially conveyed. Gold and silver mines are of this sort; the first universally, and the other where three half-pennies of silver can be extracted from the pound of lead, 1424, c. 12, (three half-pennies in the reign of James I. is equal to about two shillings five pennies of our present Scots money, according to Mr. Ruddiman, *Pref. to Diplom. Scot.* p. 82.) These were by our ancient law annexed to the crown; but by an unprinted act, 1592, No. 12, they are dissolved from it; and every freeholder, (that is, as to this question, every proprietor, though he should hold his lands of a subject, 8th *Dec.* 1739, D. *Argyll*,) is entitled to a grant of the mines within his own lands, with the burden of delivering to the crown a

tenth of what shall be brought up, 12th *Jan.* 1750, E. *Hopeton.* This unprinted statute mentions also tin and copper mines, as if these were *inter regalia.*

34. Salmon fishing is likewise a right understood to be reserved by the crown if it be not expressly granted; but forty years possession thereof, where the lands are either erected into a barony, or granted with the general clause of fishings, establishes the full right of the salmon fishing in the vassal. A charter of lands, within which any of the king's forests lie, does not carry the property of such forest to the vassal.

35. All the subjects which were by the Roman law accounted *res publicæ*, as rivers, highways, ports, &c. are, since the introduction of feus, held to be *inter regalia*, or *in patrimonio principis;* and hence encroachment upon a highway is said to infer purpresture.

36. The vassal acquires right by his grant, not only to the lands specially contained in the charter, but to those that have been possessed forty years as *pertinent* thereof.

37. As barony is a *nomen universitatis*, and unites the several parts contained in it into one individual right, the general conveyance of a barony carries with it all the different tenements of which it consists, though they should not be specially enumerated (and this holds, even without erection into a barony, in lands that have been united under a special name.)

38. The vassal is entitled, in consequence of his property, to levy the rents of his own lands, and to recover them from his tenants by an action for rent before his own court, and from all other possessors and intromitters, by an action of mails and duties before the sheriff. He can also remove from his lands tenants who have no leases, and he can grant tacks or leases to others.—A tack is a contract of location, whereby the use of land, or any other immoveable subject, is set to the lessee or tacksman for a certain yearly rent, either in money, the fruits of the ground, or services. It ought to be reduced into writing, as it is a right concerning lands. Tacks, therefore, that are given verbally, to endure for a term of years, are good against neither party for more than one year.

39. The tacksman's right is limited to the fruits which spring up annually from the subject set, either naturally, or by the industry of the tacksman; he is not, therefore, entitled to any of the growing timber above ground, and far less to the minerals, coal, clay, &c. under ground, the use of which consumes the substance. All tacks were, by 1449, c. 7, for the encouragement of agriculture, declared effectual to the tacksman for the full time of their endurance, into whose hands soever the lands might come.

40. Tacks necessarily imply a *delectus personæ*, a choice by the setter of a proper person for his tenant. Hence the conveyance of a tack, not granted to assignees, is ineffectual without the landlord's consent.

41. It is not a fixed point whether a tacksman may subset the lands without an express power of subsetting. *Lord Stair*, II. 9. 22, and *Mackenzie h. l.* affirm he cannot; but it was adjudged, *Hare*, 955, that he might, even where the tack excluded assignees *per expressum*—far more ought he to have this power, where the exclusion of assignees is only implied.

42. If neither the setter nor tacksman shall properly discover their intention to have the tack dissolved at the term fixed for its expiration, they are understood or presumed to have entered into a new tack upon the same terms with the former, which is called *tacit relocation*, and continues till the landlord warn the tenant to remove, or the tenant renounce his tack to the landlord. This obtains also in the case of moveable tenants, who possess from year to year without written tacks.

43. In tacks of land, the setter is commonly bound to put all the houses and office-houses, necessary for the farm, in good condition at the tenant's entry; and the tenant must keep them and leave them so at his removal. But in tacks of houses, the setter must not only deliver to the tenant the subject set, in tenantable repair at his entry, but uphold it in that repair during the whole years of the tack; and if it should become insufficient before the ish, though without the setter's fault, the tack-duty must either be entirely remitted, or suffer an abatement in proportion to the damage sustained by the tenant.

44. A tenant, if his landlord should refuse to accept the victual-rent when offered in due time, is liable only for the prices as fixed for the sheriff-fiars of that year; but if he has not duly offered his rent in kind, he must pay the value at the ordinary prices of the country; and over and above make good to the heritor the damages incurred by him through the non delivery, if, *e. g.* he should be thereby disabled from performing a contract with a merchant to whom he had sold his farms. If the inclemency of the weather, inundation, or calamity of war, should have brought upon the crop an extraordinary damage (*plus quam tolerabile*) the landlord had, by the Roman law, no claim for any part of the tack-duty; if the damage was more moderate, he might exact the full rent. It is nowhere defined what degree of sterility or devastation makes a loss not to be borne, but the general rule of the Roman law seems to be made ours, by *Dirl.* 108. Tenants are obliged to pay no cesses or public burdens, to which they are not expressly bound by their tacks; but the law itself divides the burdens of the schoolmaster's salary equally between the proprietor and his tenants, 1696, c. 26.

45. Tacks may be evacuated during their currency, 1. In the same manner as feu-rights, by the tacksman's running in arrear of his tack-duty for two year's together; but it may be prevented by the tenant's making payment at the bar before sentence. 2. Where the tenant either runs in arrear of one year's rent, or leaves his farm uncultivated at the usual season, the judge-ordinary, when applied to by the proprietor, is required, by the *Act S.* 14th Dec. 1746, to ordain the tenant to give security for the arrears, and for the rent of the five following crops, if the tack shall subsist so long; otherwise to decern him to remove, as if the tack was at an end. 3. Tacks may be evacuated at any time by the mutual consent of parties, *e. g.* by the tacksman's renunciation accepted by the proprietor; but verbal renunciations may be resiled from.

46. The tenant who intends to quit his possession at the ish of his tack ought to make a renunciation thereof to his landlord, either in writing or otherwise, forty days before the term of the Whitsunday at or immediately preceding the ish. But if a landlord wants to remove a tenant, he is, by 1555, c. 39, required to warn him, upon a precept signed by himself, forty days preceding the term of the Whitsunday before described, personally or at his dwelling-house, to remove at that term with his family and effects. This precept must be also executed on the ground of the lands, and thereafter read in the parish-church where the lands lie, after the morning service, and affixed to the most patent door thereof. Whitsunday, though it be a moveable feast, is, in questions of removing, fixed to the 15th of May, by 1690, c. 39. In warnings from tenements within borough, it is sufficient that the tenant be warned forty days before the ish of the tack, whether it be Whitsunday or Martinmas; and in these the ceremony of chalking the door is sustained as a warning, when proceeding upon a verbal order from the proprietor, though without the warrant of a magistrate. Where the tenant is bound by an express clause of his tack to remove at the ish of it, without warning, such

obligation is, by the above-quoted act of sederunt, 14th Dec. 1756, declared to be a sufficient warrant for letters of horning; upon which, if the landlord charges his tenant forty days before the said Whitsunday, the judge is authorized to eject him within six days after the term of removing expressed in the tack.

47. The landlord has in security of his tack-duty, over and above the tenant's personal obligation, a tacit pledge of hypothec, not only in the fruits, as he had by the Roman law, but in the cattle pasturing on the ground. The corn and other fruits are hypothecated for the rent of that year whereof they are the crop; for which they remain affected, though the landlord should not use his right for years together. The whole cattle on the ground, considered as a quantity, are hypothecated for a year's rent, one after another successively, provided the hypothec be applied within three months from the last conventional term of payment of each year. In tacks of houses, breweries, shops, and other tenements, which have no natural fruits, the furniture and other goods brought into the subject set (*invecta et illata*,) are hypothecated to the landlord for one year's rent.—The king's prerogative process takes place of the landlord's hypothec.

TITLE III. *Of the Voluntary Transmission of Heritable Rights by Confirmation and Resignation.*

1. A vassal may transmit his feu either to universal successors as heirs, or to singular successors, *i. e.* those who acquire by gift, purchase, or other singular title. This last sort of transmission is either voluntary, by disposition; or necessary, by adjudication.

2. Dispositions to be holden of the disponer are transmissions only of the property, the superiority remaining as formerly. This sort does not necessarily require a confirmation by the grantor's superior, because his vassal continues the same, notwithstanding the subaltern right granted to the subvassal; but because the subvassal's property is exposed to the hazard of all the casualities falling by his superior, where confirmation is not adhibited, it is commonly applied for.

3. Dispositions to be holden of the grantor's superior may be perfected either by confirmation or resignation; and therefore they generally contain both precept of seisin and procuratory of resignation. When the receiver is to complete his right in the first way, he takes seisin upon the precept; but such seisin is ineffectual without the superior's confirmation; for the disponee cannot be deemed a vassal till the superior receive him as such, or confirm the holding.

4. *Resignation*, is that form of law by which a vassal surrenders his feu to his superior; and it is either *ad perpetuam remanentiam*, or *in favorem*. In resignations *ad remanentiam*, where the feu is resigned to the effect that it may remain with the superior, the superior, who before had the superiority, acquires by the resignation the property also of the lands resigned; and as his infeftment of the lands still subsisted, notwithstanding the right by which he had given his vassal the property, therefore, upon the vassal's resignation, the superior's right of property revives, and is consolidated with the superiority, without the necessity of a new infeftment; so that resignations *ad remanentiam* are truly extinctions, not transmissions, of a right.

5. Resignations *in favorem* are made, not with an intention that the property resigned should remain with the superior, but that it should be again given by him in favour either of the resigner himself, or of a third party. They have not therefore the effect, like resignations *ad remanentiam*, of divesting the resigner; for the surrender is not attended with any purpose, or *causa habilis*, of transferring the property to the superior, but is only used as a step to convey to another; consequently the fee remains in the resigner, till the person in whose favour the resignation is made, gets his right from the superior perfected by seisin.

6. Formerly, one who was vested with a personal right of lands, *i. e.* a right not completed by seisin, effectually divested himself by disponing it to another; after which, no right remained in the disponer which could be carried by a second disposition, because a personal right is no more than a *jus obligationis*, which may be transferred by any deed sufficiently expressing the will of the grantor. But this doctrine, at the same time that it rendered the security of the records extremely uncertain, was not truly applicable to such rights as required seisin to complete them; and therefore it now obtains, that the grantor of a personal right of lands is not so divested, by conveying the right to one person, but that he may effectually make it over afterwards to another; and the preference between the two does not depend on the dates of the dispositions, but on the priority of the seisins following upon them.

TITLE IV. *Of Redeemable Rights, and of the two great classes of Burdens affecting Lands—Servitudes and Teinds.*

1. An heritable right is said to be redeemable, when it contains a right of reversion or return in favour of the person from whom the right flows. Reversions are either *legal*, which arise from the law itself, as in adjudications, which law declares to be redeemable within a certain term after their date; or *conventional*, which are constituted by the agreement of parties, as in wadsets, rights of annual rent, and rights of security. A *wadset* (from wad or pledge) is a right by which lands or other heritable subjects are impignorated by the proprietor to his creditor in security of his debt; and like other heritable rights is perfected by seisin. The debtor, who grants the wadset, and has the right of reversion, is called the *reverser;* and the creditor, receiver of the wadset, is called the wadsetter.

2. Wadsets are either *proper* or *improper*. A *proper* wadset is that whereby it is agreed that the use of the land shall go for the use of the money; so that the wadsetter takes his hazard of the rents, and enjoys them, without accounting in satisfaction or *in solutum* of his interest. Though, therefore, the rent of the lands should be less than the yearly interest of the sum lent, the lands are redeemable upon payment of the bare principal sum, without any claim for bygone interests; if it amounts to more, the wadsetter is not obliged to impute the surplus (*in sortem*) towards the extinction of the principal sum. Where the wadsetter thus subjects himself to all the chances by which the fruits may be lost, it is a proper wadset, though the reverser should be obliged to pay the public burdens.

3. In an improper wadset, the reverser, if the rent should fall short of the interest, is taken bound to make up the deficiency; if it amounts to more, the wadsetter is obliged to impute the excrescence towards extinction of the capital. And as soon as the whole sums, principal and interest, are extinguished by the wadsetter's possession, he may be compelled to renounce or divest himself in favour of the reverser. Where the wadsetter, in place of possessing by himself, grants a backtack of the lands to the reverser for payment of the interest of the wadset sums, as the tack duty, the wadset is thereby rendered improper; for the wadsetter has in that event no chance of getting more than his interest; and consequently the redemption is burdened, not only with the payment of the principal sum, but of the interest or tack duties remaining unpaid. But this burden

is ineffectual against singular successors, if it be not expressed in the right of reversion, or if the back tack be not recorded in the proper register.

4. Infeftments of annualrent are also redeemable rights. A right of annualrent does not carry the prŏperty of the lands, but it creates a real *nexus* or burden upon the property, for payment of the interest or annualrent contained in the right; and consequently the bygone interests due upon it are *debita fundi.*

5. Infeftments in security are another kind of redeemable right, (now frequently used in place of rights of annualrent,) by which the receivers are infeft in the lands themselves, (and not simply in an annualrent forth of them,) for security of the principal sums, interest, and penalty contained in the rights. These rights, when they are granted, not to the creditors for payment of their debts, but to cautioners for relief of their engagements, are called infeftments of relief. If an infeftment in security be granted to a creditor, he may thereupon enter into the immediate possession of the lands or annualrent for his payment; whereas rights of relief are conditional, and have no operation till the cautioner either pays the debt, or is distressed for it.

6. All rights of annualrent, rights in security, and generally whatever constitutes a real burden on the fee, may be the ground of an adjudication, which is preferable to all adjudications or other diligences intervening between the date of the right, and of the adjudication deduced on it, not only for the principal sum contained in the right, but also for the whole past interest contained in the adjudication. This preference arises from the nature of real debts, or *debita fundi*, and is expressly reserved by the act 1661, c. 62, establishing the *pari passu* preference of adjudications; but in order to obtain it for the interest of the interest accumulated in the adjudication, such adjudication must proceed on a process of poinding the ground.

7. *Servitude* is a burden affecting lands or other heritable subjects, whereby the proprietor is either restrained from the full use of what is his own, or is obliged to suffer another to do something upon it. Servitudes are either *natural*, *legal*, or *conventional*. *Nature* itself may be said to constitute a servitude upon inferior tenements, whereby they must receive the water that falls from those that stand on higher ground. *Legal* servitudes are established by statute or custom from considerations of public policy: among which may be numbered the public restraints laid upon the proprietors of tenements within the city of Edinburgh, by 1621, c. 26, and 1698, c. 8. There is as great variety of conventional servitudes, as there are ways by which the exercise of property may be restrained by paction in favour of another. They are constituted either *by grant*, where the will of the party burdened is expressed in writing; or by *prescription*, where his consent is presumed from his acquiescence in the burden for forty years.

8. Servitudes are either *predial* (sometimes called *real*) or *personal*. *Predial* servitudes are burdens imposed upon one tenement in favour of another tenement, and are divided into *rural* servitudes, or *of lands*, and *urban* servitudes, or *of houses*. The rural servitudes of the Romans were *iter*, *actus*, *via*, *aquæductus*, *aquæ haustus*, and *jus pascendi pecoris*. Similar servitudes are recognised in the law of Scotland; as of a foot road, horse road, cart road, dams and aqueducts, watering of cattle, and pasturage. The chief servitudes of houses among the Romans were those of support, viz. *tigni immittendi*, and *oneris ferendi*. The first was the right of fixing in our neighbour's wall a joist or beam from our house; the second was that of resting the weight of one's house upon his neighbour's wall. To these may be added the servitudes *altius non tollendi*, *et non officiendi luminibus vel prospectui*, restraining proprietors from raising their houses beyond a certain height, or from making any building whatsoever that may hurt the light or prospect of the dominant tenement,—which several servitudes are also known in the law of Scotland.

9. But besides these, there are two predial servitudes usual in Scotland, to which the Romans were strangers, viz. that of *fuel* or *feal*, and *divot*, and of *thirlage*. The first is a right, by which the owner of the dominant tenement may turn up peats, turfs, feals, or divots, from the ground of the servient, and carry them off, either for fuel or thatch, or the other uses of his own tenement. *Thirlage*, is that servitude by which lands are astricted or thirled to a particular mill, and the possessors bound to grind their grain there, for payment of certain multures and sequels, as the agreed price of grinding.

10. Servitudes are extinguished, 1. *Confusione*, when the same person comes to be the proprietor of the dominant and servient tenements; for *res sua nemini servit*, and the use the proprietor thereafter makes of the servient tenement is not *jure servitutis*, but is an act of property. 2. By the perishing either of the dominant or servient tenement. 3. Servitudes are lost *non utendo*, by the dominant tenement's neglecting to use the right for forty years, which is considered as a dereliction of it, though he who has the servient tenement should have made no interruption, by doing acts contrary to the servitude.

Personal servitudes are those by which the property of a subject is burdened in favour, *not of a tenement*, but *of a person*. The only personal servitude known in our law is *usufruct* or *liferent*, which is a right to use and enjoy a thing during life, the substance of it being preserved. A liferent cannot therefore be constituted upon things which perish in the use; and though it may upon subjects which gradually wear out by time, as household furniture, &c. yet with us it is generally applied to heritable subjects. He whose property is burdened is usually called the *fiar*.

12. Liferents are divided into *conventional* and *legal*. *Conventional* liferents are either *simple*, or *by reservation*. A *simple liferent*, or by a separate constitution, is that which is granted by the proprietor in favour of another; and this sort requires seisin, in order to affect singular successors. A liferent *by reservation*, is that which a proprietor reserves to himself, in the same writing by which he conveys the fee to another. It requires no seisin; for the grantor's former seisin, which virtually included the liferent, still subsists as to the liferent which is expressly reserved.

13. Liferents *by law* are the *terce* and the *courtesy*. The *terce* (*tertia*) is a liferent competent by law to widows who have not accepted of special provisions, in the third of the heritable subjects in which their husbands died infeft. Burgage-tenements and superiorities are excluded from it. *Courtesy* is a liferent given by law to the surviving husband, of all his wife's heritage in which she died infeft, if there was a child of the marriage born alive. A marriage, though of the longest continuance, gives no right to the courtesy, if there was no issue of it. As in the terce the husband's seisin is the ground and measure of the wife's right, so in the courtesy the wife's seisin is the foundation of the husband's; and the two rights are in all other respects of the same nature, except that the courtesy extends to burgage holdings and to superiorities.

14. Liferent is extinguished by the liferenter's death. That part of the rents which the liferenter had a proper right to before his death falls to his executors; the rest, as never having been *in bonis* of the deceased, goes to the fiar. Martinmas and Whitsunday are by our custom the

legal terms of the payment of rent; consequently, if a liferenter of land survives the term of Whitsunday, his executors are entitled to the half of that year's rent, because it was due the term before his death; if he survives Martinmas, they have a right to the whole.

15. Ecclesiastical rights are called *benefices*,—an appellation transferred from secular feus to church livings, because they were given to churchmen in consideration of their *spiritual warfare*. They consist either of lands, or of the tithe or teind of lands; the first is called the *temporality*, the other the *spirituality* of the benefice. *Teinds* or tithes are that liquid proportion of our rents or goods which is due to churchmen for performing divine service, or exercising the other spiritual functions proper to their several offices. *Personal* teinds, *i. e.* the tenth of what one acquires by his own industry or employment, are not acknowledged by our law, though they have been found due, when supported by forty years possession. *Predial* teinds are, by the usage of Scotland, either *parsonage* or *vicarage*. *Parsonage* teinds are the teinds of corn; and they are so called, because they are due to the parson or other titular of the benefice. *Vicarage* teinds are the small teinds of calves, lint, hemp, eggs, &c. which were commonly given by the titular to the vicar, who served the cure in his place. The first sort was universally due, unless in the case of their infeudation to laics, or of a pontifical exemption; but by the customs of almost all Christendom, the lesser teinds were not demanded where they had not been customarily paid. By the practice of Scotland, the teinds of animals, or of things produced from animals, as lambs, wool, calves, are due, though not accustomed to be paid; but roots, herbs, &c. are not tithable unless use of payment be proved.

16. After the Reformation, James VI. considered himself as proprietor of all the church lands; partly because the purposes for which they had been granted were declared superstitious, and partly in consequence of the resignation which he and Queen Mary, his mother, had procured from the beneficiaries. And even as to the teinds, though our reformed clergy, after the example of the canonists, claimed them as the patrimony of the church, our sovereign did not submit to that doctrine farther than it extended to a competent provision for ministers. He therefore erected or secularized several abbacies and priories into temporal lordships; the grantees of which were called sometimes lords of erection, and sometimes titulars, as having by their grants the same title to the erected benefices that the monasteries had formerly.

17. Proprietors of land may sue the titulars for a valuation, and, if they think fit, for a sale also of their teinds, before the commissioners named for that purpose. The rate of teind, when it is possessed by the proprietor jointly with the stock, for payment of a certain duty to the titular, and so does not admit a separate valuation, is fixed at a fifth part of the constant yearly rent, which is accounted a reasonable *surrogatum*, in place of a tenth of the increase. Where it is drawn by the titular, and consequently may be valued separately from the stock, it is to be valued as its extent may be ascertained upon a proof before the commissioners; but in this last valuation, a fifth part is to be deducted from the proved teind, in favour of the proprietor. Where the proprietor insists also for a sale of his teinds, the titular is obliged to sell them at nine years purchase of the valued teind-duty; and upon receiving the price, to execute a disposition in the purchaser's favour, containing procuratory of resignation and precept of seisin.

18. Some teinds are more directly subject to an allocation for the minister's stipend than others. The teinds in the hands of the lay titular fall first to be allocated, who, since he is not capable to serve the cure in his own person, ought to provide one who can; and if the titular, in place of drawing the teind, has set it in tack, the tack-duty is allocated: This sort is called *free teind*. Where the tack-duty, which is the titular's interest in the teinds, falls short, the tack itself is burdened, or, in other words, the surplus teind over and above the tack-duty: But in this case the court of commission of teinds is empowered to recompense the tack-man, by prorogating his tack for such a number of years as they shall judge equitable. Where this likewise proves deficient, the allocation falls on the teinds hereditably conveyed by the titular, unless he has warranted his grant against future augmentations; in which case the teinds of the lands belonging in property to the titular himself, must be allocated in the first place.

19. Teinds are *debita fructuum*, not *fundi*; for as by their first condition the beneficiary might, if he used the proper diligence, make them effectual, by drawing them out of the several corps, so he needed no real security. The action, therefore, for bygone teinds, is only personal against those who have intermeddled either with the teind by itself, or with stock and teind jointly; unless where the titular is infeft in the lands, in security of the valued teind-duty.

20. After a minister's death, his executors have right to the annat; which, in the sense of the canon law, was a right reserved to the Pope, of the first year's fruits of every benefice: But the word annat or ann, as it is now understood, is the right which law gives to the executors of ministers, of half a year's benefice, over and above what was due to the minister himself for his incumbency. So that if the incumbent survives Whitsunday, his executors have the half of that year for the deceased's incumbency, and the other half as annat; if he survive Michaelmas, they have that whole year for his incumbency, and the half of the next in name of ann. The executors of a minister need make up no title to the ann by confirmation: Neither is the right assignable by the minister, or affectable for his debts; for it never belonged to him, but is a mere gratuity given by law to those for whom it is presumed the deceased could not sufficiently provide: And law has given it without distinction to the executors of all ministers, even where the stipend is made up, not of teinds, but of the public revenue of a borough, or of a voluntary contribution.

TITLE V.—*Of the transmission of Heritable Rights by the Diligence of the Law; or of Inhibitions and Adjudications.*

1. The constitution and transmission of feudal rights being explained, and the burdens with which they are chargeable, it remains to be considered how these rights may be affected at the suit of creditors by legal diligence. *Diligences* are certain forms of law, whereby a creditor endeavours to make good his payment, either by affecting the person of his debtor, or by securing the subjects belonging to him from alienation, or by carrying the property of these subjects to himself. They are either *real* or *personal*. *Real* diligence is that which is proper to heritable or real rights; *personal* is that by which the person of the debtor may be secured, or his personal estate affected. Of the first sort we have two, 1. *Inhibition*. 2. *Adjudication*.

2. *Inhibition* is a personal prohibition, which passes by letters under the signet, prohibiting the party inhibited to contract any debt, or to do any deed, by which any part of his lands may be aliened or carried off in prejudice of the creditor inhibiting. It must be executed against the debtor personally, or at his dwelling-house, according to

the order prescribed in the case of summonses by 1540, c. 75. and thereafter published and registered, in the same manner with interdictions. It secures the creditor who inhibits against all deeds of alienation, even onerous ones that are granted posterior to the publication of the letters, provided he shall, within the time statuted, proceed to perfect his diligence by registration.

3. Though inhibitions by their uniform style disable the debtor from selling his moveable as well as his heritable estate, their effect has been long limited to heritage, from the interruption that such an embargo upon moveables must have given to commerce.

4. This diligence only strikes against the voluntary debts or deeds of the inhibited person. It does not restrain him from granting necessary deeds, *i. e.* such as he was obliged to grant anterior to the inhibition.

5. Inhibitions may be reduced upon legal nullities, arising either from the ground of debt, or the form of diligence. When payment is made by the debtor to the inhibiter, the inhibition is said to be purged.

6. *Adjudication* is a form of diligence, by which creditors proceed against the lands of their debtors, by way of action before the Court of Session. Such part only of the debtor's lands is to be adjudged as is equivalent to the principal sum and interest of the debt, with the composition due to the superior and expenses of infeftment, and a fifth part more, in respect the creditor is obliged to take land for his money; but without penalties or sheriff-fees. The debtor must deliver to the creditor a valid right of the lands to be adjudged, renounce the possession in his favour, and ratify the decree of adjudication. And law considers the rent of the lands as precisely commensurate to the interest of the debt, so that the adjudger lies under no obligation to account for the surplus rents. In this, which is called a *special* adjudication, the legal, or term of redemption, is declared to be five years; and the creditor attaining possession upon it can use no further execution against the debtor, unless the lands be evicted from him.

7. Where the debtor does not produce a sufficient right to the lands, or is not willing to renounce the possession, and ratify the decree, (which is the case that has most frequently happened,) it is lawful for the creditor to adjudge all right belonging to the debtor, in the same manner, and under the same reversion of ten years, as he could by the former laws have apprised it. In this last kind, which is called a *general* adjudication, the creditor must limit his claim to the principal sum, interest, and penalty, without demanding a fifth part more.

8. There are two other kinds of adjudication, those on a decree *cognitionis causa*, otherwise called *contra hæreditatem jacentem*, and adjudications *in implement*. Where the debtor's apparent heir formally renounces the succession, the creditor may obtain a decree *cognitionis causa*, in which, though the heir renouncing is cited for the sake of form, no sentence condemnatory can be pronounced against him in respect of his renunciation; the only effect of it is to subject the *hæreditas jacens* to the creditor's diligence. Adjudications *in implement* are deduced against those who have granted deeds without procuratory of resignation or precept of seisin, and refuse to divest themselves,—to the end that the subject conveyed may be effectually vested in the grantee.

9. There is a further diligence by which land estates may be affected for the recovery of debt, called *judicial sales of bankrupt estates.* The word *bankrupt* is in our law sometimes applied to persons whose funds are not sufficient for their debts; and sometimes not to the debtor, but to his estate. There was no method known in our law for the proper sale of a bankrupt estate, so as the price might be divided among the creditors, till 1681, c. 17. by which the Court of Session was empowered, at the suit of any real creditor, to try the value of the debtor's estate, and name commissioners to sell it for the payment of his debts. But as the commissioners named by the Session, in pursuance of this act, were generally backward to undertake so ungrateful an office, and as the consent of the debtor, which the statute required where his right of reversion was not expired, could seldom be obtained, it was enacted, by 1690, c. 20. that decrees of sale of bankrupt estates should be pronounced by the Court itself, and that such sales might proceed in all cases, without the consent of the debtor.

TITLE VI.—*Of Moveable Rights, or of Obligations and Contracts.*

1. The laws of heritable rights being explained, moveable rights fall next to be considered, the doctrine of which depends chiefly on the nature of obligations. An *obligation* is a legal tie, by which one is bound to pay or perform something to another. Every obligation on the person obliged implies an opposite right in the creditor, so that what is a burden in regard to the one, is a right with respect to the other; and all rights founded on obligations are called personal. There is this essential difference between a real and a personal right, that a *jus in re*, whether of property, or of an inferior kind, as servitude, entitles the person vested with it to possess the subject as his own, or if he is not in possession, to demand it from the possessors; whereas the creditor in a personal right has only *a jus ad rem*, or a right to compel the debtor to fulfil his obligation, without any right in the subject itself.

2. Obligations, when considered with regard to their cause, were divided by the Romans into those arising from *contract*, *quasi-contract*, *delict*, *and quasi delict*: But there are certain obligations, even full and proper ones, which cannot be derived from any of these sources, and to which Lord Stair gives the name of *obediential.* Such is, among others, the obligation of parents to aliment or maintain their children; which arises singly from the relation of parent and child, and may be enforced by the civil magistrate. Under parents are comprehended the mother, grandfather, and grandmother, in their proper order. This obligation on parents extends to the providing of their issue in all the necessaries of life, and giving them suitable education. It ceases when the children can earn a livelihood by their own industry; but the obligation on parents to maintain their indigent children, and reciprocally on children to maintain their indigent parents, is perpetual.

3. All obligations arising from the natural duty of restitution fall under this class: Thus things given upon the view of a certain event must be restored, if that event does not afterwards exist, *e. g.* what is given in contemplation of a marriage which never followed: And on the same principle, one upon whose ground a house is built or repaired by another is obliged, without any covenant, to restore the expence laid out upon it in so far as it has been profitable to him.

4. A contract is the voluntary agreement of two or more persons, whereby something is to be given or performed upon one part, for a valuable consideration, either present or future, on the other part. Contracts were, by the Roman law, perfected either, *re*, by the intervention of things; or by words; or by writing; or by sole consent. The *real* contracts of the Roman are, *loan*, *commodate*, *depositation*, and *pledge*.

5. *Loan*, or *mutuum*, is that contract which obliges a

person who has borrowed any fungible subject from another, to restore to him as much of the same kind, and of equal goodness. Whatever receives its estimation in number, weight, or measure, is a fungible; as corn, wine, current coin, &c. The only proper subjects of this contract are things which cannot be used without either their extinction or alienation; hence the property of the thing lent is necessarily transferred, by delivery, to the borrower, who consequently must run all the hazards either of its deterioration or its perishing, according to the rule, *ris perit suo domino.*

6. *Commodate* is a species of loan, gratuitous on the part of the lender, where the thing lent may be used without either its perishing or its alienation. Hence, in this sort of loan, the property continues with the lender; the only right the borrower acquires in the subject is its use, after which he must restore the individual thing that he borrowed.

7. *Depositation* is a contract, by which one who has the custody of a thing committed to him, (the depositary,) is obliged to restore it to the depositor. If a reward is bargained for by the depositary for his care, it resolves into the contract of location. As this contract is gratuitous, the depositary is only answerable for the consequences of gross neglect; but after the deposit is redemanded, he is accountable even for casual misfortunes. An obligation arises, without formal paction, barely by a traveller's entering into an inn, ship, or stable, and there depositing his goods, or putting up his horses; whereby the inn-keeper, shipmaster, or stabler, is accountable, not only for his own facts and those of his servants, (which is an obligation implied in the very exercise of these employments,) but of the other guests or passengers.

8. Pledge, when opposed to wadset, is a contract, by which a debtor puts into the hands of his creditor a special moveable subject, in security of the debt, to be redelivered on payment. Where a security is established by law to the creditor, upon a subject which continues in the debtor's possession, it has the special name of an hypothec; as in the case of owners of ships, who have an hypothec on the cargo for the freight.

9. There is nothing in the law of Scotland analogous to the *verborum obligatio* of the Romans, which was created by the parties uttering certain *verba solennia*, or words of style: And therefore the appellation of *verbal* may be properly enough applied to all obligations, to the constitution of which writing is not essential, which includes both real and consensual contracts; but, as these are afterwards explained, obligations by *word* may here be restricted to promises, and to such verbal agreements as have no special name to distinguish them. Agreement implies the intervention of two different parties, who come under mutual obligations to one another. Where nothing is to be given or performed but on one part, it is properly called a *promise*, which, as it is gratuitous, does not require the acceptance of him to whom the promise is made. An offer, which must be distinguished from a promise, implies something to be done by the other party; and consequently is not binding on the offerer till it be accepted, with its limitations or conditions, by him to whom the offer is made, after which it becomes a proper agreement.

10. *Writing* must necessarily intervene in all obligations and bargains concerning heritable subjects, though they should be only temporary; as tacks, which, when they are verbal, last but for one year. In these no verbal agreement is binding, though it should be referred to the oath of the party; for, till writing is adhibited, law gives both parties a right to resile as from an unfinished bargain; which is called *locus pænitentiæ.* Verbal or nuncupative testaments are rejected by the Scotch law; but verbal legacies are sustained, where they do not exceed 100*l.* *Scots.*

11. All writings carrying any heritable right, and other deeds of importance, must be subscribed by the principal parties, if they can subscribe, otherwise by two notaries, before four witnesses specially designed, (or distinguished.) In the case where the parties themselves subscribe, two witnesses are sufficient, and in all cases the witnesses must also subscribe. Custom has construed obligations for sums exceeding 100*l.* *Scots* to be "obligations of importance."

12. A new requisite has been added to certain deeds since the Union, for the benefit of the revenue: They must be executed on stamped paper or parchment paying a certain duty to the crown.

13. Certain privileged writings do not require the ordinary solemnities. 1. Holograph deeds (written by the grantor himself,) are effectual without witnesses. 2. Testaments, if executed where men of skill in business cannot be had, are valid, though they should not be quite formal. 3. Discharges to tenants are sustained without witnesses, from their presumed rusticity or ignorance in business. 4. Missive letters *in re mercatoria*, commissions, and fitted accounts in the course of trade, bills of exchange, and also inland bills, though they be not holograph, are, from the favour of commerce, sustained without the ordinary solemnities.

14. A bill of exchange is an obligation in the form of a mandate, whereby the drawer or mandant desires him to whom it is directed to pay a certain sum, at the day and place therein mentioned, to a third party. An inland bill is a similar mandate, but implying that both the drawer and acceptor live in the same country. In either case, the bill is valid without the designation either of the drawer, or of the person to whom it is made payable: It is enough, that the drawer's subscription appears to be truly his; and one's being possessor of a bill marks him out to be the creditor, if he bears the name given in the bill to the creditor. A creditor in a bill likewise may transmit it to another merely by indorsation, or writing his name on the back of it.

15. A writing, while the grantor keeps it under his own power or his doer's, has no force; it becomes obligatory only after it is delivered to the grantee himself, or found in the hands of a third person. But the following deeds are effectual without delivery: 1. Writings containing a clause dispensing with the delivery. 2. Deeds in favour of children, even natural ones; for parents are the proper custodiers or keepers of their children's writings. For a similar reason, postnuptial settlements by the husband to the wife need no delivery. 3. Rights which are not to take effect till the grantor's death, or even where he reserves an interest to himself during his life; for it is presumed he holds the custody of these merely to secure to himself such reserved interest. 4. Deeds that the grantor lay under an antecedent natural obligation to execute, *e. g.* rights granted to a cautioner for his relief. 5. Mutual obligations, *e. g.* contracts; for every such deed, the moment it is executed, is a common evident to all the parties contractors. Lastly, the publication of a writing by registration is equivalent to delivery.

16. Contracts *consensual, i. e.* which might by the Roman law be perfected by sole consent, without the intervention either of things or of writings, are, *sale, permutation, location, society*, and *mandate*. Where the subject of any of these contracts is heritable, writing is necessary.

17. *Sale* is a contract, by which one becomes obliged to give something to another, in consideration of a certain price

in current money to be paid for it. *Permutation* differs from a sale chiefly in this, that in permutation, one subject is given in barter or exchange for another; whereas the price in a sale consists of current money.

18. *Location* is that contract, where an hire is stipulated for the use of things, or for the service of persons. It may, without impropriety, be considered as a species of sale, in which the subject sold is the use or service; and the price is the hire, which, as in a proper sale, generally consists of money.

19. *Society*, or *copartnership*, is a contract, whereby the several partners agree concerning the communication of loss and gain arising from the subject of the contract. It is formed by the reciprocal choice that partners make of one another; and so is not constituted in the case of coheirs, or of several legatees in the same subject. A copartnership may be so constituted, that one of the partners shall, either from his sole right of property in the subject, or from his superior skill, be entitled to a certain share of the profits, without being subjected to any part of the loss; but a society where one partner is to bear a certain proportion of loss, without being entitled to any share of the profits, is justly reprobated. All the partners are entitled to shares of profit and loss proportioned to their several stocks, where it is not otherwise covenanted.—A joint trade is not a copartnership, but a momentary contract, where two or more persons agree to contribute a sum to be employed in a particular sort of trade, the produce whereof is to be divided among the adventurers according to their several shares after the voyage is finished.

20. *Mandate* is a contract, by which one employs another to manage any business for him; and by the Roman law, it must have been gratuitous. It may be constituted tacitly, by one's suffering another to act in a certain branch of his affairs for a tract of time together, without challenge.

21. *Quasi contracts* are formed without explicit consent, by one of the parties doing something that by its nature either obliges him to the other party, or the other party to him.

22. There are certain obligations which cannot subsist by themselves, but are accessions to, or make a part of, other obligations. Of this sort are *fidejussion*, and the *obligation to pay interest*. *Cautionry*, or *fidejussion*, is that obligation by which one becomes engaged as security for another, that he shall either pay a sum, or perform a deed. *Interest* (*usuræ*) is the profit due, by the debtor of a sum of money, to the creditor for the use of it. Soon after the Reformation, our legal interest was fixed at the rate of ten *per cent. per annum*, 1587, c. 52.; from which time it has been gradually reduced, till at last, by 12th *Ann. Stat.* 2. c. 16. it was brought to five *per cent.*, and has continued at that rate ever since.

23. *Donation*, so long as the subject is not delivered to the donee, may be justly ranked among obligations; and it is that obligation which arises from the mere good will and liberality of the grantor. Donations imply no warrandice but from the future facts of the donor. Donations made in contemplation of death, or *mortis causa*, are of the nature of legacies, and like them revokable; consequently, not being effectual in the grantor's life, they cannot compete with any of his creditors, not even with those whose debts were contracted after the donation.

24. Obligations may be dissolved. 1. By specifical *performance*. 2. By the *consent* of the creditor, who without full implement, or even any implement, may renounce the right constituted in his own favour. 3. Where the same person is both creditor and debtor to another, the mutual obligations, if they are for equal sums, are extinguished by *compensation*; if for unequal, still the lesser obligation is extinguished, and the greater diminished, as far as the concourse of debt and credit goes. 4. Obligations are dissolved by *novation*, whereby one obligation is changed into another, without changing either the debtor or creditor. The first obligation being thereby extinguished, the cautioners in it are loosed, and all its consequences discharged; so that the debtor remains bound only by the last. Obligations are extinguished, lastly, *confusione*, where the debt and credit meet in the same person, either by succession or singular title, *e. g.* when the debtor succeeds to the creditor, or the creditor to the debtor, or a stranger to both; for one cannot be debtor to himself.

TITLE VII. *Of the Voluntary Transmission of Moveable and Personal Rights; or of Assignations.*

1. Heritable rights, when they are clothed with infeftment, are transmitted by *disposition*, which is a writing containing procuratory of resignation and precept of seisin; but those which either require no seisin, as servitudes, patronages, reversions, &c. or on which seisin has not actually followed, and also all moveable rights, are transmissible by simple assignation. He who grants the assignation is called the *cedent*, and he who receives it, the *assignee* or *cessionary*. If the assignee conveys his right to a third person, it is called a *translation*; and if he assigns it back to the cedent, a *retrocession*. Certain rights are, from the uses to which they are destined, incapable of transmission; as alimentary rights: Others cannot be assigned by the person vested in them, without special power given to him, as tacks, &c. The transmission of a third sort is not presumed to be intended, without an express conveyance, as of paraphernal goods, which are so proper to the wife, that a general assignation by her to her husband, of all that did or should belong to her at her decease, does not comprehend them. A liferent right is, by its nature, incapable of a proper transmission; but its profits may be assigned while it subsists.

2. Assignations must not only be delivered to the assignee, but intimated by him to the debtor. Intimations have been probably first introduced merely as an interpellation or prohibition to the debtor, that he should not pay to the original creditor; but they came afterwards to be considered as likewise necessary for completing the conveyance.

3. Certain conveyances need no intimation. 1. Indorsations of bills of exchange; for these are not to be fettered with forms introduced by the laws of particular states. 2. Bank-notes are fully conveyed by the bare delivery of them; for as they are payable to the bearer, their property must pass with their possession. 3. Adjudication, which is a judicial conveyance, and marriage, which is a legal one, carry the full right of the subjects thereby conveyed, without intimation.

TITLE VIII. *Of the Transmission of Moveable Rights by the Diligence of the Law; or of Arrestments and Poindings.*

1. The diligences whereby a creditor may affect his debtor's moveable subjects, are *arrestment* and *poinding*. By *arrestment* is sometimes meant the securing of a criminal's person till trial; but, as it is understood in the rubric of this title, it is the order of a judge, by which he who is debtor in a moveable obligation to the arrester's debtor, is prohibited to make payment or delivery till the debt due to the arrester be paid or secured.

2. All debts in which one is personally bound, though

they should be heritably secured, are grounds upon which the creditor may arrest the moveable estate belonging to his debtor; for every creditor, whatever the nature of his debt may be, ought to have the whole of his debtor's estate subject to his diligence. Arrestment may proceed on a debt, the term of payment whereof is not yet come, in case the debtor be *vergens ad inopiam*. If a debt be not yet constituted by a decree or registration, the creditor may raise and execute a summons against his debtor for payment, on which pending action arrestment may be used, in the same manner as inhibition, which is called arrestment upon a dependence.

3. Certain debts are not arrestable: 1. Debts due by bills, for those pass from hand to hand as bags of money. 2. Future debts. 3. Alimentary debts, for these are granted on personal considerations, and so are not communicable to creditors.

4. Arrestment is only an inchoated or begun diligence; to perfect it there must be an action brought by the arrester against the arrestee, to make the debt or subject arrested *forthcoming*. In this action the common debtor must be called for his interest, that he may have an opportunity of excepting to the lawfulness or extent of the debt on which the diligence proceeded.

5 *Poinding*, is that diligence affecting moveable subjects, by which their property is carried directly to the creditor. It may have for its warrant either letters of horning, containing a clause for poinding, and then it is executed by messengers; or precepts of poinding, granted by sheriffs, commissaries, &c. which are executed by their proper officers. No poinding can proceed till a charge be given to the debtor to pay or perform, and the days thereof be expired.

6. In the execution of poinding, the debtor's goods must be appraised, first on the ground of the lands where they are laid hold on; and a second time at the market-cross of the jurisdiction, by the stated appraisers; or, if there are none, by persons named by the messenger or other officer employed in the diligence. Next, the messenger must, after public intimation by three oyesses, declare the value of the goods according to the second appraisement, and require the debtor to make payment of the debt, including interest and expenses. If payment shall be offered to the creditor, or in his absence to his lawful attorney; or if, in case of refusal by them, consignation of the debt shall be made in the hands of the judge-ordinary, or his clerk, the goods must be left with the debtor; if not, the messenger ought to adjudge and deliver them over, at the appraised value, to the user of the diligence, towards his payment: And the debtor is entitled to a copy of the warrant and executions, as a voucher that the debt is discharged in whole or in part by the goods poinded.

TITLE IX.—*Of Prescriptions.*

1. *Prescription*, which is a method both of establishing and of extinguishing property, is either positive or negative. *Positive* prescription is generally defined as the Roman *usucapio*, the acquisition of property, (it should rather be when applied to our law, the securing it against all further challenge,) by the possessor's continuing his possession for the time which law has declared sufficient for that purpose. *Negative* is the loss or omission of a right, by neglecting to follow it forth or use it during the whole time limited by law.

2. *Positive* prescription was first introduced into our law by 1617, c. 12, which enacts, that whoever shall have possessed his lands, annual rents, or other heritages, peaceably, in virtue of infeftments, for forty years continually after their dates, shall not thereafter be disquieted in his right by any person pretending a better title. The act requires, that the possessor produce, as his title of prescription, a charter of the lands preceding the forty years possession, with the seisin following on it; and where there is no charter extant, seisins, one or more, standing together for forty years, and proceeding either on retours, or precepts of *clare constat*.

3. The *negative* prescription of obligations, by the lapse of forty years, was introduced into our law long before the positive, by 1469, c. 29—1474, c. 55. This prescription is now amplified by the foresaid act 1617, which has extended it to all actions competent upon heritable bonds, reversions, and others whatsoever, unless where the reversions are either incorporated in the body of the wadset right, or registered in the register of reversions. And reversions so incorporated or registered are not only exempted from the negative prescription, but are an effectual bar against any person from pleading the positive.

4. A shorter negative prescription is introduced by statute in certain rights and debts. Actions of spulzie, ejection, "*and others of that nature*," must be pursued within three years after the commission of the fact on which the action is founded. Servants' fees, house rents, men's ordinaries, (*i. e.* money due for board,) and merchants' and writers' accounts, alimentary debts, and workmen's wages, fall under the like prescription *as to the mean of proof by witnesses*, *i. e.* these debts may be proved after the three years either by the writing or oath of the debtor. The right of reducing erroneous retours prescribes in twenty years. Ministers' stipends and multures prescribe in five years after they are due; and arrears of rent (or mails and duties,) five years after the tenant's removing from the lands. Bargains concerning moveables, or sums of money which are proveable by witnesses, prescribe also in five years after the bargain. But these different debts may also, after the five years, be proved either by the oath or the writing of the debtor. No person binding for or with another, either as cautioner or co-principal in a bond or contract for a sum of money, continues bound after seven years from the date of the bond, provided he has either a clause of relief in the bond, or a separate bond of relief intimated to the creditor at his receiving the bond. But the act declares, that all diligence used within the seven years against the cautioner shall stand good. And as this is a public law, intended to prevent the bad consequences of rash engagements, its benefit cannot before the lapse of seven years be renounced by the cautioner. Holograph bonds, missive letters, and books of account not attested by witnesses, prescribe in twenty years, unless the creditor shall thereafter prove the verity of the subscription by the defender's oath.

TITLE X. *Of Succession in Heritable Rights.*

1. Singular successors are those who succeed to a person yet alive, in a special subject, by singular titles; but succession, in its proper sense, is a method of transmitting rights from the dead to the living. *Heritable rights* descend by succession to the heir properly so called; *moveable rights* to the *executors*, who are sometimes said to be heirs in moveables. Succession is either *by special destination*, which descends to those named by the proprietor himself; or *legal*, which devolves upon the persons whom the law marks out for successors, from a presumption that the proprietor would have named them, had he made a destination. The first is in all cases preferred to the other, as presumption must yield to truth.

2. In the succession of heritage, the heirs at law are otherwise called *heirs-general*, *heirs whatsoever*, *or heirs of*

line; and they succeed by the right of blood in the following order: First, *Descendants*, whose preference before ascendants or collaterals is established by the universal consent of nations. The Romans divided the succession equally among all the immediate descendants of the deceased; but we, from our close attention to the feudal plan, prefer sons to daughters, and the eldest son to all the younger. Where there are daughters only, they succeed equally, and are called *heirs-portioners*. Failing immediate descendants, grand-children succeed; and, in default of them, great-grand children; and so on *in infinitum*, preferring, as in the former case, males to females, and the eldest male to the younger.

3. Next after descendants, *collaterals* succeed; among whom the brothers german of the deceased have the first place, *i. e.* brothers both by father and mother; for the full blood excludes the half blood. But as, in no case, the legal succession of heritage is, by the law of Scotland, divided into parts, unless where it descends to females; the immediate younger brother of the deceased excludes the rest; according to the rule, *heritage descends*. Where the deceased is himself the youngest, the succession goes to the immediate elder brother, as being the least deviation from this rule. If there are no brothers-german, the sisters-german succeed equally; then brothers consanguinean equally. Next the father succeeds, though by our ancient usage he was excluded, *Cr.* 321. 46. after him his brothers and sisters, according to the rules already explained, then the grandfather; failing him, his brothers and sisters, and so upwards, as far back as propinquity can be proved. Though children succeed to their mother, a mother cannot to her child, nor is there any succession by our law through the mother of the deceased; insomuch, that one brother-uterine, *i. e.* by the mother only, cannot succeed to another, even in that estate which flowed originally from their own common mother.

4. In heritage there is a right of *representation*, by which one succeeds, not from any title in himself, but in the place, and as representing some of his deceased ascendants. Thus where one leaves a younger son, and a grandchild by his eldest; the grandchild, though farther removed in degree from the deceased than his uncle, excludes him, as coming in place of his father the eldest son. Hence arises the distinction between succession *in capita*, where the division is made into as many equal parts as there are *capita* or heirs, which is the case of heirs-portioners; and succession *in stirpes*, where the remoter heirs draw no more among them than the share belonging to their ascendant, or *stirps*, whom they represent; an example of which may be found in the case where a man leaves behind him a daughter alive, and two grand-daughters by a daughter deceased. Though the right or succession does in no case fall to the mother of the deceased, nor to his relations by her, yet as children succeed to their mother, therefore in every case where the mother herself would have succeeded, had she been alive, her children also succeed as representing her.

4. In the succession of *heirs-portioners*, indivisible rights, *e. g.* titles of dignity, fall to the eldest sister. A single right of superiority goes also to the eldest; for it hardly admits a division, and the condition of the vassal ought not to be made worse by multiplying superiors upon him. Where there are more such rights, the eldest may perhaps have her election of the best; but the younger sisters are entitled to a recompense, in so far as the divisions are unequal, at least where the superiorities yield a constant yearly rent, *e. g.* a yearly feu-duty. The principal seat of the family falls to the eldest, with the garden and orchard belonging to it, without recompense to the younger sisters; but all other houses are divided amongst them, together with the lands on which they are built, as parts and pertinents of these lands.

6. Those heritable rights to which the deceased did himself succeed, as heir to his father or other ancestor, get sometimes the name of heritage in a strict sense, in opposition to the *feuda nova*, or feus of *conquest*, which he had acquired by singular titles, and which descend not to his heir of line, but of conquest. This distinction obtains only where two or more brothers or uncles, or their issue, are next in succession; in which case the immediate younger brother, as heir of line, succeeds to the proper heritage, because that descends; whereas the conquest ascends to the immediate elder brother. It has no place in female succession, which the law divides equally among the heirs-portioners. Where the deceased was the youngest brother, the immediate elder brother, whether of the same or of a former marriage, is heir both of line and of conquest. An estate, disponed by a father to his eldest son, is not conquest in the son's person, but heritage; because the son would have succeeded to it though there had been no disposition. The heir of conquest succeeds to all rights affecting land which require seisin to perfect them, and consequently to dispositions or heritable bonds, though they should not be actualy followed by seisin. But teinds go to the heir of line, because they are merely a burden on the fruits, not on the land. Tacks do not fall under conquest, because they are complete rights without seisin; nor personal bonds taken to heirs excluding executors, both for the reason just mentioned, and because they are heritable, not *ex sua natura*, but by the force of destination; and therefore that heir is understood in the destination, who is heir in the most proper sense.

7. The heir of line is entitled to the succession, not only of subjects properly heritable, but to that sort of moveables called *heirship*, which is the best of certain kinds, 1474. c. 54. This doctrine has been probably introduced, that the heir might not have a house and estate to succeed to quite dismantled by the executor.

8. As to succession by destination, no proprietor can settle any heritable estate in the proper form of a testament, not even bonds secluding executors, though these are not heritable *ex sua natura*. But where a testament is in part drawn up in the style of a deed *inter vivos*, such part of it may contain a settlement of heritage, though executors should be named in the testamentary part.

9. All heirs by destination may properly enough be called, by a general name, heirs of tailzie, from *tailler*, to cut, because the lineal succession is cut off in their favour; but they are usually distinguished into heirs *of tailzie* and *of provision*. The appellation of tailzie, or entail, is chiefly used in the case of a land-estate, which is settled on a long series of heirs, substituted one after another; whereas heirs pointed out in contracts of marriage, or in bonds containing clauses of substitution, are more commonly called heirs of provision. The person first called in the tailzie is the *institute*, the rest the *heirs of tailzie*, or the *substitutes*.

10. Heirs of *provision* are those who succeed to any subject, in virtue of a provision in the investiture or other deed of settlement, and the appellation, as has just been observed, is given most commonly to heirs of a marriage. These are more favourably regarded than heirs by simple destination; for heirs of a marriage, because their provisions are constituted by an onerous contract, cannot be disappointed of them by any gratuitous deed of the father; and they may sue him or his cautioner to purge incumbrances, or to make good their provisions in the event of his death.

11. An heir is, in the judgment of law, *eadem persona cum defuncto*, and so represents the deceased universally, not only in his rights, but in his debts. In the first view, he is said to be heir *activè ;* in the second *passivè :* From this general rule are excepted heirs substituted in a special bond ; and even substitutes in a disposition *omnium bonorum*, to take effect at the grantor's death ; for such substitutes are considered as singular successors, and their right as an universal legacy, which does not subject the legatee *ultra valorem*. But heirs male or of tailzie, though their right be limited to special subjects, are nevertheless liable, not merely to the extent of the subject entailed or provided, but *in solidum*, because such rights are designed to carry an universal character, and so infer an universal representation of the grantor.

12. Before an heir can have an active title to his ancestor's rights, he must be entered by service and retour. The service of heirs is either general or special. A general service vests the heir in the right of all heritable subjects, which either do not require seisin, as reversions, bonds secluding executors, heirship moveables, &c. or which have not been perfected by seisin in the person of the ancestor, as dispositions, heritable bonds, &c. ; but it can carry no right clothed with infeftment, not even the personal obligation contained in a right of annualrent on which seisin had followed, so as to be a title to demand payment from the debtor. A special service, followed by seisin, vests the heir in the right of the special subjects in which the ancestor died infeft. All services proceed on brieves issuing from the chancery, and the judge to whom they are directed is required to try the matter by an inquest of fifteen sworn men.

13. Practice has introduced an anomalous sort of entry, without the interposition of an inquest, by the sole consent of the superior, who, if he be satisfied that the person applying to him is the next heir, grants him a precept (called of *clare constat*, from the first words of its recital,) commanding his bailie to infeft him in the subjects that belonged to his ancestor. These precepts are, no doubt, effectual against the superior who grants them, and his heirs ; and they may, when followed by seisin, afford a title of prescription. But, as no person can be declared an heir by private authority, they cannot bar the true heir from entering after twenty years, as a legal entry would have done. Of the same nature is the entry by hasp and staple, commonly used in burgage tenements of houses, of which the bailie, without calling an inquest, cognosces or declares a person heir, upon evidence brought before himself ; and, at the same time, infefts him in the subject by the symbol of the hasp and staple of the door.

14. An heir, by immixing with his ancestor's estate without entry, subjects himself to his debts as if he had entered ; or, in our law phrase, incurs a passive title.

15. Our law, from its jealousy of the weakness of mankind while under sickness, and of the importunity of friends in that conjuncture, has declared that all deeds affecting heritage, if they be granted by a person on deathbed, (*i. e.* after contracting that sickness which ends in death,) to the damage of the heir, are ineffectual. And the privilege of setting aside deeds *ex capite lecti* is competent to all heirs, not to heirs of line only, but of conquest, tailzie, or provision ; and not only to the immediate, but to remote heirs, as soon as the succession opens to them, though the deed in dispute should not appear hurtful to the immediate heir of the grantor. But where it is consented to, or ratified by, the immediate heir, it is secured against all challenge even from the remoter ; for such consent has the effect of a *fictio brevis manus*, the dying person being considered as disponing to the heir, and he to the stranger in whose favour the deed was really granted.

Title XI.—*Of Succession in Moveable Rights.*

1. In the succession of moveable rights, it is an universal rule, that the next in degree to the deceased (or next of kin) succeeds to the whole ; and if there are two or more equally near, all of them succeed by equal parts, without that prerogative which takes place in heritage, of the eldest son over the younger, or males over females. Neither does the right of representation, already explained, obtain in the succession of moveables, except in the single case of a competition between the full blood and the half blood ; for a niece by the full blood will be preferred before a brother by the half blood, though she is by one degree more remote from the deceased than her uncle. Where the estate of a person deceased consists partly of heritage and partly of moveables, the heir in the heritage has no right to the moveables, if there are others as near in degree to the deceased as himself. But where the heir in such case finds it his interest to renounce his exclusive claim to the heritage, and betake himself to his right as one of the next of kin, he may collate or communicate the heritage with the others, who, in their turn, must collate the moveables with him, so that the whole is thrown into one mass, and divided equally among all of them. This doctrine holds, not only in the line of descendants, but of collaterals ; for it was introduced that the heir might in no case fare worse than the other next of kin.

2. One may settle his moveable estate upon whom he pleases, excluding the legal successor by a testament ; which is a written declaration of what a person wills to be done with his estate after his death. No testamentary deed is effectual till the death of the testator, who may therefore revoke it at pleasure, or make a new one, by which the first loses its force ; and hence testaments are called last or latter wills. Testaments, in their strict acceptation, must contain a nomination of executors, *i. e.* of persons appointed to administer the succession according to the will of the deceased.

3. A legacy is a donation by the deceased, to be paid by the executor to the legatee. It may be granted either in the testament or in a separate writing. Legacies are not due till the grantor's death ; and consequently they can transmit no right to the executors of the legatee, in the event that the grantor survives him.

4. Minors after puberty can test without their curators ; wives without their husbands ; and persons interdicted without their interdictors ; but bastards cannot test, except in the cases afterwards mentioned.

5. If a person deceased leaves a widow, but no child, his testament, or in other words the goods in communion, divide in two ; one half goes to the widow, the other is the dead's part, *i. e.* the absolute property of the deceased, on which he could have tested, and which fall to his next of kin if he died intestate. Where he leaves children, one or more, but no widow, the children get one half as their legitim ; the other part is the dead's part, which falls also to the children, if the father has not tested upon it. If he leaves both widow and children, the division is tripartite ; the wife takes one-third by herself ; another falls as legitim to the children, equally among them, or even to an only child, though he should succeed to the heritage ; the remaining third is the dead's part. Where the wife predeceases, without children, one half is retained by the husband, the other falls to her next of kin. Where she leaves children, the division ought also to be bipartite by the com-

mon rules of society, since no legitim is truly due on a mother's death; yet it is in practice tripartite; two-thirds remain with the surviving father, as if one-third were due to him *proprio nomine*, and another as admsnistrator of the legitim for his children; the remaining third, being the wife's share, goes to her children, whether of that or any former marriage; for they are all equally her next of kin.

6. For preserving an equality among all the children who continue entitled to the legitim, we have adopted the Roman doctrine of *collatio bonorum;* whereby the child who has got a provision from his father is obliged to collate it with the others, and impute it towards his own share of the legitim; but if, from the deed of provision, the father shall appear to have intended it as a *præcipuum* to the child, collation is excluded. A child is not bound to collate an heritable subject provided to him, because the legitim is not impaired by such provision.

7. As an heir in heritage must complete his titles by entry, so an executor is not vested in the right of the moveable estate of the deceased without confirmation; which therefore is called by some lawyers, though improperly, the *additio hæreditatis in mobilibus.* Confirmation is a sentence of the commissary or bishop's court, empowering an executor, one or more, upon making inventory of the moveables pertaining to the deceased, to recover, possess, and administer them, either in behalf of themselves or of others interested therein.

8. The legitim and relic's share, because they are rights arising *ex lege*, in consequence of the communion of goods, and of the natural obligation upon fathers to give a certain portion of their estate to their issue, operate *ipso jure* upon the father's death in favour of the relic and children; and consequently pass from them, though they should die before confirmation, to their next of kin: Whereas the dead's part which falls to the children or other next of kin in the way of succession, remains, if they should die before confirming, *in bonis* of the first deceased; and so does not descend to their next of kin, but may be confirmed by the person who, at the time of confirmation, is the next of kin to the first deceased. Special assignations, though neither intimated nor made public during the life of the grantor, carry to the assignee the full right of the subjects assigned, without confirmation; and so also special legacies, as being also really assignations.

9. The only passive title in moveables is vicious intromission, which may be defined an unwarrantable intermeddling with the moveable estate of a person deceased without the order of law. This is not confined, as the passive titles in heritage are, to the persons interested in the succession, but strikes against all intromitters; because even strangers, when attending on dying persons, have frequent opportunities of intermeddling with moveables, which are more easily abstracted than heritage. The bare intermeddling infers this passive title, though the thing intermeddled with should not be applied to any use by the intromitter. Where an executor, confirmed, intermeddles with more than he has confirmed, he incurs a passive title; fraud being in the common case presumed, from his not giving up in inventory the full subjects intermeddled with. Vitious intromission is presumed, by *Act S.* 23. *Feb.* 1692, in the special case where the repositories of a dying person are not sealed up, as soon as he becomes incapable of sense, by his nearest relations; or, if he dies in a house not his own, they must be sealed by the master of such house, and the keys delivered to the judge ordinary, to be kept by him for the benefit of all having interest. But vitious intromission is excluded by any probable title, or by any circumstance that takes off the presumption of fraud.

10. Where a vassal dies without leaving any heir who can prove the remotest propinquity to him, it is not the superior, as the old law stood, but the king, who succeeds as last heir, both in the heritable and moveable estate of the deceased, in consequence of the rule, *quod nullius est, cedit domino regi.*

11. A bastard can have no legal heirs, except those of his own body; since there is no succession but by the father, and a bastard has no certain father. The king therefore succeeds to him, failing his lawful issue, as last heir. Though the bastard, as absolute proprietor of his own estate, can dispose of his heritage in *liege poustie*, (that is, exempt from the disease of which he afterwards dies,) and of his moveables by any deed *inter vivos;* yet he is disabled, *ex defectu natalium*, from beqeathing by testament without letters of legitimation from the sovereign. If the bastard has lawful children, he may test without such letters, and name tutors and curators to his issue; for in such case, the king can have no interest to object, the bastard's children being his lawful heirs.

12. A bastard is not only excluded, 1. From his father's succession, because law knows no father who is not marked out by marriage; and, 2. From all heritable succession, whether by the father or mother, because he cannot be pronounced lawful heir by the inquest in terms of the brief; but, also, 3. From the moveable succession of his mother; for though the mother be known, the bastard is not her lawful child, and legitimacy is implied in all succession deferred by law. A bastard, though he cannot succeed *jure sanguinis*, may succeed by destination, where he is specially called to the succession by an entail or testament. Aliens are, from their allegiance to a foreign prince, incapable of succeeding in feudal rights, though not in moveables, without naturalization. Papists may get free from their disabilities on taking the oath of abjuration, and making the declaration prescribed by 33 Geo. III. c. 44.

BOOK III.

Of Actions.

1. Hitherto of the rights arising from the relation of *persons*, and of those arising from *things*, the two first objects of law. *Actions* are its third object, whereby persons make their rights effectual. An action may be defined, *A demand regularly made and insisted in before the judge competent, for the retaining or recovering of a right.*

2. The supreme power, which has the right of enacting laws, falls naturally to have the right of erecting courts and appointing judges, who may apply these laws to particular cases. But in Scotland, this right has been from our earliest times intrusted with the crown, as having the executive power of the state. In our supreme courts of session and exchequer, not only process but execution of diligence runs in the name of the sovereign, notwithstanding which these courts have a proper jurisdiction, seeing all their necessary writs, both of process and execution, issue under their own direction.

3. *Jurisdiction* is a power conferred upon a judge or magistrate, to take cognizance of and decide causes according to law, and to carry his sentences into execution. That tract of ground or district within which a judge has the right of jurisdiction, is called his territory; and every act of jurisdiction exercised by a judge beyond his territory, either by pronouncing sentence, or carrying it into execution, is null,

4. All judges must at their admission swear, 1. The oath of allegiance, and subscribe the assurance, 1693, c. 6—2. The oath of abjuration was first imposed 6 An. c. 14, and has been since continued by several British statutes. Lastly, The oath *de fideli administratione.*

5. By the treaty of union 1707, c. 7, art. 3, the parliaments of Scotland and England are united into one parliament of Great Britain. From this period, *the British House of Peers*, as coming in place of the Scots parliament, is become our court of the last resort, to which appeals lie from the supreme courts of Scotland.

6. *The Court of Session*, or college of justice, the supreme civil tribunal of Scotland, was originally formed in the reign of James V. but has since undergone several important changes. It at present consists of fifteen judges, who are vested with an universal civil jurisdiction, and who are distinguished into three classes; one principally occupied in the preparation of causes, called the *Outer-House* judges; and two others for the final determination of them, called the *First* and *Second Divisions.* Though the jurisdiction of the session be properly limited to civil causes, the judges have always sustained themselves as competent to the crime of falsehood, either from its necessary connection with civil right, or perhaps because the summary proceedings of the court of justiciary were not well adapted to the tedious proofs frequently brought in improbation, when pursued in the indirect manner. This court, besides its original jurisdiction, has a power of review over inferior courts, by the processes of advocation, suspension, and reduction.

7. Five lords of session, as commissioners of justiciary, the justice-general, and justice-clerk, form the *justiciary court*, or supreme criminal court of Scotland. The justice-general, if present, is president of the court, and in his absence the justice-clerk. By the late jurisdiction act, 20 Geo. II. circuit courts are to be held twice in the year in place of once as formerly, with a power to his majesty to add to or alter the places or districts at which these courts are to be held, and to appoint their times of meeting. One judge may by this statute, proceed to business in the absence of his colleague.

8. The Scots *court of exchequer*, as the king's chamberlain court, judged in all questions of the revenue. By 6 An. c. 26, (passed in pursuance of 1707, c. 7, art. 19,) that court is abolished, and a new court erected, consisting of the lord high treasurer of Great Britain, and a chief baron, with four other barons of exchequer. This court has a privative jurisdiction conferred upon it as to the duties of customs, excise, or other revenues appertaining to the king or prince of Scotland, and as to all honours and estates that may accrue to the crown; in which matters they are to judge by the forms of proceeding used in the English court of exchequer, under the following limitations; that no debt due to the crown shall affect the debtor's real estate in any other manner than such estate may be affected by the laws of Scotland, and that the validity of the crown's titles to any honours or lands shall continue to be tried by the court of session.

9. The *high admiral* is declared the king's justice-general upon the seas, on fresh water within the flood-mark, and in all harbours and creeks. His civil jurisdiction extends to all maritime causes, and so comprehends questions of charter parties, freights, salvages, bottomries, &c. He exercises his supreme jurisdiction by a delegate, the judge of the high court of admiralty; and he may also name inferior deputies, whose jurisdiction is limited to particular districts, and whose sentences are subject to the review of the high court. The admiral has acquired by usage a jurisdiction in mercantile causes, even where they are not strictly maritime, cumulative with that of the judge ordinary.

10. At the Reformation, all Episcopal jurisdiction, exercised under the authority of the bishop of Rome, was abolished by an act 1560, ratified by 1567, c. 2. As the course of justice in consistorial causes was thereby stopped, queen Mary, besides naming a commissary for every diocese, did by a special grant, mentioned in Books S. 1, March 1563—4, establish a new *commissary court at Edinburgh*, consisting of four judges or commissaries, which grant is ratified by an unprinted act, 1592, c. 25. This court is vested with a double jurisdiction; one diocesan, which is exercised in the special territory contained in the grant, viz. the counties of Edinburgh, Haddington, Linlithgow, Peebles, and a part of Stirlingshire; and another universal, by which the judges confirm the testaments of all who die in foreign parts, and may reduce the decrees of all inferior commissaries, provided the reduction be pursued within a year after the decree. They have an exclusive power of judging in declarators of marriage, and of the nullity of marriage, in actions of divorce and of non-adherence, of adultery, bastardy, &c. because all these matters are still considered properly consistorial.

11. *Sheriff* is the *judge ordinary* constituted by the crown over a particular division or county. He judges in all actions upon contracts, or other personal obligations, to the greatest extent, and indeed in most other actions. His criminal jurisdiction extends to certain capital crimes, as theft, and even murder, though it be one of the pleas of the crown; and he is competent to most questions of public police, and has a cumulative jurisdiction with justices of the peace in all riots and breaches of the peace. He has also a cumulative jurisdiction with magistrates within borough.

12. *Justices of the peace* are magistrates named by the sovereign over the several counties of the kingdom, for the special purpose of preserving the public peace.

13. A *borough* is a body corporate, made up of the inhabitants of a certain tract of ground erected by the sovereign, with jurisdiction annexed to it. Boroughs are erected, either to be holden of the sovereign himself, which is the general case of royal boroughs, or of the superior of the lands erected, as boroughs of regality and barony. Bailies of boroughs have jurisdiction in matters of debt, services, and questions of possession betwixt the inhabitants. Their criminal jurisdiction extends to petty riots; and by special statute, to reckless (not intended) fire-raising.

14. To constitute a *baron* in the strict law sense, his lands must have been erected, or at least confirmed by the king *in liberam baroniam*; and such baron had a certain jurisdiction, both civil and criminal, which is now greatly abridged. His civil jurisdiction is reduced to the power of recovering from his vassals and tenants the rents of his lands, and of condemning them in mill services; and of judging in causes where the debt and damages do not exceed 40s. Sterling. His criminal jurisdiction is limited to assaults, batteries, and other smaller offences, which may be punished by a fine not exceeding 20s. Sterling, or by setting the offender in the stocks in the day time, not above three hours.

15. The office of the *lyon king of arms* was chiefly ministerial, to denounce war, proclaim peace, carry public messages, &c. But he has also a right of jurisdiction, whereby he can punish all who usurp arms contrary to the law of arms, and deprive or suspend messengers, heralds, or pursuivants, who are all officers named by himself.—We now proceed with actions prosecutable in one or other of these courts.

16. Actions are either *real* or *personal*. A *real* action is that which arises from a right in the thing itself, and which therefore may be directed against all possessors of that thing. Thus an action for the recovery even of a moveable subject, when founded on a *jus in re*, is, in the proper acceptation, real; but real actions are in vulgar speech confined to such as are directed against heritable subjects. A *personal* action is founded only on an obligation undertaken for the performance of some fact, or the delivery of some subject; and therefore can be carried on against no other than the person obliged, or his heirs. Both rights are included in an infeftment of annualrent, which contains not only a personal obligation on the grantor to pay, but a right of hypothec on the subject itself; and therefore the creditor can either sue the grantor or his representatives in a personal action; or he may, for his payment, insist in a real action of poinding the ground against the possessors of the subject affected, though they should not represent the grantor. *Poinding of the ground*, though it be properly a diligence or an execution, is generally considered by lawyers as a species of real action; and is so called to distinguish it from personal poinding, which is founded merely on an obligation to pay. Every *debitum fundi*, whether legal or conventional, is a foundation for this action. It is competent to all creditors in debts which make a real burden on lands; and is directed against the goods that are found on the lands burdened, even though the original debtor should be divested of the property in favour of a singular successor.

17. Actions are either *ordinary* or *rescissory*. All actions are, in the sense of this division, ordinary, which are not recissory. *Recissory* actions are divided, 1. Into actions of proper improbation. 2. Actions of reduction improbation. 3. Actions of simple reductions. Proper improbations, which are brought for declaring writings false or forged, are treated of in Book IV.

Reduction improbation is an action, whereby a person who may be hurt or affected by a writing, insists for producing or exhibiting it in court, in order to have it set aside, or its effect ascertained, under the certification that the writing, if not produced, shall be declared false and forged. This certification is a fiction of law, introduced that the production of writings may be the more effectually forced, and therefore it operates only in favour of the pursuer; so that the writing, though declared false, continues in full strength in all questions with third parties. In an action of simple reduction, the certification is only temporary, declaring the writings called for null until they be produced; so that they recover their full force after production, even against the pursuer himself.

18. Actions are also, both by the Roman law and ours, divided into *rei persecutoriæ* and *pœnales*. By the first, the pursuer insists barely to recover what *patrimonio ejus abest*, the subject that is his, or the debt that is due to him; and this includes the damage sustained by the pursuer, *damnum et interesse;* for one is as truly a sufferer in his patrimonial interest by that damage, as by the loss of the subject itself. In penal actions, which always arise *ex delicto*, something is also demanded by way of penalty.

19. Actions of spuilzie, ejection, and intrusion, are penal. An action of spuilzie is competent to one dispossessed of a moveable subject violently, or without order of law, against the person dispossessing, not only for being restored to the possession of the subject if extant, or for the value if it be destroyed, but also for the violent profits. Ejection and intrusion are, in heritable subjects, what spuilzie is in moveables.

20. The most celebrated division of actions in our law, is into *petitory*, *possessory*, and *declaratory*. Petitory actions are those where something is demanded from the defender, in consequence of a right of property or of credit in the pursuer. Thus actions for restitution of moveables, actions of poinding, of forthcoming, and indeed all personal actions, upon contracts or quasi-contracts, are petitory. Possessory actions are those which are founded either upon possession alone, as spuilzies, or upon possession joined with another title, as removings; and they are competent either for getting into possession, for holding it, or for recovering it; analagous to the interdicts of the Roman law, *quorum bonorum*, *uti possidetis*, and *unde vi*. A declaratory action is that in which some right is craved to be declared in favour of the pursuer, but nothing sought to be paid or performed by the defender; such as declarators of marriage, of irritancy, of expiry of the legal reversion, actions competent to superiors, or their donatories, for declaring casualties incurred by vassals, &c. Under this class may be also comprehended rescissory actions, which, without any personal conclusion against the defender, tends simply to set aside the rights or writings libelled; in consequence of which a contrary right or immunity arises to the pursuer. An action for proving the tenor, whereby a writing which is destroyed or missing is endeavoured to be revived, is in effect declaratory. The action of double or multiple poinding may be also reckoned declaratory. It is competent to a debtor who is distressed, or threatened with distress, by two or more persons claiming right to the debt, and who therefore brings the several claimants into the field, in order to the debating and settling their several preferences, that so he may pay securely to him whose right shall be found preferable.

22. Actions proceeded anciently upon brieves issuing from the chancery, directed to the justiciary or judge-ordinary, who tried the matter by a jury, upon whose verdict judgment was pronounced. And to this day we retain certain brieves, as of inquest, terce, idiotry, tutory, perambulation, and perhaps two or three others. But summonses were, immediately upon the institution of the college of justice, introduced into our law in the place of brieves. A summons, when applied to actions pursued before the session, is a writ in the king's name, issuing from his signet upon the pursuer's complaint, authorizing messengers to cite the defender to appear before the court and make his defences. The libel or declaration setting forth the ground of action, must be filled up in the summons before execution.

23. *Defences*, are pleas offered by a defender for eliding an action. They are either dilatory, which do not enter into the cause itself, and so can only procure an absolvitor from the *lis pendens;* or preremptory, which entirely cut off the pursuers's right of action.

24. A cause, after the parties had litigated it before the judge, was said by the Romans to be *litiscontested*. By *litiscontestation* a judicial contract is understood to be entered into by the litigants, by which the action is perpetuated against heirs, even when it arises *ex delito*. By our law, litiscontestation is not formed till an act is extracted, admitting the libel or defences to proof.

25. All allegations by parties to a suit must be supported by proper proof. Probation is either by writing, by the party's own oath, or by witnesses. In the case of allegations, which may be proved by either of the three ways, a proof is said to be admitted *prout de jure;* because in such case all the legal methods of probation are competent to the party. If the proof he brings by writing be lame, he may have recourse either to witnesses, or to his adversary's oath; but if he should first take himself to the proof by oath, he cannot thereafter use any other probation.

26. As obligations or deeds, signed by the party himself, or his ancestors or authors, must be, of all evidence, the

least liable to exception; therefore every debt or allegation may be proved by proper evidence in writing.

27. Regularly, no person's right can be proved by his own oath, nor taken away by that of his adversary; because these are the bare averments of parties in their own favour. But where the matter at issue is referred by one of the parties to the oath of the other, such oath, though made in favour of the deponent himself, is decisive of the point. The party to whom reference is made, in place of making oath, sometimes defers the point back to his adversary; but this is not indulged, unless it shall appear, from the circumstances of the case, that he himself cannot depose in the matter referred to him with distinctness.

28. The law of Scotland rejects the testimony of witnesses, 1. In payments of any sum above 100*l.* Scots, all which must be proved either *scripto vel juramento.* 2. In all gratuitous promises, which, though for the smallest trifle, cannot be proved by witnesses. 3. In all contracts, where writing is either essential to their constitution, or where it is usually adhibited, as in the borrowing of money. And it is a general rule, subject to the restrictions about to be mentioned, that no debt or right, once constituted by writing, can be taken away by witnesses. On the other part, probation by witnesses is admitted to the extent of 100*l.* Scots, in payments, nuncupative legacies, and verbal agreements which contain mutual obligations. And it is received to the highest extent, 1. In all bargains, which have known engagements naturally arising from them, concerning moveable goods. 2. In facts performed in satisfaction even of a written obligation, where such obligation binds the party precisely to the performance of them. 3. In facts which with difficulty admit of a proof by writing, even though the effect of such proof should be the extinction of a written obligation, especially if the facts import fraud or violence. Thus a bond is reducible *ex dolo*, on a proof by witnesses. Lastly, All intromission by a creditor with the rents of his debtor's estate, payable in grain, may be proved by witnesses.

29. No person, whose near relation to another bars him from being a judge in the cause, can be admitted as a witness for him, but he may against him. Formerly, domestic servants and moveable tenants, *i. e.* tenants who have no written tacks, were disallowed, from the presumed influence of their masters and landlords over them; but now our practice admits them. The testimony of infamous persons is rejected, *i. e.* persons who have been guilty of crimes that the law declares infer infamy, or who have been declared infamous by the sentence of a judge. Pupils are inhabile witnesses, being in the judgment of law incapable of the impression of an oath. The testimony of women was formerly received with reluctance, but it is now as admissible as that of men, except in the single case of acting as *instrumentary witnesses.*

30. *Decrees* of the court of session are either *in foro contradictorio*, where both parties have litigated the cause, or in absence of the defender. Decrees of the session *in foro* cannot in the general case be again brought under the review of the court, either on points which the parties neglected to plead before sentence, (which we call competent and omitted,) or upon points pleaded and found insufficient, (proponed and repelled.) But decrees, though *in foro*, are reversable by the court, where either they labour under essential nullities, *e. g.* where they are *ultra petita*, or not conformable to their grounds and warrants, or founded in an error *in calculo*, &c. or where the party against whom the decree is obtained, has thereafter recovered evidence sufficient to overturn it, of which he knew not before.

31. The sentences of inferior courts may be reviewed by the court of session before decree, by advocation, and after decree by suspension or reduction; which last are also the methods of calling in question such decrees of the session itself as can again be brought under the review of the court.

32. *Reduction* is the proper remedy, either where the decree has already received full execution by payment, or where it ordains nothing to be paid or performed, but simply declares a right in favour of the pursuer. *Suspension* is that form of law by which the effect of a sentence-condemnatory, that has not yet received execution, is stayed or postponed till the cause be again considered. If the reasons of suspension be repelled, the court find the letters of diligence *orderly proceeded* i. e. regularly carried on; and they ordain them to be put to farther execution.

33. An *appeal* lies in the last resort to the House of Lords; and by an order of that house, 24th March 1725, no appeal is to be received by them from sentences of the session, after five years from extracting the sentence, unless the person entitled to such an appeal be minor, clothed with a husband, *non compos mentis*, imprisoned, or out of the kingdom.

34. Decrees are carried into execution by diligence, either against the *person*, or against the *estate*, of the debtor. The first step of *personal* execution is by letters of horning, which are granted by warrant of the court of session, not only on their own decrees, but on those of magistrates of boroughs, sheriffs, admirals, and commissaries. If the debtor does not obey the will of the letters of horning within the days of the charge, the charger, after denouncing him rebel, and registering the horning, may apply for letters of caption, which contain a command, not only to messengers, but to magistrates, to apprehend and imprison the debtor.

35. Our law, from a consideration of compassion, allows insolvent debtors to apply for a release from prison upon a *ceſſio bonorum*, *i. e.* upon their making over to their creditors all their estate, real and personal. This must be insisted for by way of action, to which all the creditors of the prisoner ought to be made parties. A fraudulent bankrupt is not allowed this privilege.

36. Decrees are executed against the *moveable* estate of the debtor by arrestment or poinding, and against his *heritable* estate by inhibition or adjudication, of all of which we have already spoken. Letters of poinding, as well as of horning, may be issued by warrant of the court of session on the decrees of inferior judges.

BOOK IV.

OF CRIMES.

1. By the law of Scotland no private party, except the person injured, or his next of kin, can accuse criminally: But the king's advocate, who in this question represents the community, has a right to prosecute all crimes *in vindictam publicam*, though the party injured should refuse to concur.

2. Those crimes that are in their consequences most hurtful to society, are punished capitally, or by death; others escape with a less punishment, sometimes fixed by statute, and sometimes arbitrary, *i. e.* left to the discretion of the judge, who may exercise his jurisdiction either by fine, imprisonment, or a corporal punishment. Where the punishment is left by law to the discretion of the judge, he can in no case extend it to death; for where the law intends to punish capitally, it says so in express words, and leaves no liberty to the judge to modify. But where, in any of our ancient laws, the life of the offender is put in the mercy or will of the king, it is probable that the judge, in place of pronoun-

sing sentence himself, left it to the sovereign, who inflicted sometimes a capital, and sometimes a less punishment on the person guilty, according to his demerit. The single escheat of the criminal falls on conviction in all capital trials, though the sentence should not express it, for if the bare non-appearance in a criminal prosecution draws this forfeiture after it, much more ought the being convicted of a capital crime to infer it.

3. Certain crimes are committed more immediately against *God himself* others against *the state*, and a third kind against *particular persons*. The chief crime in the first class, cognizable by temporal courts, is *blasphemy*, under which may be included atheism. This crime consists in the denying or vilifying the Deity by speech or writing. Blasphemers were punished capitally both by the Jewish law, Lev. xxiv.16, and by the Roman. All who curse God, or any of the persons of the blessed Trinity, are by our law, 1661, c. 21, to suffer death even for a single act; and those who deny him, if they persist in their denial. This act is ratified by 1695, c. 11, which also makes the denial of a Providence, or of the authority of the Holy Scriptures, criminal; and punishable capitally for the third offence.

4. Some crimes against *the state* are levelled directly against the supreme power, and strike at the constitution itself; others discover such a contempt of law, as tends to baffle authority, or slacken the reins of government. *Treason*, *crimen majestatis*, is that crime which is aimed against the majesty of the state, and can be committed only by those who are subjects of that state, either by birth or residence. It was high treason, by the law of Scotland, to intend the king's death, to lay any restraint upon his person, or to entice any foreign power to invade his dominions, 1662, c. 2, and to rise in arms, maintain forts, or make treaties with foreign states, without his authority, 1661, c. 5. Certain facts, though not in their nature treasonable, were declared by statute to be punishable as treason, viz. theft by landed men, 1587, c. 50, murder under trust, ibid. c. 51, wilfully setting fire to coal-heughs, 1592, c. 146, or to houses or corns, 1528, c. 8, and assassination, 1601, c. 15. Treason was punished by death, and by forfeiture to the king of the traitor's estate, both real and personal. But this forfeiture did not cut off the right of the creditors, tacksmen, superiors, vassals, heirs of entail, or widows of the forfeiting persons, 1690, c. 33. Treason might by our law have been tried after the death of the traitor, and sentence condemnatory upon such trial carried the estate to the crown, 1540, c. 69, which was indeed agreeable to the *jus novum* of the Romans, but contrary to the rules of law and the dictates of humanity.

5. Soon after the union of the two kingdoms in 1707, the laws of treason then in force in England, were made ours by 7 An. c. 21, both with regard to the facts constituting that crime, to the forms of trial, the corruption of blood, and all the penalties and forfeitures consequent on it. By this act, the facts that inferred statutory treason by our former law, are declared simply capital crimes.—For what this crime consists in, for the form of trial, &c. we refer to the preceding article on the *Law of England*, B. iv. sect. vi.

6. The crime of *sedition* consists in the raising commotions or disturbances in the state. It is either verbal or real. Verbal sedition, or leasing-making, is inferred from the uttering of words tending to create discord between the king and his people. It was formerly punished by death and the forfeiture of goods, but now either by imprisonment, fine, or banishment, at the discretion of the judge. Real sedition is generally committed by convocating together any considerable number of people without lawful authority, under the pretence of redressing some public grievance, to the disturbing of the public peace. Those who are convicted of this crime are punished by the confiscation of their goods; and their lives are to be at the king's will. For preventing rebellious riots and tumults, it is enacted, 1 Geo. I. st. 2. c. 5, that if any persons to the number of twelve shall assemble, and being required by a magistrate or constable to disperse, shall nevertheless continue together for an hour after such command, the persons disobeying shall suffer death, and the confiscation of moveables.

7. Judges who, *wilfully or through corruption*, use their authority as a cover to injustice or oppression, are punished with the loss of honour, fame, and dignity, 1540, c. 104. Under this head may be classed *theft-bote*, (from *bote*, compensation,) which is the taking a consideration in money or goods from a thief to exempt him from punishment, or connive at his escape from justice. A sheriff or other judge, guilty of this crime, forfeits his life and goods, 1436, c. 137. And by a posterior statute, 1515, c. 2, even a private person who takes theft-bote suffers as the principal thief. The buying of disputed claims, concerning which there is a pending process, by any judge or member, either of the session or of an inferior court, is punished by the loss of the delinquent's office, and all the privileges thereto belonging, 1594, c. 216.

8. *Deforcement* is the opposition given, or resistance made, to messengers or other officers, while they are employed in executing the law, and is punishable with the confiscation of moveables. Deforcement of the officers of the customs, by persons to the number of eight or upwards, was punished by transportation to America, for a term of years not exceeding seven, 6 Geo. I. c. 21. 34. But now, by 19 Geo. II. c. 34, armed persons to the number of three or more, assisting in the illegal running, landing, and exporting of prohibited or uncustomed goods, or any who shall resist, wound, or main any officer of the revenue in the execution of his office, shall suffer death, and the confiscation of moveables.

9. *Breach of arrestment* is a crime of the same nature with deforcement, as it imports a contempt of the law and of the judges; and it is subjected to the pains inflicted on deforcement, by 1581, c. 118, viz. an arbitrary corporal punishment, and the escheat of moveables, with a preference to the creditor for his debt, and for such farther sum as shall be modified to him by the judge.—Under this head of crimes against good government and police, may be reckoned the forestalling of markets; that is, the buying of goods intended for a public market before they are carried there, which, for the third criminal act, infers the escheat of moveables, 1592, c. 148; slaying salmon in forbidden time, 1503, c. 27; offences against the acts for preserving the game; destroying plough-graith in time of tillage, and slaying or houghing horses or cows in time of harvest, 1587, c. 82; and destroying or spoiling growing timber, 1698, c. 16.—1 Geo. I. st. 2, c. 48.

10. Crimes against *particular persons* may be directed, either against life, limb, liberty, chastity, goods, or reputation. *Murder* is the wilful taking away of a person's life without a necessary cause. The distinction which obtained in our ancient law between slaughter premeditated, or upon *forethought felony*, and that which was committed on a suddenty, or *chaud mella*, indulging to the last the privilege of girth and sanctuary, st. Rob. II. c. 9 —1555, c. 31, was taken off by 1661, c. 22, (copied after 1649, c. 19.) which supposes homicide to be a capital crime, without any such distinction. *Casual homicide*, where the actor is in some degree blameable, and *homicide in self-defence*, where the just bounds of defence have been exceeded, are punished

arbitrarily by this act; but the slaughter of night thieves, house-breakers, assistants in masterful depredations, or rebels denounced for capital crimes, may be committed with impunity. The crime of *demembration*, or the cutting off of a member, is joined with that of murder, in 1491, c. 28; but in practice, its punishment has been restricted to the escheat of moveables, and an assythment or indemnification to the party. *Mutilation*, or the disabling of a member, is punished at the discretion of the judge.

11. *Self-murder* is as highly criminal as the killing our neighbour; and for this reason, our law has, contrary to the rule *crimina morte extinguuntur*, allowed a proof of the crime after the offender's death, that his single escheat might fall to the king or his donatory. To this end an action must be brought, not before the justiciary, but the session, because it is only intended *ad civilem effectum*, for proving and declaring the self-murder; and the next of kin to the deceased must be made a party to it.

12. The punishment of *parricide*, or of the murder of a parent, is not confined by our law to the criminal himself. All his posterity in the right line are declared incapable of inheriting, and the succession devolves on the next collateral heir, 1594, c. 220. Even the cursing or beating of a parent infers death, if the person guilty be above sixteen years, and an arbitrary punishment if he be under it, 1661, c. 2. A *presumptive* or *statutory* murder was constituted by 1690, c. 21, by which any woman who should conceal her pregnancy during its whole course, and should not call for or make use of help in the birth, was reputed the murderer, if the child was found dead, or was missing. This act was intended to discourage the unnatural practice, which yet continues too frequent, of women making away with their children begotten in fornication, to avoid church censures. It is however now repealed by 49 Geo. III. c. 14, which enacts that the circumstances mentioned in the act 1690, shall infer the punishment of imprisonment only, for a space not exceeding two years.

13. *Duelling* is the crime of fighting in single combat, on previous challenges given and received. The single combat was authorised by the Gothic polity, as a method of determining both criminal and civil questions; but fighting in a duel without license from the king, is by 1600, c. 12, made punishable by death. This act is ratified by 1696, c. 35, which also enacts, that whatever person, principal or second, shall give a challenge to fight a duel, or shall accept a challenge, or otherwise engage therein, shall be punished by banishment and escheat of moveables, though no actual fighting should ensue.

14. *Haimsucken* (from *haim*, home, and *socken*, to seek or pursue,) is the assaulting or beating of a person in his own house. The punishment of this crime is nowhere defined, except in the books of the majesty, which make it the same as that of a rape; and it is, like rape, capital by our practice. The assault must be made in the proper house of the person assaulted, where he lies and rises daily and nightly; so that neither a public-house, nor even a private, where one is only transiently, falls within the law.

15. Any *party to a law-suit* who shall *slay, wound, or otherwise invade his adversary*, at any period of time between executing the summons and the complete execution of the decree, or shall be accessory to such invasion, shall lose his cause, 1584, c. 138.—1594, c. 219. As these acts direct, that proof shall be previously taken of the invasion, by the justice *or other competent judge*, the court of session sustain themselves judges, because they are truly competent to all causes where the conclusion is merely civil. The sentence pronounced on this trial against him who has committed the battery, is by the act declared not subject to reduction, either on the head of minority, or any other ground whatever. And if the person prosecuted for this crime shall be denounced for not appearing, his liferent, as well as single escheat, falls upon the denunciation.

16. The crime of *wrongous imprisonment* is described, 1701, c. 6. It is inferred, by granting warrants of commitment in order to trial, proceeding on information not subscribed, or without expressing the cause of commitment; by receiving or detaining prisoners on such warrants; by refusing to a prisoner a copy of the warrant of commitment; by detaining him in close confinement above eight days after his commitment; by not releasing him on bail where the crime is bailable; and by transporting persons out of the kingdom, without either their own consent or a lawful sentence. The persons guilty of wrongous imprisonment are punished by a pecuniary mulct, from 600*l.* down to 400*l.* Scots, according to the rank of the person detained, and the judge or other person acting contrary to the directions of the act, is over and above subjected to pay to the person detained a certain sum *per diem*, proportioned to his rank, and is declared incapable of public trust. All these penalties may be insisted for by a summary action before the session, and are subject to no modification. Private persons may be guilty of this crime, 14 Dec. 1736, Paterson.

17. *Adultery* is the crime by which the marriage bed is polluted. This crime could neither by the Roman law, l. 61, *ad leg. Jul. de adult*, nor the Jewish, Lev. xx. 10. Deut. xxvi. 22, be committed, but where the guilty woman was the wife of another. By ours, it is adultery if either the man or woman be married. We distinguish between simple adultery, and that which is notorious or manifest. Open and manifest adulterers, who continue incorrigible, notwithstanding the censure of the church, were punished 1551, c. 20, by the escheat of moveables; but soon thereafter, by 1563, c. 74, the punishment of notorious and manifest adultery was made capital. This crime is distinguished by one or other of the following characters. Where there is issue procreated between the two adulterers; or where they keep bed and company together notoriously; or where they give scandal to the church, and are, upon their obstinate refusing to listen to its admonitions, excommunicated, 1581, c. 105. The punishment of simple adultery, not being defined by statute, is left to the discretion of the judge; but custom has made the falling of the single escheat one of its penalties.

18. *Bigamy* is a person's entering into the engagement of a second marriage, in violation of a former marriage-vow still subsisting. Bigamy, on the part of the man, has been tolerated in many states before the establishment of Christianity, even by the Jews themselves; but it is prohibited by the precepts of the Gospel, and is punished by our law, whether on the part of the man or of the woman, with the pains of perjury, 1551, c. 19.

19. *Incest* is committed by persons who stand within the degrees of kindred forbidden in Lev. xviii. and it is punished capitally by 1567, c. 14. The same degrees are prohibited in affinity as in consanguinity, Lev. xviii. 14, *et seq.* As this crime is repugnant to nature itself, it is an ill-founded opinion that incest cannot be committed but between persons born in lawful marriage; for, in questions of the law of nature, all children, whether lawful or natural, stand on an equal footing: *Civilis ratio civilia jura corrumpere potest, non vere naturalia.* It is difficult, indeed, to bring a legal proof of a relation merely natural on the side of the father; but the mother may be certainly known without marriage.

20. There is no explicit statute making *rape*, or the ravishing of women, capital; but it is plainly supposed in act

1612, c. 4. by which the ravisher is exempted from the pains of death, only in the case of the woman's subsequent consent, or her declaration that she went off with him of her own free will; and even then he is to suffer an arbitrary punishment, either by imprisonment, confiscation of goods, or a pecuniary fine.

21. *Theft* is defined a fradulent intermeddling with the property of another, with a view of making gain. Neither the law of Moses nor of Rome punished theft capitally. By the first the thief was bound to restore, in some cases, five times the value; in others less, Exod. xxii. 1. *et seq.*; and by the Roman, either the double or quadruple, according to the circumstances attending the crime. Our ancient law proportioned the punishment of the theft to the value of the goods stolen; heightening it gradually from a slight corporal punishment to a capital, if the value amounted to thirty-two pennies Scots, which in the reign of David I. was the price of two sheep, R. M. l. 4. c. 16. § 3. L. B. c. 121. § 6. In several later acts, it is taken for granted, that this crime is capital, 1587, c. 82.—1606, c. 5, &c. But where the thing stolen is of small value, we consider it, not as theft, but as pickery, which is punished either corporally or by banishment. The breaking of orchards, and the stealing of green wood, is punished by a fine, which rises as the crime is repeated, 1579, c. 84.

22. Theft may be *aggravated* into a *capital* crime, though the value of the thing stolen be *trifling*, as theft twice repeated, L. B. c. 121. § 5, or committed in the night, *arg.* 1661, c. 22; or by landed men, or of things set apart for sacred uses. The receivers and concealers of stolen goods, knowing them to be such, suffer as thieves. Those who barely harbour the person of the criminal (*receptatores*) within forty-eight hours either before or after committing the crime, are punished as partakers of the theft. Such as sell goods belonging to thieves, or lawless persons, who dare not themselves come to market, are punished with banishment and the escheat of moveables.

23. Theft, attended with violence, is called *robbery*; and, in our old statutes, *rief*, 1477, c. 78, or *stouthrief*, 1515, c. 2; under which class may be included *sorning*, or the taking of meat and drink by force, without paying for it. Stouthrief came at last to be committed so audaciously, by bands of men associated together, that it was thought necessary to vest all our freeholders with a power of holding courts upon sorners and rievers, and condemning them to death, 1594, c. 227. Nay, all were capitally punished, who, to secure their lands from depredation, paid to the rievers a yearly contribution, which got the name of *blackmail*, 1567, c. 21.—1587, c. 102. An act passed 1609, c. 18, commanding to banishment a band of sorners, who were originally from *Egypt*, called *gypsies*, and adjudging to death all that should be reputed Egyptians, if found thereafter within the kingdom. Robbery committed on the seas is called *piracy*, and is punished capitally by the high admiral. Several of the facts which constitute this crime are set forth in a British statute, Geo. I. c. 24.

24. *Falsehood*, in a large sense, is the fraudulent imitation or suppression of truth to the damage of another. The lives and goods of persons convicted of using false weights or measures were, by our old law, in the king's mercy; and their heirs could not inherit but upon a remission, L. B. c. 132. The latest statute against this crime, 1609, c. 2, punishes it by confiscation of moveables.

25. That particular species of falsehood, which consists in the falsifying of writings, passes by the name of *forgery*, and was by the Roman law punished capitally when the atrocity of the fact required it. By our statute law, the punishment of this crime was at first the amputation of the hand; afterwards proscription, banishment, and dismembering of the hand and tongue, joined with the other pains inflicted by the common law; and at last it is declared, in general terms, to be the pains due to the committers of falsehood, 1621, c. 22. Our practice has now of a long time, agreeably to the Roman law, made the crime capital, unless the forgery be of executions, or other writings of smaller moment; in which case it is punished arbitrarily.

26. *Perjury*, which is the judicial affirmation of a falsehood on oath, really constitutes the *crimen falsi*; for he who is guilty of it does, in the most solemn manner, substitute falsehood in the place of truth. To constitute this crime, the violation of truth must be deliberately intended by the swearer; and, therefore, reasonable allowances ought to be given to forgetfulness or misapprehension, according to his age, health, and other circumstances. The breach of a promissory oath does not infer this crime; for he who promises on oath, may sincerely intend performance when he swears, and so cannot be said to call on God to attest a falsehood. Though an oath, however false, if made upon reference in a civil question, concludes the cause, the person perjured is liable to a criminal trial; for the effect of the reference can go no farther than the private right of the parties. Notwithstanding the mischievous consequences of perjury to society, it is not punished capitally, either by the Roman law or by ours. The special punishment of swearing falsely on an assize was, confiscation of moveables, imprisonment for a year, and infamy; which punishment came, in the course of time, to be transferred to perjury in general, with a small variation, 1555, c. 47.

27. The crime of *stellionate*, from *stellio*, *Plin. Hist. Nat. l.* 30, c. 10, includes every fraud which is not distinguished by a special name, but is chiefly applied to conveyances of the same numerical right, granted by the proprietor to different disponees. The punishment of stellionate must necessarily be arbitrary, to adapt it to the various natures and different aggravations of the fraudulent acts. The persons guilty of that kind of it which consists in granting double conveyances are by our law declared infamous, and their lives and goods at the king's mercy, 1540, c. 105. The cognizance of *fraudulent bankruptcy* is appropriated to the court of session, who may inflict any punishment on the offender that appears proportioned to his guilt, death excepted, 1696, c. 5.

28. The crime of *usury*, before the Reformation, consisted in the taking of *any* interest for the use of money; and now in taking a higher rate than is authorised by law. The punishment of usury was, by 1597, c. 247. declared to be the escheat of moveables, annulling the usurious contract, and a forfeiture of the principal sum lent, with the lawful interest due upon it, to the king or his donatory, with the burden of restoring to the private party, in case he should concur in the prosecution, the unlawful profits given by him to the creditor. But, by 12 An. stat. 2. c. 16, the usurious obligation is not only declared void, but the creditor, if he has received any unlawful profits, forfeits the treble value of the sums and goods lent. Usury, when it is to be pursued criminally, must be tried by the justiciary; but where the libel concludes only for the voiding of the debt or restitution, the session is the proper court.

29. *Injury*, in its proper acceptation, is the reproaching or affronting our neighbour. Injuries are either verbal or real. A *verbal* injury, when directed against a private person, consists in the uttering contumelious words, which tend to expose our neighbour's character, by making him little or ridiculous. Where these words are uttered in the heat of a dispute, and spoken to the person's face, the law does not presume any malicious intention in the utterer, whose resentment generally subsides with his passion; and

yet, even in that case, the truth of the injurious words seldom absolves entirely from punishment. It does not seem that the twitting one with natural defects, without any sarcastical reflections, though it be inhuman, falls under that description, as these imply no real reproach in the just opinion of mankind. Where the injurious expressions have a tendency to blacken one's moral character, or fix some particular guilt upon him, and are deliberately repeated in different companies, or handed about in whispers to confidents, it then grows up to the crime of slander, agreeably to the distinction of the Roman law, l. 15. § 12. *De Inj.* And where a person's moral character is thus attacked, the *animus injuriandi* is commonly inferred from the injurious words themselves, unless special circumstances be offered to take off the presumption; *ex. gr.* that the words were uttered in judgment in one's own defence, or by way of information to a magistrate, and had some foundation in fact. The cognizance of slander was, and perhaps is to this day, proper to the commissaries, who, as the *judices Christianitatis*, were the only judges of scandal; but, for some time past, bare verbal injuries, or hasty words uttered intemperately *in rixa*, have been tried by other criminal judges, and even by the session. It is punished either by a fine, proportioned to the condition of the persons injuring and injured, and the circumstances of time and place; or, if the injury import scandal, by publicly acknowledging the offence; and frequently the two are conjoined. The calling one a bankrupt is not, in strict speech, a verbal injury, as it does not affect the person's moral character; yet, as it may hurt his credit in the way of business, it founds him in an action of damages, which must be brought before the judge-ordinary. A *real* injury is inflicted by any fact by which a person's honour or dignity is affected; as striking one with a cane, or even aiming a blow without striking; spitting in one's face; assuming a coat of arms, or any other mark of distinction proper to another, &c. The composing and publishing defamatory libels may be reckoned of this kind. Real injuries are tried by the judge-ordinary, and punished either by fine or imprisonment, according to the demerit of the offenders.

30 Anciently, no person could be convicted of the smallest offence till he was found guilty by a jury of his countrymen; and though now, for more than a century past, inferior judges have tried lesser breaches of the peace *de plano*, yet to this day all prosecutions of a higher nature, whether before the supreme or inferior criminal courts, must proceed *by jury*; and no trial, even for a blood-wit, if pursued before the justiciary, can be carried on without a jury. In the trial of crimes competent to the court of session, the judges may well be considered in the character both of court and of jury.

31. Crimes cannot, like debts, be referred to the defender's oath; for no person is compellable to swear against himself, where his life, limb, liberty, or state is concerned; nor even in crimes which infer infamy, because one's good name is, in right estimation, as valuable as his life. The law is however forced, in the crime of usury, to depart from some of its common rules, that the crime may be brought to light. Where the usury is founded on a written obligation, in the hands of the defender, the pursuer may, by an exhibition, force him to produce it in evidence of the crime, contrary to the rule. *Nemo tenetur edere instrumenta contra se*; and where it is not founded upon writing, the crime may be proved by the usurer's own oath, notwithstanding the rule, *Nemo tenetur jurare in suam turpitudinem*, 1600, c. 7 Crimes therefore are, in the general case, proveable only by the defender's free confession, or by writing, or by witnesses. No extrajudicial confession, unless it is adhered to by the pannel in judgment, can be admitted as evidence; for the whole proof must be deduced in open court, in presence of the assize, or jury, as well as of the pannel. A judicial confession ought to be received with all the qualities that the pannel has thought fit to adject to it; so that the prosecutor, who pleads upon one part of it, must admit the whole. Proof by writing is seldom used but in usury, forgery, and perjury. Though, in deforcement, the written execution of the messenger or officer is sufficient evidence of the violence in all civil questions concerning the validity of the diligence, till it be declared false; yet in a criminal trial moved against the deforcers, the messenger's execution, who is a party interested in the prosecution, is not regarded.

32. All objections relevant against a witness in civil cases, are also relevant in criminal. No witness is admitted who may gain or lose by the event of the trial. Hence, in the crime of usury, the testimony of him who has given the unlawful profits is rejected, because he becomes a gainer by the conviction of the usurer, 1600, c. 7. In deforcement, the persons employed by the messenger to attest the execution are in some sense parties, violence being commonly used against them as well as against the messenger; yet, as the proof of the crime would be frequently impracticable if their evidence were rejected, the law considers the messenger as the only party against whom the violence is intended, and therefore receives the testimony of the witnesses, though they should be beaten. *Socii criminis*, or associates in the same crime, are not admitted against one another, except either in crimes against the state, as treason; in occult crimes, where other witnesses cannot be had, as forgery; or in thefts or depredations committed in the Highlands, 21 Geo. II. c. 34. 21. The testimony of the private party injured may be received against the pannel, where the king's advocate is the only prosecutor, if, from the nature of the crime, there must needs be a penury of witnesses, as in rape, robbery, &c.

33. Where a crime is to be proved by several circumstances connected together, every one of which makes a part of the same criminal act, a single witness to each circumstance, is sufficient evidence. But it may be doubted, whether this ought to obtain in crimes reiterated by different criminal acts; for if a single witness should be deemed sufficient in such case for proof of each separate act, it would destroy one of the strongest checks by which the testimony of false witnesses may be controlled. Formerly, the depositions of witnesses in all trials before the criminal court were reduced into writing; but that practice is abolished by 21 Geo. II. c. 19, unless where the libel concludes for death or demembration. Crimes which, by their nature, hardly admit direct evidence, may be proved by presumptive evidence; and these presumptions ought, from the severity of the conclusions in criminal trials, to be so pregnant as necessarily to carry conviction along with them. But where a crime is to be tried only *ad civilem effectum*, *e. g.* where a process of adultery is brought for obtaining a divorce, more slender presumptions will be received; so that the same proof that has been judged sufficient for procuring a divorce before the commissaries, may be cast, if the crime should be afterwards tried criminally.

35. After all the witnesses have been examined in court, the assizers are shut up in a room by themselves, where they must continue, excluded from all correspondence till their verdict or judgment be subscribed by the foreman (or chancellor) and clerk; but if they are unanimous, they may, by 54 Geo. III. c. 67, deliver their verdict at once by the mouth of their chancellor, without retiring from the box. According to this verdict, the court pronounces sentence, either absolving or condemning. It is not necessary, by the law of Scotland, that a jury should be unanimous in

finding a person guilty; the narrowest majority is as sufficient against the pannel as for him. Juries cannot be punished on account of an erroneous verdict, either for or against the pannel; but they might, by our former law, for absolving him against clear evidence.

36. Though the proper business of a jury be to inquire into the truth of the facts found relevant by the court, for which reason they are sometimes called the inquest; yet, in many cases, they judge also in matters of law or relevancy. Thus, though an objection against a witness should be repelled by the court, the assizers are under no necessity to give more credit to his testimony than they think just; and in all trials of art and part, where special facts are not libelled, the jury, if they return a general verdict, are indeed judges, not only of the truth, but of the relevancy of the facts that are sworn to by the witnesses. A general verdict is that which finds, in general terms, that the pannel is guilty or not guilty, or that the libel or defences are proved or not proved. In a special verdict, the jury finds certain facts proved, the import of which is to be afterwards considered by the court.

37. By our old law, the sheriff was confined to a definite time, in pronouncing and executing sentence on certain criminals. When a murderer was taken red hand, *i. e.* apprehended in the criminal act, it behoved the sheriff not only to try him, but to execute the sentence within three suns; whereas, if he was apprehended *ex intervallo*, forty days were allowed for that purpose. It was afterwards provided, that in all cases where the sheriff was tied down to do justice in three suns, sentence might be executed at any time within nine days, provided it had been pronounced within three. But, by our present laws, criminal judges not only may, but must suspend for some time the execution of such sentences as affect life or limb, so that condemned criminals, whose cases deserve favour, might have access to apply to the king for mercy. No sentence of any court of judicature, south of the river Forth, importing either capital or coporal punishment, could be executed in less than thirty days; and if north of it in less than forty, after the date of the sentence by 11 Geo. I. c. 26, 10. This act, in so far as it concerns corporal punishments, less than death, or dismembering, *e. g.* whipping, pillory, &c. is altered; so that judges may now inflict these eight days after sentence on this side Forth, and twelve days after sentence beyond it, Geo. II. c. 32.

38. Crimes are extinguished, 1. By the *death of the criminal;* both because a dead person can make no defence, so that his trial is truly a judging upon the hearing of one side; and because, though his guilt should be ever so notorious, he is, after death, carried beyond the reach of human penalties, and consequently continues no longer an object of correction, which is one of the greatest purposes of punishment. Such trials, therefore, can have no effect, but to punish the innocent heir, contrary to that most equitable rule, *Culpa tenet suos auctores.* 2. Crimes may be extinguished by a *remission from the sovereign.* But a remission, though it secures the delinquent from the public resentment, the exercise of which belongs to the crown, cannot cut off the party injured from his claim of damages, over which the crown has no prerogative. Agreeably to this distinction, no person was allowed to plead a remission, till he had given security to satisfy the private party; and in the case of slaughter, it behoved the wife, or the executors of the deceased, who were entitled to that satisfaction, or as it is called in the style of our statutes, *assythement*, to sign letters of *slains*, acknowledging that they had received satisfaction before any remission could be granted to the slayer. Whoever, therefore, founds on a remission, is liable in damages to the private prosecutor, in the same manner as if he had been tried and found guilty. Crimes are also extinguished by *acts of indemnity*, and by *prescription.* By the custom of Scotland, following in this respect the Roman law, the term of prescription is twenty years; but in certain crimes it is limited, by statute, to various shorter periods, according to the quality of the offence.

The following are the principal *institutional* works on the law of Scotland: Craig's *Jus Feudale*, folio, 1732; Stair's *Institutions of the Law of Scotland*, folio, 1759, (of this work, which is of the highest authority among institutional treatises, a new edition, with notes illustrative of the law since 1759, is in the press). Bankton's *Institutes of the Laws of Scotland*, 3 vols. folio, 1751-1753; Erskine's *Principles of do. with Notes*, 8vo. 1816; and Erskine's *Institutes of do. with Notes*, folio, 1812. To which may be added, on certain branches of the law, Ross's *Lectures on the Practice of the Law of Scotland*, 2 vols. 4to. 1792; Wight *on Parliament and Elections in Scotland, with Supplement*, 2 vols. 4to. 1806; Bell's *Commentaries on the Law of Scotland, and on the Principles of Mercantile Jurisprudence*, vol. 1st. 4to. 1816; and Kame's *Principles of Equity*, 8vo. 1800. For the *Criminal* Law of Scotland, see Hume's *Commentaries on the Law of Scotland, respecting the Description, Punishment, and trial of Crimes, with Supplement*, 5 vols. 4to. 1797-1800, Sup. 1814. (J. B.

AMERICAN LAW.

There is in fact, properly speaking, no general law of the United States of America, except the federal constitution, and the statutes enacted by congress in pursuance of it. Of course it extends only to such subjects, persons and places as are within the purview of federal legislation.

The legislative powers of congress, vested in them by the constitution of the United States, are expressly defined by that instrument, which limits, at the same time that it declares, the authority of the various branches of the federal government. These powers may be divided into three classes, or heads:

1. As they respect place or locality.
2. As they respect or affect persons.
3. As to their subject matter.

I. *Of local jurisdiction.*—By the sixteenth paragraph of the eighth section of the first article of the constitution, it is provided, " That congress shall have power to exercise " exclusive legislation in all cases whatsoever, over such " district, (not exceeding ten miles square,) as may by " cession of particular states, and the acceptance of con" gress, become the seat of government of the United " States, and to exercise like authority over all places pur" chased by the consent of the legislature, in which the " same shall be, for the erection of forts, magazines, " arsenals, dock-yards, and other lawful buildings."

By virtue of this express grant, the congress have, and exercise exclusive legislation in all cases whatsoever over the district of Columbia, where the seat of government is now established; and which has been duly ceded to the United States, by the states of Virginia and Maryland, of which it formerly was a part; and over the various spots of ground which they have purchased in like manner of different states, for the sites of forts, arsenals, and other similar establishments; yet, although they have the power so to do, they have not yet established a general code of laws for those places in which they have the sole right of legislation; they have as yet gone no farther than to define certain offences, and fix their punishment by statute; in other cases, the laws of the states, from which the several districts were severed, have hitherto been suffered to prevail. It is understood that a code of civil laws for the district of Columbia has been ordered to be prepared; this, however, will, probably, be local in its nature, and will not extend to the other places over which thefederal government has exclusive jurisdiction.

In the territories not yet erected into states, the congress also possess the right of general legislation; but do not exercise it by themselves; they have hitherto delegated it to the local and temporary governments which they have established over those territories.

Although the power of legislation on the high seas (exclusively of the separate states,) is not expressly granted to congress by any article of the constitution, (except in cases of piracy and felony); yet, it appears to flow naturally from the general tenor and object of that instrument, and may be even deduced from a fair construction of several of its parts. Congress, therefore, has found no difficulty in passing laws for the regulation of seamen in the merchants' service, which extend even to the forms of their contracts made at land. On the same principle, many are of opinion that the federal legislature has a right to regulate by law, all maritime contracts; such as insurance, bottomry, freight, and the like. Even shipwreck, the English statutes of Richard II. notwithstanding, appears fairly to be within the federal maritime and commercial jurisdiction.

II. *Of personal jurisdiction.* There appears to be also vested in congress an exclusive right of legislation in cases concerning or affecting certain descriptions of persons. In cases affecting foreign ambassadors and other public ministers and consuls, they have hitherto exercised this power with the general approbation, although it is not expressly granted to them, but is fairly deduced from their right to make war and peace, to negotiate treaties, and of course to maintain the nation in peace and harmony with foreign governments, and from the exclusive power vested in the federal tribunals to hear and decide on cases of this description.

Over alien enemies in time of war congress have also exercised the right of legislation, and the power appears to be generally conceded to them; but it is more doubted whether they can exercise the same over *alien friends*, by an alien law similar to that of Great Britain. Such an act was passed in the year 1798, at a time when it was believed that danger was to be apprehended from the emissaries of the Directory of France (then a Republic). But this law, the duration of which was limited to two years, and was at the time very unpopular, was suffered to expire by its own limitation, and has never since been re-enacted.

Over the persons composing the army and navy of the United States, congress have undoubtedly a right to legislate, and as far as relates to their military duties this right is admitted to be exclusive; they have even passed laws to exempt them from the jurisdiction of the states in civil cases; but it is not understood that they can by law free them from the consequences of a breach of the peace or violation of the criminal laws of the state in which they may reside at the time of the act committed.

Congress have also the power of exclusive legislation over their civil officers, as far as respects their official duties; they may likewise declare the privileges of their own members, and enforce them by their own authority.

III. *Of legislative power founded on the subject matter.* This class of legislative powers is the most numerous and the most diversified of all those that are vested in the congress of the United States, and within the various circles of this jurisdiction, their authority extends over all persons and places within the American territory. Notwithstanding all the pains that have been taken to define these several powers by the constitution, a great many of them must be gathered by construction or inference from the context of the whole or from particular parts of the instrument. Of these some are exclusively granted to the federal legislature by express provisions in the constitution, others (though not so expressly given) yet appear from their very nature to be also exclusive, while others are vested in them concurrently with the legislatures of the several states. To discriminate correctly between the exclusive and the concurrent legislative powers of the federal and state governments is a matter of no small difficulty; it is best to leave the decision of all these doubtful points to the competent authorities, whenever the questions shall come properly before them.

The legislative powers which the constitution expressly vests in the congress of the United States are the following:

1. To lay and collect taxes, duties, imposts and excises.

The exercise of this power is limited to the object of "paying the debts and providing for the common defence and general welfare of the United States;" which seems to be rather the expression of the motives which induced the grant, than a restriction of the authority granted; yet it is not impossible that cases may occur in which this clause may be restrictively construed.

This power is also modified, in as much as the same paragraph provides "that all duties, imposts and excises, shall be uniform throughout the United States."

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, among the several states, and with the Indian tribes.

4. To establish an uniform rule of naturalization.

5. To make uniform laws on the subject of bankruptcies throughout the United States.

A general uniform bankrupt law was made by congress in the year 1800, which was limited in its duration to five years. Three years afterwards it was repealed, and has not been since revived; though such a law is much wanted in the commercial towns.

6. To coin money, regulate its value, and that of foreign coins.

7. To fix the standard of weights and measures.

This power has not yet been acted upon.

8. To provide for the punishment of counterfeiting the securities and current coin of the United States.

9. To establish post offices.

10. To *establish* post roads.

The construction of this last article has occasioned much discussion in and out of congress, and is not yet finally settled. Some are of opinion that it gives to the federal legislature the power of making new roads, others that it only authorises them to erect roads already made into *post roads*. The power of making *military* roads, for purposes of national *defence*, seems generally admitted without any restriction.

11. To promote the progress of science and useful arts, by securing, for limited times, to authors and *inventors*, the

exclusive right to their respective writings and discoveries.

It is questioned whether this power extends to granting a patent, or exclusive right, to the person who should introduce an useful process of art or manufacture, not originally invented by him, but known and used in another country, though it should be kept a secret there and its importation highly advantageous to the UnitedStates. In the case of Livingston and Fulton's steam boat, the court of appeals of the state of New York recognized the validity of a *state patent*, on the ground that the patentees did not claim as *inventors*, and therefore that their claim was not within the above clause of the constitution.

12. To constitute a supreme court of judicature, and Tribunals inferior to it.

13. To define and punish piracies and offences committed on the high seas.

14. To define and punish *offences* against the law of nations.

It is remarkable that the power to " declare and enforce the law of nations" in *others* than criminal cases, is not among the powers expressly vested by the constitution in the congress of the United States; nevertheless, it does not yet appear to have been doubted, that from the general purview and context of the instrument, congress is possessed of this power *to the fullest extent, and exclusively of the state legislatures.*

15. To declare war.

The only declaration of war that has yet been made under the constitution, has been in the *defensive* form " THAT WAR EXISTS." Still it does not follow that congress are restricted from *making* " offensive war."

16. To grant letters of marque and reprisal.

17. To make rules concerning captures on land and water.

18. To raise and support armies.

19. To provide and maintain a navy.

20. To make rules for the government of the land and naval forces.

21. To provide for calling forth the militia.

This power is restricted to three objects.

1. To execute the laws of the Union.
2. To suppress insurrections.
3. To repel invasions.

As *war* has hitherto been *declared* by an act of congress or *law*; it seems that congress have the power of " calling forth the militia" for the purpose of carrying on war, after the same is declared, though no actual invasion of the American territory should have taken place.

22. To provide for organizing, arming and disciplining the militia.

23. To *provide for* GOVERNING such part of the militia as may be employed in the service of the United States.

The appointment of officers, and the authority of training the militia, are reserved to the states; the last to be exercised according to the discipline prescribed by congress.

24. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers; and all other powers vested by the constitution in the government of the United States, or in any department or officer thereof.

25. Since the year 1808 congress have the power to prohibit the importation of *persons* into the United States, even though the particular states should think proper to admit them. Under this clause they have prohibited the importation of *slaves*

The constitution has not only granted certain express legislative powers to congress, but has restricted them, in the same express manner, from exercising others. Such are the following:

1. Congress cannot appropriate monies for raising and supporting armies for a longer term than two years.

2. They cannot suspend the privilege of the writ of habeas corpus, except in cases of rebellion or invasion, and not even then, unless the public safety requires it.

3. They cannot pass bills of attainder.

4. Nor *expost facto* laws.

5. They cannot lay a capitation or direct tax except in certain proportions which the constitution provides.

6. They cannot lay duties on articles exported from any state.

7. They cannot give a preference by revenue laws to the ports of one state over those of another.

8. They cannot oblige vessels bound to or from one state, to enter, clear or pay duties in another.

9. They cannot grant titles of nobility.

10. They cannot make laws respecting an establishment of religion, or prohibiting the free exercise thereof.

11. Nor laws abridging the freedom of speech or of the press.

12. Nor abridging the right of the people peaceably to assemble and petition government for a redress of grievances.

13. Nor infringing the right of the people to keep and bear arms.

14. Nor in violation of any of the articles of the bill of rights annexed to the constitution, in the form of amendments, and adopted by the requisite majority of the states.

While the national government is thus restricted in its powers of legislation, it is, on the other hand, protected by analogous restrictions on the legislative authority of the states. By the tenth section of the first article of the constitution, various prohibitions are laid upon the individual states, some of which are absolute, and others merely interdict the exercise of certain powers without the permission of congress first had and obtained.

The absolute prohibitions are the following:

1. No state shall enter into any treaty, alliance, or *confederation.*

By this last word is clearly understood, not only with foreign states, but *with each other.*

2. Nor grant letters of marque or reprisal.

This amounts to an absolute prohibition from entering into a *maritime war.*

3. They shall not coin money; emit bills of credit, nor make any thing but gold and silver a tender for the payment of debts.

4 Nor grant any title of nobility.

5. Nor pass any bill of attainder.

6. Nor expost facto law.

7. Nor law impairing the obligation of contracts.

The prohibition against making *expost facto laws*, has been judicially expounded to apply only to penal statutes. (Calder v. Bull; in Sup. Cur. U. S. 3. Dallas 386) It does not, therefore, apply to laws merely affecting civil rights or engagements. These are provided for by the following clause, which prohibits the states from making laws *impairing the obligation of contracts.* There is a case at this moment before the supreme court at Washington, which involves the question whether an insolvent law enacted by a state legislature, by which not only the person of the debtor, but the debt itself is discharged, comes within this prohibition. As to debts existing at the time of passing the law, there can be no doubt that, a state has a power to declare them discharged in any case against the will of the creditor; if the statute, however, is prospective, and to affect only such debts as may be contracted after its passage. there seems more reason to hesitate, as every contract is considered as made with a view to the existing laws, and to be modified by them ; but we will not anticipate on the decision of the supreme tribunal of the union.

We pass now on to the legislative powers which the states can only exercise with the permission of congress, and they are the following :

1. To engage in war, unless actually invaded, or in such imminent danger as will admit of no delay.

2. To keep troops or ships of war *in time of peaee*.

3. To enter into any agreement or compact with *another state*, or foreign power.

4. To lay any duty on tonnage.

5. Or any impost or duty on imports or exports, except what may be absolutely necessary for executing the states' inspection laws.

It is further provided, that all state laws laying imposts or duties on imports or exports, shall be subject to the revison and control of congress, and that the produce of all such duties or imposts shall be for the use of the treasury of the United States.

Thus our national constitution offers the novel spectacle of a confederacy of independent governments limitted in their powers by a supreme government which has itself but a limitted authority ; so that it may be truly said, that a *general legislative power* exists in no delegated body of men in this country. Round the federal as well as round the state governments, the constitution has traced various circles, beyond which, like the sun and stars in the firmament, the power which created them has forbidden them to move.

That power is THE PEOPLE. Their paramount authority is secured by two special amendments to the constitution.

ARTICLE IX. The enumeration in the constitution of certain rights, shall not be construed to deny or disparage others retained by THE PEOPLE.

ARTICLE X. The powers not delegated to the United States by the constitution, nor prohibited by it to the states, are reserved to THE STATES respectively, or to THE PEOPLE.

This last clause has established a very material difference between the powers of the federal and those of the state governments. The latter may legislate in all cases where they are not restricted by the constitution of the United States, or by their own, while the congress can make no laws but in pursuance of the special authority delegated to them. This amendment was introduced to allay the great jealousy which at the time was entertained of the powers of the federal government, which many were led to believe would, in the end, annihilate and destroy the individual states, or reduce them to the rank of mere corporations. Experience has since proved that jealousy to be unfounded, and hitherto the federal government has received more efficient opposition from the states, in the exercise of its lawful authority, than the states from the federal government. The strong impediments opposed to the measures of the federal administration, during the last war, by certain states are well remembered; as well as the opposition made by the state of Pennsylvania for a number of years, to the exercise in a particular case of the admiralty jurisdiction of the federal judiciary ; and it is well known, also, that the state governments, by their powerful influence, have succeeded in withdrawing themselves entirely from the authority of the federal tribunals in controversies between them and individuals, to which the constitution, as first established, had subjected them. It is much to be wished that this authority were revived, so as to enable, at least, the federal courts to decide as arbitrators between individuals and the state governments, leaving the execution of their judgments to the honorable discretion of the latter. The usual compulsory means employed by courts of justice to enforce their decisions, do not well comport with the honour and dignity of sovereign states ; but the greatest potentates of the earth have not disdained to submit their differences, even with their own subjects, to the arbitration of others than themselves.

With such a limited scope of legislation, it cannot be expected, that the laws made by the congress of the United States have yet reached many objects. The organization of the different branches of their own government, the regulation of the army and navy, the revenue, the public lands, the privileges of ambassadors, the militia, the rights of neutrality, and the definition and punishment of crimes and offences committed ont he high seas, and in other places subjected to their exclusive jurisdiction, form the principal titles in the federal code. It is in the laws of the different states, that we are to look for what may be called the general system of American jurisprudence. The federal courts are bound by those laws whenever they apply, and are, in fact, auxiliary to their due administration. So the state courts and magistrates, in many cases, lend an auxiliary hand to the administration of the federal laws.

In the states, however, we find nothing like a general system of legislation ; they are at present, like the different provinces of France before the late revolution, each governed by its own local laws, usages, and customs. In most of the states, the common law of England, under certain modifications, is received as the law of the land ; but it is not so in all ; in Louisiana, for instance, it is rejected altogether, and a local code, (a servile copy of the *code Napoleon*,) is the rule of civil rights ; which the Roman law and the law of Spain are called in to explain, in doubtful cases. In Connecticut, (and, it is believed, in most, if not all, the New England states,) the common law is only binding in cases where its principles have been sanctioned by some act of their legislatures, or decision of their tribunals ; in all other cases, it is respected as an equitable system, but has no obligatory force. " The common law," says the excellent commentator on the laws of Connecticut, " has never been considered to be more obligatory here, than the civil law is in England." *Swift's System of the Laws of Conn.* vol. 1. p. 44, 45.

Thus, the common law of England is not the common law of the United States, generally speaking ; and, in fact, as a confederated body, they have no common law, but the constitution and statutes of the union. So early as the year 1807, the supreme court of the United States declared, by the organ of the chief justice, MARSHALL, that the federal courts, being created by written law, had no jurisdiction but that given to them by statute. The question was, whether the power given to the court by act of congress to issue writs of *habeas corpus*, could be construed or explained by the *common law*, as to its application to particular cases. The court decided that it could not. *Exparte Bollman*, 4 *Cranch*, 93. In a later case, the same court determined that they had no common law jurisdiction on the subject of libels, or in other words, in criminal cases. *United States* v. *Hudson*, 7 Cranch, 32. This was a case from the federal circuit court for Connecticut, in which the defendant was indicted for a libel on the President and congress of the United States. If the indictment was founded on the common law of *England*, the principle on which the jurisdiction of the circuit court was denied, is easily understood ; not so if the defendant was indicted for an offence made such by the common law of *Connecticut*, which, it would seem, the federal circuit court was bound to administer. Is, then, a libel no offence by the common law of that state, and were not the president and congress, in common with others, entitled to be protected by it? It must be acknowledged, that the report of that case is not very clear upon this subject.

Certain it is, however, that in criminal cases, the English common law has been decided not to be the common law of the United States, considered as an aggregate community; nevertheless, it has often been recurred to for the purpose of expounding institutions evidently borrowed from that system, and its forms have occasionally been employed to carry those institutions into effect. Thus, *trial by jury*, being a part of the law of the United States, its incidents in all cases not otherwise provided for by statute or local practice, have been regulated by the rules and principles of that system from which this noble institution was derived, *the common law of England.*

In the states where the common law obtains, it is variously modified by local statutes. It is difficult to reduce those modifications to a general system, as they vary considerably from each other. There are, however, certain features which appear to be common to all the states, and may properly be here mentioned.

1. The law of primogeniture is abolished in all the states; but the rules of descent which have been introduced in the place of it, are not the same every where. In general, the rule of the English statute of distributions has been applied to descents, not, however, without some variations and modifications. In Pennsylvania, inheritances ascend in certain cases, and the father and mother take by *ascent;* in the same state collaterals, in defect of lineal heirs, take by representation *ad infinitum.*

2. Entails have in all the states either been entirely abolished, or some easy mode of barring them has been introduced by statute. In Pennsylvania it is sufficient that the tenant in tail declare in a deed of bargain and sale, that it is his intention to bar the entail and convey a fee simple.

3. Joint tenancies of lands have in most of the states been abolished, and converted into tenancies in common. Trust estates are generally excepted from this provision.

4. The old incidents to the feudal tenures, as waifs, estrays, deodands and the like, have in some states been abolished, and in all are entirely out of use. A wager of law or battle would hardly be permitted in the United States.

5. The forms of proceeding have been greatly simplified in almost all the states, and special pleading is fast going out of use. In Pennsylvania the fictitious mode of proceeding in ejectments, has been abolished, and a more rational mode of proceeding substituted in lieu of it. It is believed to have been done also in other states.

6. All lands in the United States are held in free and common socage or allodially. All grants of land made by the state of New York are in *allodium;* in practice, however, lands thus held are considered as held in *fee simple.*

7. The penal laws of England have been mitigated in all the states, and rendered less sanguinary. The punishment of death is seldom inflicted, and the penitentiary system has been introduced almost every where.

8. The right of holding lands has been extended to aliens in many of the states. The *droit d'aubaine* of the common law, which subjects lands so held to confiscation, is still preserved in some of them, but may be considered as a dead letter, never having been enforced, that we know of, against a bona fide alien purchaser. After his death, however, it is difficult for his alien heirs to obtain possession of his property, because of the principle *that they have no inheritable blood.*

The administration of justice is, in general, on the English model, with simplified forms. In criminal cases, and in civil cases, at the common law, the trial is by jury. Trial by compulsory arbitration has lately been introduced into the state of Pennsylvania, and it is certain that this mode of proceeding has prevented much tedious and expensive litigation. The parties are heard before the arbitrators, and an appeal lies from their decision to a court and jury; not however, unless the party swears that he does not appeal for the sake of delay. Equity in most of the states, is administered by courts of chancery, variously constituted; in some (as in the federal tribunals) equity jurisdiction is vested in the common law judges, who proceed in such cases, according to the forms of the English chancery court. In Pennsylvania, there is no court vested with equity jurisdiction, except in a few specified cases, the principles, however, on which courts of equity determine, are considered, where they apply, as part of the law of the state. The probate of wills and granting of letters of administration, with their incidents, belong to special tribunals created for that express purpose, under the various denominations of surrogates, registers of wills, judges of probate, and the like, with an appeal in some states to the court exercising chancery powers, in others to a Register's court and an Orphan's court, in which parts of the jurisdiction of the English ecclesiastical courts are vested for that purpose. The admiralty and prize jurisdiction belongs to the federal tribunals, and is at present vested in the district courts, with an appeal to the circuit courts, and ultimately to the supreme court of the union. The jurisdiction of the instance courts of admiralty, is restricted, as in England under the statutes of Richard II., though an opinion begins to prevail, that it ought to be further enlarged. In revenue causes, however, this jurisdiction has been extended to all cases of seizure for the violation of impost laws, or of those for the regulation of navigation or trade, when the *seizure* has been made on waters navigable from the sea by vessels of ten or more tons burthen. Such cases are tried *without a jury.* United States, v. Schooner Betsy and Charlotte, 4. Cranch, 529.

Upon the whole, in the United States, the English system of jurisprudence is gradually undergoing great changes and modifications; which will probably produce, after a lapse of time, a different code; but whether better or worse, it is impossible to foresee. In some of the states, already, laws have been made to prohibit the reading or quoting in courts of justice the reports of English decisions made since the period of the American revolution. This course of legislation is not generally approved; it is thought that it would be better to amend the common law where it is thought deficient, than to prohibit the expositions given of it by learned men of any country. But it is always easier to cut down the tree than to prune it.

DUPONCEAU.

LAW, John, comptroller-general of the finances of France, was the son of William Law, goldsmith and banker in Edinburgh, and proprietor of the lands of Lauriston, in the parish of Cramond. He was born at Edinburgh, on the 21st of April, 1671. During the period of puberty, and for some considerable time after it, he applied himself with great vigour to the sciences of geography, arithmetic, and algebra, in all of which he made such astonishing progress, as to be able, with a single glance, to solve the most difficult problems. His mind seems also to have been led to the comprehensive and complicated questions connected with political economy. He directed his attention to the state of trade, manufactures, and commerce, in his native country; to the principles of public and private credit; to the best means of national improvement; and, in a word, to the system of finance in all its branches, connections, and consequences. A natural predilection for these pursuits, laid the foundation of all his future greatness, and particularly of all the fame which he afterwards acquired as a political speculator.

Shortly after the death of his father, which happened in 1685, Mr. Law visited London. This step he was induced to take, from motives similar to those which stimulate most of our young adventurers, considering London as the theatre on which mental endowments and external graces may be displayed to most advantage; and borne up, no doubt, by a sense of his own superiority in these respects, he naturally conceived, that a residence in the capital of the British empire, would not only favour his progress in the pursuits to which he had the strongest attachment, but likewise gratify him, sooner or later, in all his hopes and wishes. In London, Mr. Law, remarkable as he always was for elegance of person, engaging convivial powers, and an extreme propensity to deep play, soon gained admission into the first circles of fashion. His company was courted particularly by the fair sex; and his conversation was prized by every votary of the *beau monde*.

While thus at the very outset of his career, a circumstance happened which, at first view, was likely to blast all his rising prospects. His fondness for affairs of gallantry involved him in a quarrel with one Mr. Wilson, a gentleman inferior only to himself in those endowments which attract the notice and ensure the attention of the gay. This quarrel, as commonly happens in similar cases, ended in a mutual challenge to the field. In the encounter Law came off victorious, having left his antagonist dead upon the spot where they fought. Having neglected to seek his safety by flight, he was soon afterwards apprehended, and committed to the King's Bench Prison. Thinking it unadvisable to stand trial, he took the first opportunity of making his escape. He went to the continent, and, during the period of his exile, betook himself to his favourite pursuits. In these, which during his residence in London had been almost totally neglected, he soon made greater progress than ever. Indeed, it could not be otherwise, since his mind was formed with that inquisitive disposition which prompts to the pursuit of knowledge on all hands, and which no difficulties can discourage. The field of information also was now much enlarged. While in Britain, his attention was confined exclusively to the state of things around him. Now, however, his residence on the continent put it in his power to view things on a larger scale. He examined the state of manufactures and trade in the chief commercial cities of Europe. He visited the principal banking houses; and the office of secretary to the British resident in Holland, which he held for some time, put it in his power to gain an acquaintance with the operations of the mysterious bank of Amsterdam. It appears, however, that before the commencement of the 18th century he returned to his native country, where, in December 1700, he published at Edinburgh the Introduction to his *Proposals and Reasons for Constituting a Council of Trade*. His professed object in this work was, to suggest measures whereby the commercial interests of his country might be promoted. The attempt was laudable, and, which is not always the case, well-timed. A variety of unfortunate circumstances, and particularly the failure of the Darien expedition, had reduced the trade and manufactures of the country to a low ebb. In such a state of things, it might have been expected that the exertions, however feeble, of any public-spirited individual, in support of the interests of the country, would have met with general encouragement. This, however, was not the case with the publication of Mr. Law. His projects did not accord with the sentiments of the supreme judicature, and, consequently, met with no encouragement from that quarter. The proposal, also, which he made to parliament in 1705, for the establishment of a paper currency, was rejected by the house, from an idea that, if carried into effect, it would be prejudicial to the landed interests of the country. This repeated disappointment in his plans, the object of which was, at one and the same time, personal aggrandizement and public good, naturally alienated his mind from his native country. Accordingly he left Scotland soon after, and was at Genoa in 1708. For five or six years after he rambled about the continent, observing the manners of the different nations, and making his fortune by skill in games of hazard. It is said, that when he settled at Paris in 1714, he was possessed of a fortune, acquired in this way, of 110,000*l*.

Prior to this period, he had visited the capital of France twice; but his plans there met with as little encouragement as they did in England. The natural jealousy of the Parisians, also, would no doubt be excited by the circumstance of his being a foreigner. Through the advice and under the patronage of his friend, the King of Sardinia, however, he visited Paris a third time, in 1714. The death of Louis XIV. happened soon after; and he was patronised by the Duke of Orleans, regent during the minority of Louis XV.

By Law's advice and direction, certain improvements were made in the state of the finances, and measures adopted for establishing, upon a firmer basis, the sinking credit of the country. In connection with his brother William, then settled at London, he set up a private bank, under the firm of the "General Bank of Law & Co." So great was the public confidence placed in this institution, and so uncommon the success of which it was productive to the proprietors, that, about the close of the year 1718. the Duke of Orleans resolved to take it into his majesty's hands, as had at first been proposed. This measure was strenuously opposed by the proprietors; but all opposition to the will of the crown being vain, the "General Bank of Law & Co." was, on the 4th December, 1718, incorporated by royal charter into what was afterwards termed the "Royal Bank." It was perhaps this circumstance which led to the more speedy development of that stupendous scheme, which seems to have long occupied the mind of Law, generally known by the name of the *Missisippi System*.

The object of this scheme was, to invest the whole of the national trade, with certain revenues arising from different sources, in the hands of one great company, who might thus be enabled to extend their commercial projects to an indefinite extent. By the suggestions of Law, such a company actually was instituted, under the name of the Company of the West. To this company was granted the whole province of Louisiana in North America, a country watered throughout by the Mississippi river; from which circumstance the scheme was generally known afterwards by the name of the Mississippi System. This vast project, which owed its birth entirely to Law, who was in consequence appointed director-general of the company, soon became the topic of general conversation. The minds of the lower orders were interested by the fair prospects which it held forth; while the novelty of the scheme attracted the notice not only of France, but of all the other European nations. Nothing was talked of in Paris but the Mississippi; and nothing was sought after with such avidity as shares in the India Company. The reputation and the fame of Law extended far and wide. His house was crowded from morning till night with visitors from all quarters, most of whom were satisfied with a look or a smile from the illustrious foreigner. He was considered by all ranks as the saviour of the kingdom; and the same honour was conferred upon him, as upon the king and regent themselves. Soon after, he was declared comptroller-general of the finances, or, in other words, prime minister of state. Honours were heaped upon him from all quarters. He was elected an honorary member of the Academy of Sciences; and the freedom of his native city was transmitted to him in a gold box of the value of 300*l*. Thus was an obscure foreigner elevated at once to the second rank of authority and power in the politest nation of Europe.

The system of which Law was the founder continued to gain credit and influence for some time. Its immediate effect was the exaltation of the lower orders in Paris. As there was daily a prodigious rise in the price of shares in the Company, those who had purchased a share one day, found themselves possessed of a fortune by selling it the next. The distinctions betwixt master and servant was for a time abolished. High and low, rich and poor, were banded together. Paris was crowded with strangers from all quarters of Europe; and there was a prodigious influx of wealth into the French empire. Thinking men soon perceived that the necessary consequences of such a state of things would be, the destruction of all government, the stagnation of trade, and the dissolution of morals. The order of things in society is so wisely constituted, that changes such as that which took place upon the establishment of the Mississippi system could not fail to produce the most baneful effects. The grand object, too, which the original projector of the scheme had in view, must have been frustrated, at least for the present, by the confusion and disorder of which it was the immediate occasion. A scheme, such as that which we are now contemplating, requires, in a pre-eminent degree, caution and deliberation. Where these qualities are wanting, a scheme may promise fair, and it may be borne up for some time by popular favour. The springs of an organised body may be kept in motion by the mere energy of enthusiasm; but it requires not the spirit of prophecy to foresee, that a scheme, which has nothing more than novelty and enthusiasm to support it, will speedily be ruined. To the want, then, of cautious inquiry and cool philosophic deliberation, we may attribute the speedy downfal of the Mississippi system. The Company speculated to a most enormous extent. The original proprietors forgot the purpose for which it was organised, and were intent solely on the acquisition of wealth for themselves and their friends. Hence, in the midst of the general delirium, there was observed a constant drain of specie from the bank. So great was the desire manifested by the members of the Company to have their shares converted into gold and silver, that there was scarcely left enough of these articles for the purposes of ordinary circulation. From this and other causes, apprehensions of danger to the national interest arose. Accordingly, by certain edicts published from the crown, it was easy to perceive, that the downfal of the Mississippi system, and of Law's greatness, was speedily to happen. In promoting these events, personal pique and envy, no doubt, had a considerable share of influence. The greatness of a foreigner gave umbrage to the Parisian ministry; and their influence tended to alienate the minds of the nobles and of the king from Law. Accordingly, on the 21st of May, 1720, a royal edict was published, appointing a gradual reduction in the value of the Company's shares, from 10,000 livres, at which they then were, to 5000. A reduction of the same kind took place upon the notes issued by the bank, which had been prior to this time incorporated with the Mississippi Company. These reductions were little different from composition or bankruptcy; and hence this edict gave a death blow to the reputation of Law, and the interests of the system. All public credit was lost. All connected with the system, particularly the director and his coadjutors, were stigmatised and calumniated. Popular favour was in an instant turned into popular rage. The career of enthusiasm was stopt in an instant, while consternation and fury pervaded all ranks of people. The Mississippi system was now completely at an end. All that remained to be done was the payment of its debts, and this, upon enquiry, was found to be no easy matter. A commission was appointed for the purpose; while the ministers of state, and all who possessed rank and influence in Paris, did every thing in their power to restore things to their usual channel.

With respect to the propriety and design of the Mississippi scheme a variety of opinions have been entertained. Some have thought, that the whole was a project devised for the purpose of monopolizing individuals, at the expense of the country. Others have thought, that it involved in it treasonable intentions against the state. Neither of these suppositions, however, is supported by any plausible arguments. We have no right to impute evil motives, when the facts in question may with equal ease be accounted for upon the supposition of good ones. In all likelihood, those originally connected with the Mississippi business were actuated by the best intentions. Law's object seems to have been, to revive the interests of commerce, and to extend the trade of France beyond its former bounds. It readily occurred to him, as it would have done to any one in his situation, that the grand obstacle to commercial speculation in France, was the limited nature of the exertions hitherto made. The means possessed by individuals were ineffectual to the production of any great and lasting effects. It seemed necessary, therefore, that commercial speculation should become an object of general interest. This appeared to be the most effectual method by which the evil might be remedied. There is reason to think, however, that, in running from one extreme, Law and his coadjutors fell into another. Instead of applying the remedy with care and caution, they seem to have overdone the matter. They formed ideas too vast; and the plans to which these ideas gave rise were too complicated and extensive. It was desirable that a great trading company should be established; but there was a danger, lest the machine, from its size, should become incapable of being moved. Mental energies are especially requisite in order to the promotion of some great object; but there is reason to think, that when a variety of principles, prepossessions, and views, are associated together, the mental energies of individuals may be lost in the general mass. Enlightened schemes may be counteracted by the suggestions of one parsimonious individual. The best concerted plan may be frustrated by a want of co-operation. Where an association is formed upon so broad a basis as that of the Mississippi, great discrimination in the admission of members is requisite. Such discrimination does not appear to have been exercised by the Mississippians to a sufficient extent. It was not inquired, with what views and intentions shares in the company were sought after. A line of distinction was not drawn betwixt those who wished to be connected with the scheme from mere secular and private ends, and those who entertained enlightened ideas of national improvement. In a word, the Mississippi system presents to our view a stately fabric, but destitute of a proper foundation. In it we discover a great and enterprising mind, devising plans of political good; while, at the same time, we discern the want of that cool and discriminating judgment, from the union of which with genius, the most beneficial effects may be expected.

The prosperous career of Law was now terminated. The rage of the populace continually increased, and he saw no prospect either of favour or of safety, if he remained any longer at Paris. Accordingly he left France, and came once more to his native country. He went by the way of Holland, passing under the name of M. du Jardin. Wherever he was known, he was received by all ranks with kindness and respect. All were desirous to see the man who had extended his fame far and wide, and who, from an obscure and private station, had, by the exertion of his own abilities, risen to the highest civil rank which a commoner can attain. He passed through Brussels and Venice, and went to England by the way of Bohemia, Hanover, and Denmark. At Copenhagen, he found a British squadron, in which he was safely conveyed to London. There he took a splendid house, and was daily visited by the first ranks of people. Soon after his arrival, he heard of the confiscation of his property in France. Conscious, however, of the rectitude of his intentions, and of the fidelity with which he had conducted himself in the different stations which he was appointed to fill, he naturally expected, that, after the fullest investigation, the balance would be found considerably in his favour. In this, his expectations were frustrated. The regent, who had always been his friend, and who did not desert him in this sad reversal of his fortunes, died suddenly on the 2d December, 1723. With him perished the last hopes of Law. All prospect of recovering any part of his property became every day fainter and fainter. His official salary, which, through the regent's kindness, had hitherto been regularly transmitted to him, was discontinued. He soon became embarrassed. Suits against him were commenced both in England and in France, and he was threatened with imprisonment by his creditors. He made another attempt, through the Duke of Bourbon, prime minister of France, to recover his property; but this entirely failed. In the year 1725, he bid a final adieu to Britain, and fixed his residence at Venice. There he died in a state of comparative indigence, on the 21st of March, 1729, in the 58th year of his age. He was buried in one of the churches of the city, where a monument is erected to his memory. The following epitaph appeared soon after:

> Ce gît cet Ecossois célébre,
> Ce calculateur sans egàle,
> Qui, par les régles de l'algébre,
> A mis la France à l'hôpital.

LAWRENCE, St. See Canada.

LAY, Benjamin, one of the first public advocates for the emancipation of the enslaved Africans, was born in England, anno domini 7. He was educated in the principles of the religious society of Friends, but possessing an eccentric mind and violent temper, his conduct in some respects was so inconsistent with the profession of his brethren, as to induce them to disunite him from membership about the year 1717.

In the early part of his life he chose the occupation of a sailor, and thus had an opportunity of visiting many parts of the world. In 1710, he married one of his own countrywomen, and soon after that event removed to the island of Barbadoes; here his feelings became highly excited by the cruelty inflicted upon the slaves, and he ardently opposed the unrighteous system for many years; but finally, seeing no prospect of success in producing any change in the conduct of the inhabitants in this respect, he removed to Pennsylvania in 1731. Here too, finding slavery existed, he renewed his efforts to abolish the practice, and lived to witness great improvement in the field of his benevolent labours. He resided for many years in a cave, and subsisted upon vegetable diet; his clothing was entirely composed of tow fabric, of his own spinning; he would not eat any food, nor wear any garment, nor use any article, which was produced at the expense of animal life, or that was in the remotest degree the product of the labour of slaves. His physical organization was not less remarkable, than the qualities of his mind were extraordinary. He was only four feet seven inches in height, his head large in proportion to his body, the features of his face remarkable, and boldy delineated, with a countenance grave, and benignant. He was hunch-backed, with a projecting chest, and diminutive as his body was, his legs were so slender as to appear unequal to the office of supporting it. He wore his beard, which was long and white, and presented a figure perfectly unique. At one period of his life, he conceived it to be his duty to fast for the same length of time as the Saviour of mankind, and persisted in his notion for three weeks, but his system sunk under the plan, and with it his mental faculties; in this state, suitable diet was administered, and he gradually recovered his usual health. In 1759, after a short illness, he died at the age of 82 years, and his body was interred in Friends burial ground at Abington, ten miles north of Philadelphia.

For a more minute account of this singular character, with a portrait of him, vide "*Memoirs of the Lives of Benjamin Lay and Ralph Sandiford,*" by Roberts Vaux.

LAYBACH. See Carniola.

LAZARETTO, is the name of a public building for the reception of persons who are appointed to perform quarantine, in consequence of coming from places suspected of the plague. See Howard's *Account of the principal Lazarettos in Europe*, Warrington, 1789, and the article Quarantine.

LAZULI Lapis. See Mineralogy.

LEAD. See Chemistry, Metallurgy, and Mineralogy.

LEADHILLS. See Lanarkshire.

LEAF. See Botany, sect. V.

LEAGUE. See Measures.

LEAGUE of the Ten Jurisdictions. See Grisons.

LEASE. See Agriculture, *Index*, and Law *of Scotland*.

LEATHER, is a substance prepared from the skins of several sorts of animals, for various important purposes. It is used particularly by glovers, harness-makers, coachmakers, saddlers, breeches-makers, gilt-leather makers, chairmakers, shoemakers, and book-binders. An account of the art of preparing leather will be found under Tanning.

LEBADEA, is a town in Turkey situated betwean Delphi and Thebes. The streets of the town are narrow and ill paved; and in consequence of the numerous conduits and channels for supplying mills and reservoirs from the bed of the Hercyna, water is seen falling in all directions. Lebadea is celebrated for the Hieron of Trophonius, which is situated a few paces from the spot where the river Hercyna issues from beneath a rock. None of the Grecian antiquities are better authenticated than this. An uncertainty, however, exists respecting the *Adytum*, or residence of the oracle, in consequence of the interior not having been explored in modern times. The narrow aperture, supposed to lead to the Adytum, is close to the ground, and is choaked with stones and rubbish. Below the aperture, a fountain issues from several small pipes into a bath, paved with large hewn stones and pieces of marble, and which was used by those who came to consult the oracle.

The most sacred part of the Hieron, containing the entrance to the Adytum, and the niches for the *dona votiva*, is a perpendicular rock of black marble facing the east. The niches, which are 12 in number, are above the Adytum, and to the right and left of it, and have different shapes and magnitudes. The largest is an entire chamber of stone, containing a stone bench, which may have been the throne of Mnemosyne. This chamber is 5 feet 10 inches from the ground, and the whole of it is hewn from the solid rock. It is 12 feet 8 inches long, 11 feet 3 inches wide, and 8 feet 8 inches high. The stone bench is 8 feet 9 inches long, 14 inches wide, and 18 inches high.

The fountain which we have mentioned, serves to supply the town of Lebadea with its best water.

Dr. Clarke ascended the citadel on the summit of the rock above the cave, and found there the capital of a large Corinthian pillar, of a rare variety. It was made of the hard black marble of the rocks upon which the citadel stands. Within the fortress he observed a few fragments of antiquity; and in a mosque near it some inscriptions.

Lebadea has a considerable commerce in the produce of Attica, Bœotia, and Thessaly, and carries on a thriving export trade even to London, of corn, and cotton, and currant raisins, which it procures from Patras. The ancient *Anticyra*, now Aspropiti, is the port of Lebadea. The wine of Orchomenus is sold here, and is sometimes like the clearest spring water. The honey of Lebadea is sent to the Grand Signior's seraglio. Lebadea contains 1500 houses. A very full and interesting account of the cave of Trophonius, with a drawing of it, will be found in Dr. E. D. Clarke's *Travels*, vol. iv. p. 125—136.

LEBANON, or Libanus, is a celebrated mountain of Asia, on the borders of Palestine and Syria. It is part of a group in the form of a horse-shoe, which commences a little above Smyrna, about three or four leagues from the Mediterranean, and extending southwards towards Sidon, takes an easterly direction towards Damascus, and thence winds northward. The name of Lebanon is given to the western ridge, and Antilebanon to the eastern, comprehending Cœlosyria between them.

Mount Lebanon is said to be composed of a hard calcareous stone of a whitish colour, sonorous like freestone, and arranged in strata of various inclinations. The celebrated traveller, M. Burckhardt, whose recent death is so deeply deplored, ascended this mountain in 1811, and has stated in a letter to Dr. E. D. Clarke, that it is composed of primitive limestone.

From a very vague calculation, Volney has estimated the height of Lebanon at 1500 or 1600 fathoms. It is about 100 leagues in compass, and consists of four ridges rising one above another. The first ridge produces grain and fruits in great abundance; the second, which is rocky and barren, produces nothing but thorns; the third is covered with fruitful gardens and orchards; and the last, which is uninhabitable from the extreme cold, is covered with deep snows, which remain almost all the year.

The rivers which flow from this mountain, are the Jordan, Rocham, Nahar-Rossian, and Nahar-Cadicha, and several smaller streams.

The wines of Lebanon have long been celebrated. The principal of these is the Vino d'Oro, or golden coloured wine, which is not boiled, but purifies itself by keeping. The vintage commences about the end of September.

Mount Lebanon is chiefly inhabited by the Maronites, and by the wild Arabs, of the sect of Kali. The convent occupied by the Maronite patriarch consists of various grottos, of which the church is the largest, cut out of the rock. It lies in a deep bottom, to which there is a narrow and steep descent. See Volney's *Travels in Syria*, and Clarke's *Travels*, vol. ii. p. 456.

LEDBURY, is an ancient borough and market town of England, in the county of Hereford. It stands about one mile west of the river Leddon, on a declivity within a small valley, formed by the well-wooded eminence, called Dog Hill, and other eminences. It consists of two streets, crossing one another at right angles. The principal street extends north and south, and has a middle row near the old market-house, which is supported on strong oak pillars, and consists of timber and lath covered with plaster, the beams being painted black. Many of the old houses are built in this way with projecting stories; but the modern ones are of red brick, and look well. The church is a large building of Saxon architecture. It consists of a nave, side ailes, and chancel; a chapel dedicated to St. Catharine; and a detached tower, which rises to the height of sixty feet, terminating in a fine spire. There is a curious Saxon door-way on the west front; and the church contains many ancient and interesting sepulchral memorials. Ledbury has also an hospital, founded by Bishop Foliot in 1232; a free school, supported by grants issuing from dissolved charity lands; a charity school, and several alms houses.

The principal articles manufactured here, are ropes, linen, and sacks for meal; the clothing trade, which was once very flourishing, having now declined. Great quantities of cyder are manufactured in the neighbourhood.

In 1811, the parish contained 604 houses, and 3136 inhabitants. See the *Beauties of England and Wales*, vol. vi. page 593—597.

LEDYARD. See Africa.

LEECH. See Vermes and Surgery.

LEEDS, a large manufacturing town of England, in the West Riding of Yorkshire, is situated on the north bank of the Aire, on an eminence, which rises gently from the river to the upper end of the town, and slopes to the east, west, and south. The suburbs on the south side of the river are connected with the town by a freestone bridge, which forms an excellent entrance to the town. Leeds is about half a mile broad from north to south, and nearly a mile and a half long from east to west. Briggate, the principal street, is about 500 yards long and 30 broad, and divides the town nearly into two parts. In the middle of the town, both to the east and west of Briggate, are several good streets, and many large and elegant houses. The western part is, however, the most elegant, and is adorned with very handsome houses. In the old parts of the town the streets are narrow and crooked, and in some places not very clean; but in general the town is cleanly kept, and every street has a flagged pavement on each side.

The principal public buildings in Leeds, are the five churches, St. Peter's, St. John's, St. James', Trinity Church, and St. Paul's, the dissenting chapels, the general infirmary, the house of recovery, the free grammar school, the mixed cloth hall, the white cloth hall, the gaol and court-house, the king's mills, the water works, the charity school, the Leeds national school, and the circulating library. The church of St. Peter is a large and ancient building, 165 feet long and 97 broad. It is built in the form of a cross, with a tower or steeple 96 feet high, and underwent a thorough repair in 1811. This church contains many interesting monuments, one of which, designed and executed in marble by Flaxman, is peculiarly elegant, and was erected by the town of Leeds to the memory of Captains Samuel Walker and Richard Becket, who fell in 1809 at the battle of Talavera. St. John's church, begun in 1631, and consecrated in 1634, was founded and finished by John Harrison, Esq. It consists of two ailes only, with a single row of columns up the middle; and the tower is placed almost at one angle of the west end. St. James' church is built of stone, in the form of an octagon. It was first occupied by the Countess of Huntingdon's preachers; but was afterwards bought for the establishment. Trinity church is a handsome building in the Greek style, with a tower surmounted by a spire. It is ornamented externally with eight Doric pillars on each side; and the roof is sustained by a double row of Composite columns. The entire expence of the building was 4563*l.* St. Paul's church is an elegant stone building, which was erected through the exertions of the Rev. Miles Atkinson, at an expence of 10,000*l.* It was consecrated in 1793. The architecture is Roman; and the end front consists of a pediment, supported by four Ionic pilasters. The spire is very handsome. The dissenting meeting-houses, which are eight in number, are one Presbyterian, one Unitarian, three of Independents, one of Scotch Presbyterians, one of Baptists, and one of Quakers, besides two Methodist meeting-houses, and a Roman Catholic chapel.

The general infirmary is a large and handsome brick building of Roman architecture. It was founded in 1768, and was opened in 1771. It is 150 feet long, and 38 wide. The court is 186 feet by 30, and the back court, with the offices and gardens, is 186 feet by 120. An attic story was added to the central part of the building in 1792. Mr. Howard, who visited Leeds in 1788, says, that this hospital is one of the best in the kingdom. The average number of in-patients annually during the three years preceding 1816, was 764, and the out-patients 1675. The house of recovery was founded in Vicar Lane in 1802, and opened in 1804, and is appropriated to the reception of poor persons afflicted with infectious fevers.

The free grammar school was erected by John Harrison, Esq. and in 1692 was enlarged by Mr. Lawson. In 1780, an excellent house was erected near the school for the use of the master.

The mixed or coloured cloth hall, built in 1758, is a quadrangular building, enclosing an open area of 127½ yards by 66. It is divided into six covered streets, each of which contains two rows of stands. Each stand is 22 inches in front, and has the name of the clothier painted upon it. The total number is 1800. The number of master manufacturers, however, does not exceed 1780, some of them having two stands. Each stand originally cost three guineas; but they are now worth from 8*l.* to 15*l.* The hall is so completely lighted, that the colours of the goods can be seen as distinctly as in the open air.

The white or undyed cloth hall, built in 1775, is a quadrangle, 99 yards long and 70 broad, and is divided into five covered streets, each of which has a double row of stands, the total number of which is 1210. Each of these cost originally 30 shillings, but they now sell from 3*l.* to 8*l.* A small hall was erected some years ago in Albion street, for the use of those clothiers who had not received a regular apprenticeship, and who could not therefore be admitted into the other halls.

The market for coloured cloths is held every Monday and Saturday at nine in the morning, and that for white cloth on Tuesday at one o'clock. The market commences by the ringing of a bell. At the end of an hour a second bell rings; and at the end of a quarter of an hour a third bell announces that the market must be cleared. All the business is therefore completed in an hour and a quarter; and if any merchant remain in the hall after the last bell is finished, he is fined five shillings, and the same sum for every five minutes that he continues there. After the cloths have been properly fulled, and the uniformity of their fabric certified by a leaden ticket affixed by the inspector, they are brought to the market in the rough. The buyers purchase in a few words, and the cloths are taken to the warehouses to be examined. A part of the price is then paid, and six months credit given for the balance.

The new court-house and prison, at the bottom of Park-Row, may be ranked among the first public buildings of the town. The first stone was laid on the 2d of September, 1811, and the edifice was completed in 1813. The principal front is towards Park Row, and consists of a portico of four Corinthian columns, and two wings, which have pannels highly wrought in bas relief, containing the fasces, fleece, wreaths, &c. The rotation-office, and the West Riding magistrates' room, are on each side of the vestibule, and communicate with the great room, which contains an elevated stage for the public, capable of containing 800 persons. There are also two galleries, one for the grand jury, and a corresponding one for ladies; a room for the counsel, and a retiring-room for the jury, which communicates with their box. The casement story, which is entirely arched with stone, consists of an open ground arcade, for the use of the military, behind which is a guard-room, and an engine-room, sufficiently large to contain the whole of the town and fire-office engines.

There are also on this story, gaoler's apartments, which command the prison-court, in which are thirteen cells.

The king's mills are held by a grant from the crown by J. P. Neville, Esq. and all the inhabitants of Leeds are obliged to grind their corn there.

The water-works are near the bridge over the Aire, and supply the town with abundance of soft water. Adjoining to them are the vast warehouses belonging to the Aire and Calder Navigation.

The charity-school, in which 70 boys are taught reading, writing, and arithmetic, and 50 girls reading, writing, and knitting, was founded by Mr. Harrison. The children are admitted at seven, and remain till fourteen.

The Leeds national school is a convenient and handsome edifice, for the instruction of 320 boys and 180 girls, on Dr. Bell's system. It was begun in 1812, and opened in 1813.

A Lancastrian school was also erected in 1812, and is a large and commodious brick building.

A Wesley chapel, a very handsome and spacious building, was erected in Maiden-lane in 1816.

Leeds has an excellent circulating library, which was established in 1768 by the exertions of Dr. Priestley. It contains a large and excellent collection of books, and some valuable manuscripts, which are deposited in a splendid apartment, erected at an expence of 5000*l.*

Magnificent assembly rooms have been built in Leeds, and dancing assemblies are held every fortnight during the winter. The theatre was built in 1771; but during four years previous to 1816 it was shut up.

Besides the institutions we have mentioned, there is a workhouse, built in 1636 by Mr. Sykes, several old almshouses, founded by John Harrison, Esq. and consisting of 20 dwellings, to which 12 more have been added, and 10 new almshouses, founded by Mrs. Potter, for the widows of deceased tradesmen.

The principal manufacture of Leeds and its vicinity is that of cloth. It consisted formerly of the coarser kinds, but the superfine cloths are now manufactured on a great scale. Swandowns, toilenets, kerseymeres, and various other fancy articles, are also made here. Manufactures of sacking, canvas, linen, and thread, have also been carried on to a considerable extent. Two carpet manufactories have also been established, besides several cotton mills, manufactories for flat and green glass, and for fine and coarse pottery goods. There are also several founderies. On the banks of the Aire, and its tributary streams, are mills for grinding corn, dyers wood, rape-seed, for fulling cloth, and for driving the machinery for the carding and spinning of wool. There is likewise a large manufactory of steam engines carried on by Mr. Mathew Murray, which, we believe, is the largest in England, excepting that of Messrs. Boulton and Watt.

Leeds is one of the principal marts of the woollen manufactures in the west riding of Yorkshire, and a great part of the cloths pass through the hands of the Leeds merchants. The manufacturers of mixed cloths reside chiefly in the villages belonging to the parish of Leeds, westward of the town, and at Dewsbury and its vicinity, &c. The white cloth is made also at Dewsbury, and in a district six miles distant from Leeds.

The borough of Leeds, which includes the whole parish, is governed by a mayor, 12 aldermen, and 24 councillors.

The country round Leeds is pleasant and beautiful. The vale of the Aire is highly interesting. The soil is very fertile, and within three or four miles of the town there is abundance of coal, which is very cheap. Within a mile of the town are vast quarries of argillaceous schistus, which supply Leeds, &c. with flag-stones.

In 1811 Leeds contained 12249 houses, and 62534 inhabitants.

Leeds is situated in East Long. 0° 37′ 26″, and North Lat. 63° 48′ 0″.

For farther information respecting this opulent town, see the magnificent work of Thoresby, entitled *Ducatus Leodiensis*, edited by Dr. Whitaker, and published at Leeds in 1816; also Whitaker's *Loides and Elmete*, Leeds, 1816, a work of equal splendour; and the *Beauties of England and Wales*, vol. xvi. p. 775.

LEETAKOO or LATTAKOO, is a large and populous city of Africa, and the capital of the territory of the Booshooana tribes. This town was visited in 1801 by Dr. William Somerville and Mr. Truter, and is sixteen days journey beyond the Orange river. The account of the town given by these travellers will be found in our article BOOSHOOANAS.

Leetakoo was visited in June, 1813, by the Rev. Mr. Campbell, minister of Kingsland Chapel, who has given a very full account of the inhabitants. He describes the city as lying in a valley between hills, and stretching about three or four miles from east to west. The city is divided into about 50 districts, separated from each other, having each a headman, or alderman, and a place enclosed for public resort, where the men spend the greater part of the day together, dressing skins, and making knives, and various articles. Copper and iron are obtained from some nation farther west; and it is understood that there are copper mines in mountains not very distant from Leetakoo. From these metals the people manufacture axes, adzes, knives, spears, and bodkins, rings for the legs, arms, fingers, and ears Their cloaks are made and sewed as well as those of Europeans. The women of Leetakoo build the houses, dig the fields, and sow and reap, while the men milk the cows, make their clothes, and go to war. Even the queen digs the ground along with the other females. They use a kind of pick-axe. They all sing when at work, and strike the ground in time. In the house of Salakootoo, the king's brother, Mr. Campbell saw paintings, which were rude representations of the cameleon and rhinoceros, elephant, lion, tiger, and steinbuck. They were drawn on the clay wall with white and black paint by Salakootoo's wife. The water by which the town is supplied, is obtained from holes at the end of a hill about a mile to the westward. Each hole is one foot in diameter, and two feet deep. From 50 to 100 women are to be found at these little wells from morning till evening. From the best calculation which Mr. Campbell could make, he estimated the number of houses at 1500, and the inhabitants at 7500. There are, it is said, about a thousand places called outposts, where there are people and cattle.

Mr. Campbell places Leetakoo in about 26° 12′ of South Lat. and 25° 14′ East of Greenwich. See Barrow's *Travels in the South of Africa;* and Campbell's *Travels in the South of Africa*, chap. 15, 16, 17, 18, 19, 20. Lond. 1815.

LEFOOGA. See FRIENDLY ISLES, col. i.

LEGACY. See LAW.

LEGEND. See MEDALS.

LEGHORN, or LIVORNO, anciently *Liburni portus*, and *Liburnum*, is a flourishing city and sea-port town of Italy, in the Grand Duchy of Tuscany. It is situated in the Mediterranean, in a marshy and unhealthy country, opposite to the small island of Malora. The town, which is well fortified, is of a square form, and is about 12,790 feet in circumference. Its streets are straight, regular, and wide, and many of the buildings are tolerably handsome. The fine street, called the Street of Ferdinand, traverses the town in a straight line from the gate of Pisa to the Colonella gate. The Place of Arms is a noble square.

Leghorn contains fourteen churches, two Greek chapels, an Armenian chapel, and a magnificent synagogue. Its principal church is collegiate; and the constant residence of the canons fixes several men of learning in the town. The free Turks and Turkish slaves have a mosque; but, with the exception of the English, who have a chaplain, the Protestants are not permitted the free exercise of their religion. One of the principal objects of interest at Leghorn is the marble statue, erected by Cosmo II. to his father the Grand Duke Ferdinand I. which is the work of Giovanni del Opera. It stands in an open place before the harbour. The gigantic figures of the Turkish slaves, chained at the angles of the pedestal, are particularly admired. The *Campo Santo*, or the Cemetery of the Catholics, is planted with cypress, and has some fine chapels. The cemetery of the English is still more magnificent, and contains some superb mausoleums. The harbour is divided into the outer and the inner. The inner harbour serves merely for four or five gallies, which are employed against the Corsairs. The outer harbour is formed by a mole, 600 common paces long. It is well paved, with a partition in the middle for sheltering the shipping from the wind on one side. From this mole, which is a favourite promenade, are seen the *punta Cavaleggieri*, the lighthouse, which stands on a rock, and has 30 lamps in one lanthorn, the islands of Gorgona, Meloria, Capraia, and even Corsica. Large ships lie beyond the mole, moored to pillars of large iron rings, as there is not a sufficiency of water in the harbour. There are at Leghorn three lazarettos and an arsenal; and the vessels perform quarantine at Moleto. The inhabitants of Leghorn carry on an extensive trade, which is greatly promoted by the freedom of the port, as every bale of goods, whatever be its size, pays only two piastres, or scudi. Coral is the principal object of manufacture at Leghorn. After it is obtained from the fisheries, it is manufactured for the Indies. It is first reduced into small grains (like those of beads) of different sizes, which is done by first cutting the coral into small cubical pieces, then perforating them, and afterwards grinding them on a revolving stone till they receive the desired shape. They are next arranged into sizes by passing them through sieves, and assorted according to similarity of colour. The most lively colours are the most prized in the Indies, and the palest are most esteemed in Germany. The largest are sold at 60 francs per ounce. At the orphan's hospital there is a manufacture of artificial flowers. The great part of the trade of Leghorn is carried on by the Jews, who live in a particular part of the city, and, though subject to heavy exactions, they are still in a prosperous state. Articles brought into Leghorn from the continent pay heavy duties to government, and from that cause, as well as from the monopolies of brandy, tobacco, and salt, the necessaries of life are very dear.

Leghorn is famous for its great magazines of oils, which were constructed by the Medici family. They are square vaults, from four to five feet high, built of brick, and covered inside with a sort of stucco, made of pounded bricks. These magazines are capable of holding no less than 24, 000 barrels. Every merchant has his own reservoir, and keeps the key of it.

The bowling-green, called *Gli Sparti*, and the ramparts, are the favourite promenades. The convent of Monte Nevo, at a short distance from Leghorn, is highly celebrated. Leghorn contains no antiquities. The water of Leghorn is so bad, that the opulent inhabitants supply themselves from Pisa.

The principal imports of Leghorn from Great Britain are, alum, Jesuits' bark, cassia, fistula, and lignea, cinnamon, cloves, nutmegs, pepper, pimento, black and white ginger, Caracca, West India and Maranham cocoa, coffee, black and silver cochineal, Pernambuco, Maranham, Bahia, and Bengal cotton, cod and stockfish, Buenos Ayres and Brazil hides, East India, Caracca, and Guatimala indigo, lead in pigs, lead ore, litharge, nankeens in short pieces, Jamaica and Leewards Islands rum, raw and refined sugar, Havanna white and brown, Brazil ditto, tin in plates $\frac{2}{3}$d single, and $\frac{1}{3}$d double, Virginia and Brazil tobacco, English and Scotch wheat, fustic, logwood, Brazil or Pernambuco wood, Nicaragua in large logs, Manchester, Birmingham, and Nottingham manufactures.

The principal exports of Leghorn are, sweet and bitter almonds, anchovies, Bologna white argil, Florence ditto, red and white, Sicily barilla, juniper berries, Sicily rough brimstone, Tuscan ditto in rolls, cantharides, Parmesan cheese, cream of tartar, Zante currants, essence of bergamot and lemon, Smyrna black galls, Aleppo black galls in sorts, gum arabic and tragacanth, Bologna hemp, Irios root, liquorice, paste, lemon juice, madder root of Cyprus and Smyrna, manna in flakes and in sorts, Lucca oil in jars and in half chests, Gallipoli oil, orange peel and buds, quicksilver, Lipari and Smyrna raisins, Tuscan rags, sponges, saffflower, saffron aquillas, Sicily sumac, senna, Tuscan lamb and kid skins, white and mottled soap, valonea, &c.

The population of this town is variously stated. Some make it 60, and even 70,000; others from 40 to 50,000; and Eustace calls it only 30,000. East Long. 10° 16′ 45″, and North Lat. 43° 33′ 5″. See Eustace's *Travels*, vol. ii. p. 295.

GENERAL EXPLANATION
OF THE
PLATES BELONGING TO VOLUME ELEVENTH
OF THE
AMERICAN EDITION
OF THE
NEW EDINBURGH ENCYCLOPÆDIA.

PLATE CCCXXV.

Fig. 1. Conier's Hygrometer.
Fig. 2. De Luc's Whalebone Hygrometer as constructed by Mr. Adie of Edinburgh.
Fig. 3. De Luc's Hygrometer for examining small portions of Air.
Fig. 4. De Luc's Ivory Hygrometer.
Fig. 5. The same Instrument improved by Mr. Leslie.
Fig. 6. Saussure's Hair Hygrometer.
Fig. 7. Mr. Molyneux's Catgut Hygrometer.
Fig 8. Mr. Leslie's Hygrometer.
Fig. 9. The same Instrument in a Portable Frame.

PLATE CCCXXVI.

Fig. 1. Apparatus employed by Gay Lussac for determining the elasticity of Vapour.
Fig. 2. Diagram for illustrating the manner in which a reduction of temperature takes place in a Thermometer with a moistened bulb.
Fig. 3. Diagram representing the relation subsisting between the tension of Vapour, and the degrees of Saussure's Hygrometer.
Fig. 4. Apparatus employed to determine the Weight of the Vapour in admixture with Air at different Temperatures.

PLATE CCCXXVII.

Fig. 1. Petromyzon marinus.
Fig. 2. Raia marginata.
Fig. 3. Squatina vulgaris.
Fig. 4. Chimæra monstrosa.
Fig. 5. Tetrodon truncatus.
Fig. 6. Centriscus scolopax.

PLATE CCCXXVIII.

Fig. 1. Naso fronticornis.
Fig. 2. Scorpena antennata.
Fig. 3. Gymnetrus Hawkenii.
Fig. 4. Pimelepterus Bosquii.
Fig. 5. Chætodon cornutus.
Fig. 6. Chætodon rostratus.

PLATE CCCXXIX.

Fig. 1. Holacanthus imperator.
Fig. 2. Zeus insidiator.
Fig. 3. Anableps Surinamensis.
Fig. 4. Fistularia tabacaria.
Fig. 5. Muræнophis helena.

PLATES CCCXXX, CCCXXXI, AND CCCXXXII.

Contain Figures of Insects, illustrative of the articles ENTOMOLOGY and INSECTA. As the names of the Insects are engraven on the Plates, it is unnecessary to state them here.

PLATE CCCXXXIII.

Represents various Mouldings for Framing.

PLATE CCCXXXIV.

Exhibits Forms of the Joints of Doors and Shutters, and of the methods of hinging them together.

PLATE CCCXXXV.

Shews the various Forms of Raking Mouldings.

PLATE CCCXXXVI.

Shews the method of forming Bodies in Parts by joining them with Glue.

PLATE CCCXXXVII.

Shews the method of forming circular headed Sash Frames in circular Walls.

PLATE CCCXXXVIII.

Shews the mode of constructing Stairs and Hand Railings.

PLATE CCCXXXIX.

Contains farther Diagrams, shewing the mode of constructing Stairs.

PLATE CCCXL.

Fig. 1. Is a Section of the Blast Furnace, showing the interior of the Furnace from the top to the bottom, and the part where the blast is introduced. The dark stripes which appear on the walls, are Vent Flues for the escape of Moisture, which would not get off from such a massive building without injuring the walls, when the heat is applied to the interior.

Fig. 2. Is a Section Elevation, at right angles to the former one, Fig. 1. showing the same interior surface and the *Dam-stone d*, over which the cinder flows, while the metal is retained by the dam, till it is let out at a hole *v*, on a level with the bottom of the recess. T is called the *Tymp-stones*, and forms a bridge over the cavity in which the liquid cinder rises. *t* is the *Tymp-plate*, to give the stone greater firmness, as *e* is to the *Dam-stone*, which is called the *Dam-plate*. See the Tymp-plate and Dam-plate, more particularly in Figs. 6, 7, and 8.

Fig. 3. Is a Plan at the Level *a a*, Fig. 1. and 2, and PP, Fig. 1. a Plan at the part to which it joins. The light-shaded squares are pillars of brick, constituting a false bottom, on which the hearth rests, the cavities underneath being for the escape of vapour, at the apertures *m* and *n*, in Figs. 4 and 5.

Fig. 4. Is a Plan across the aperture where the blast is introduced, in which the Blast-pipes are seen. Although we have not before alluded to two pipes, we now observe, that it is only sometimes resorted to, the single pipe being much more common.

Fig. 5. Is a Plan at the bottom of the recess D, showing the Vent Flues in the Piers, and the Hole *v* for the outlet of the Metal, seen also in the Dam-stone, Figs. 9 and 10.

Figs. 6, 7. Represent the Tymp-plates.

Fig. 8. Represents the Dam-plate.

Figs. 9, 10. Represent the Dam-stone.

Fig. 11. Is a Side View of the large Crow, in which the Blast-pipe is inserted. The end of this iron is defended from the immediate action of the fire, by covering it from time to time with stiff fire clay.

Figs. 12, 13, 14. Are different Nose-pipes to fit the Blast-pipe.

Fig. 15. An End View of the same.

Fig. 16. Is an Elevation and Section of a Refining or Run-out Furnace.

Fig. 17. The Plan of the Refining Furnace.

Fig. 18. Is an Elevation and Section of the Puddling Furnace.

Fig. 19. Is a Plan of the Puddling Furnace.

Fig. 20. Represents the Rollers between which the Flat Bars are formed.

Fig. 21. Is a Section of the Rollers.

Fig. 22. Represents the Rollers for Square Bars.

PLATE CCCXLI.

Figs. 1, 2, 3, 4, 5. Are Diagrams illustrative of the Theory and Construction of the Kaleidoscope.

Fig. 6. Represents the Simple Kaleidoscope.

Fig. 7. Represents the Compound or Telescopic Kaleidoscope.

Fig. 8. Represents the Polyangular Kaleidoscope, as constructed by Mr. R. B. Bate, London.

Fig. 9. Represents the method of projecting the Pictures of the Kaleidoscope upon a Wall.

This Plate contains also a View of the Great Mammoth's Cave in Kentucky.

The following is an explanation of the Letters of Reference :

1. Mouth.
2. Indian mummy.
3. Right hand chamber.
4. Mountain room ; the entrance is from the top of the mountain.
5. Little room, with a spring and two pits.
6. Springs.
7. Sand room.
8. Part of the haunted room.
9. Sick room.
10. Haunted room.
11. Springs.
12. Horn room.
13. Pit 100 feet deep, and water falling several hundred feet.
14. Part of the deserted chamber, which runs under the salt rooms.
15. Deserted chamber.
16. This room runs under the deserted chamber.
17. A large spring falls several hundred feet.
18. Glauber salts (sulphate of Soda) found here.
19. Mockason room.
20. A large room or pit above 50 feet deep.
21. Salts.
22. Ground room.
23. Basket room.
24. Sembin's room.
25. Weeping willow. This room runs about a quarter of a mile, and then returns to the same place.
26. Two springs in two large sink holes.
27. Beekman's room.
28. Miller's room.
29. Hell's gate.
30. Devil's chamber, supposed to be ten miles from the mouth.

PLATE CCCXLII.

Fig. 1. Represents the external form of an Argand's Lamp.

Fig. 2. Shews a Section of the part called the Burner, which contains the Wick.

Fig. 3. Represents Dr. St. Claire's Hydrostatic Lamp as improved by Mr. Keir of Birmingham, for the purpose of keeping the oil always at the same height.

Fig. 4. Exhibits the Statical Lamp of M. Edelcrantz for the same purpose.

Fig. 5. Shows the Mechanical Lamp of Carcel.

Fig. 6. Is a Plan of the Double Pump in Fig. 5.

Fig. 7. Is an Elevation of the Double Pump.

Fig. 8 and 9. Represent the Patent Street Lamp of Lord Cochrane.

Fig. 9. Shows it in the act of being cleaned and trimmed.

Fig. 10. Shows the Automaton Lamp invented by Mr. Porter, who took a patent for it in 1804.

Fig. 11. Represents Cardan's Lamp or Fountain Reservoir.

PLATE CCCXLIII.

Represents a Plan of a Residence in the ancient or geometric style of Gardening.

PLATE CCCXLIV.

Represents a Plan of a Residence in the modern style of Landscape Gardening.

PLATE CCCXLV.

Fig. 1. Is a Profile of a complete Residence in the Geometric Style, the Trees supposed to be of 15 years growth.

Fig. 2. Is a Profile of a complete Residence in the modern style of laying out Grounds.

PLATE CCCXLVI.

Is the Working Plan to Plate CCCXLIV

END OF VOLUME ELEVEN.

William Brown, Printer, Philadelphia.

HYGROMETRY.

PLATE CCCXXV.

Fig. 1.

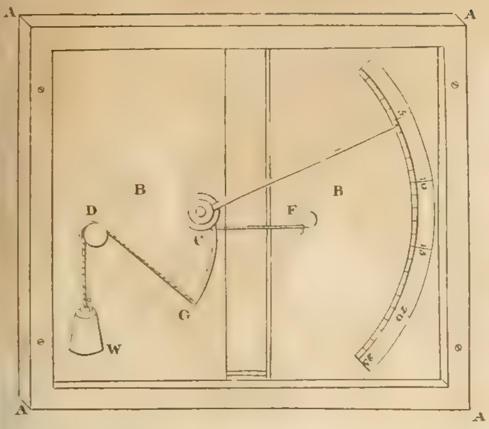


Fig. 2.

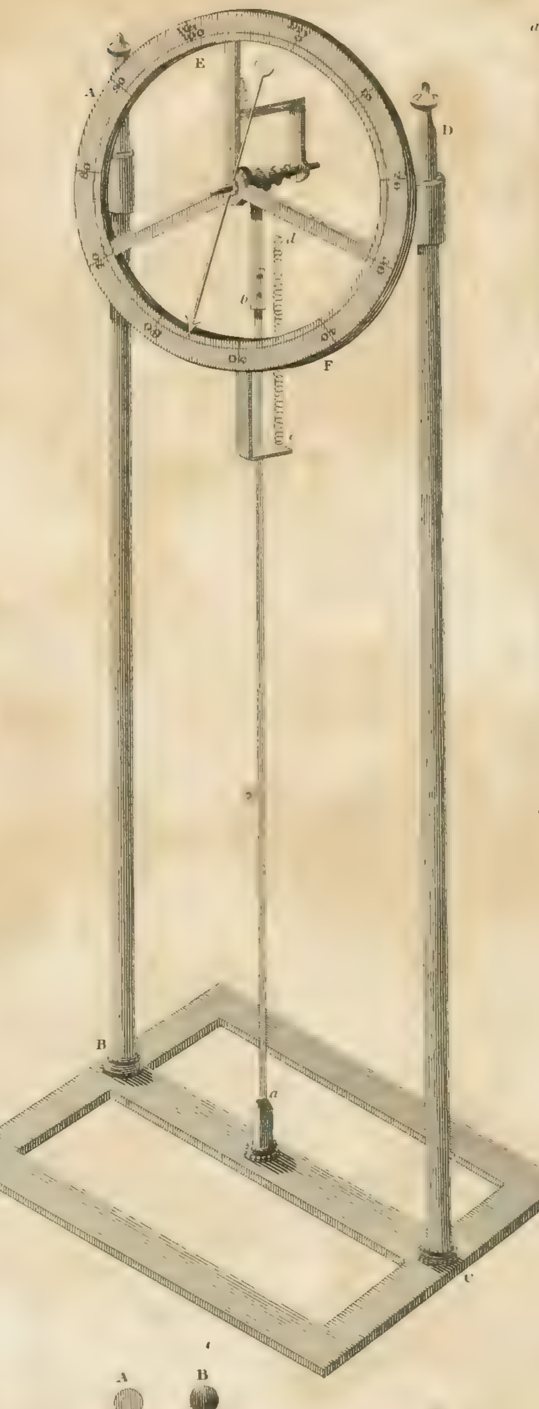


Fig. 3.

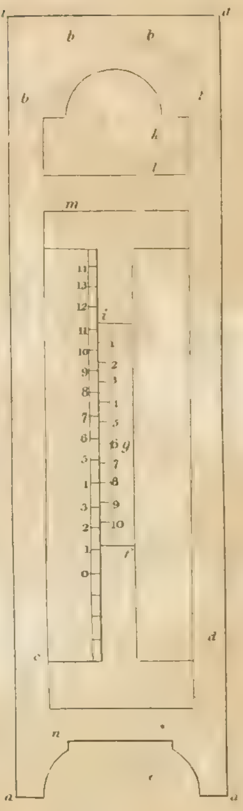


Fig. 4.

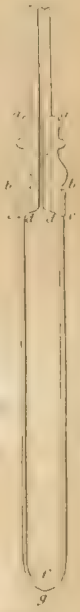


Fig. 5

Fig. 6.

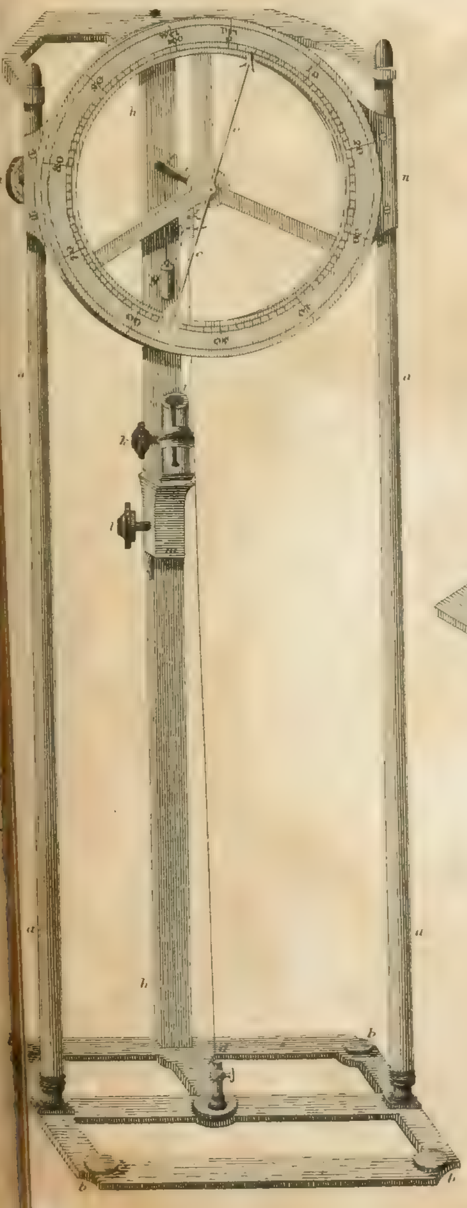


Fig. 7.

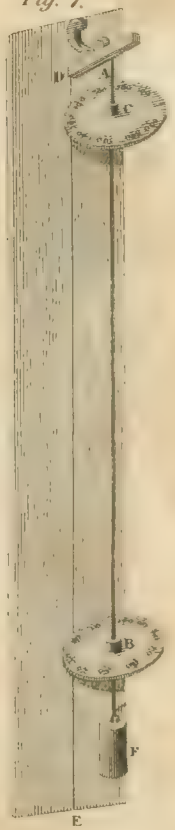


Fig. 8.

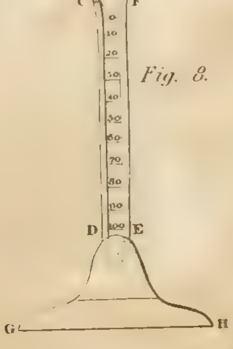
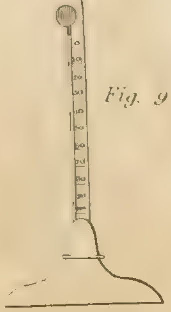


Fig. 9



HYGROMETRY. *PLATE CCCXVII.*

Fig. 1.

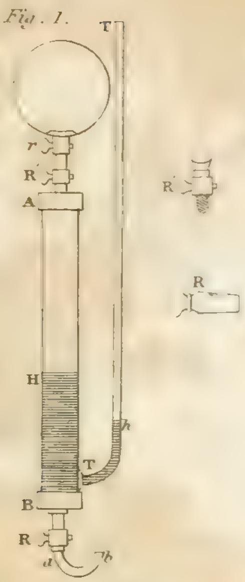


Fig. 2.

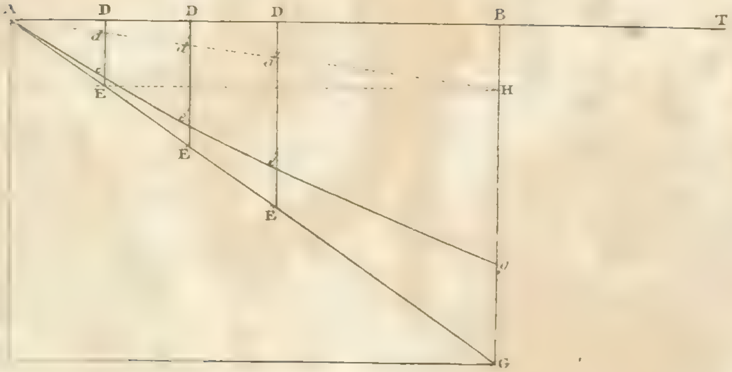
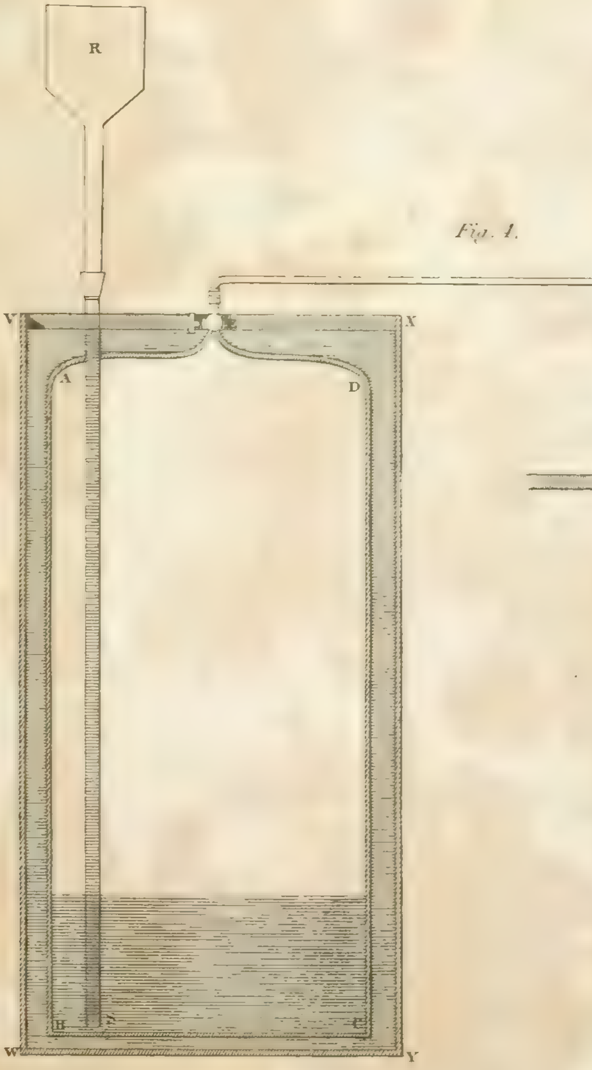


Fig. 4.



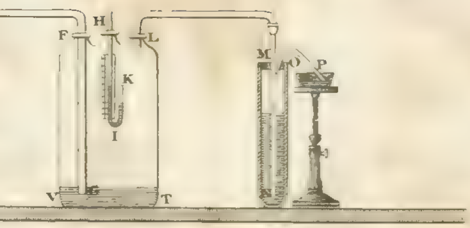
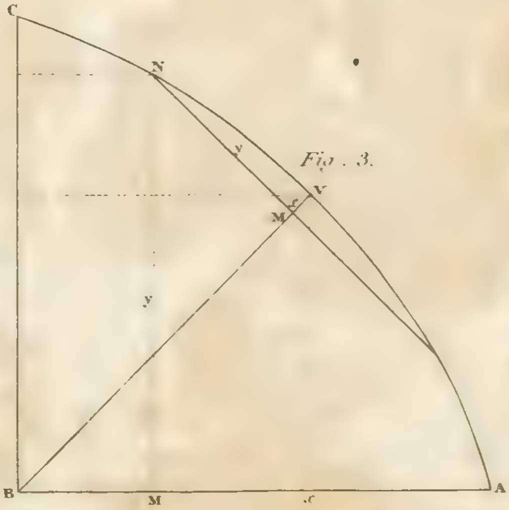


Fig. 3.



Engd by D. Haines

Fig 1

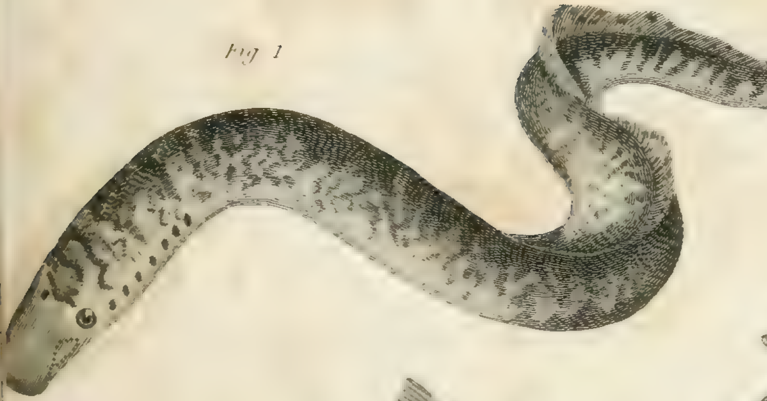
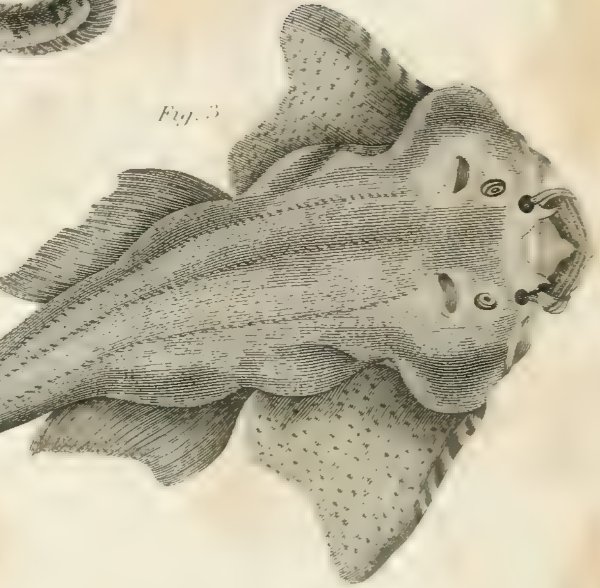


Fig. 3



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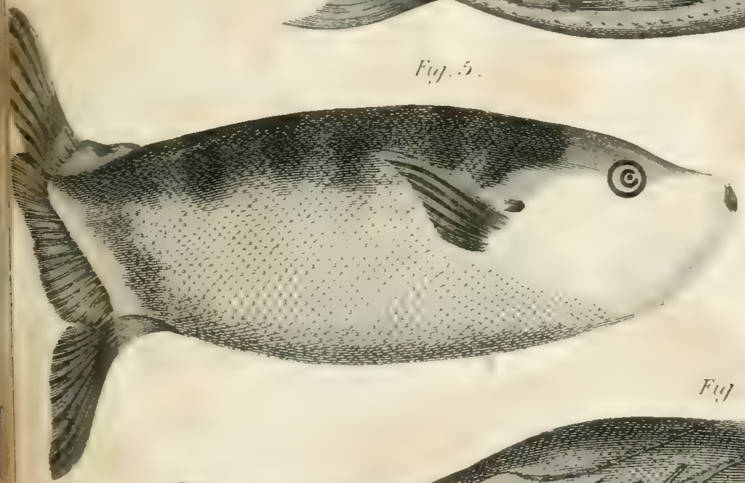


Fig 2

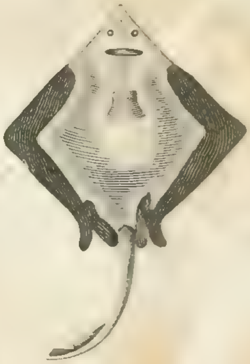


Fig 6

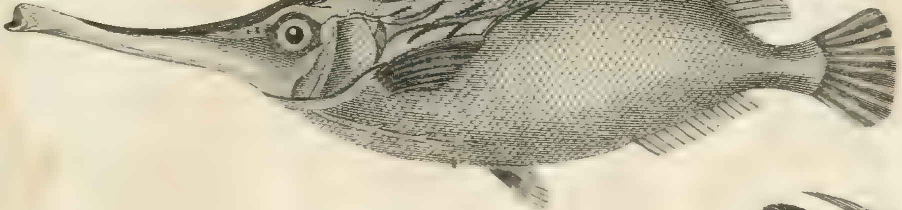
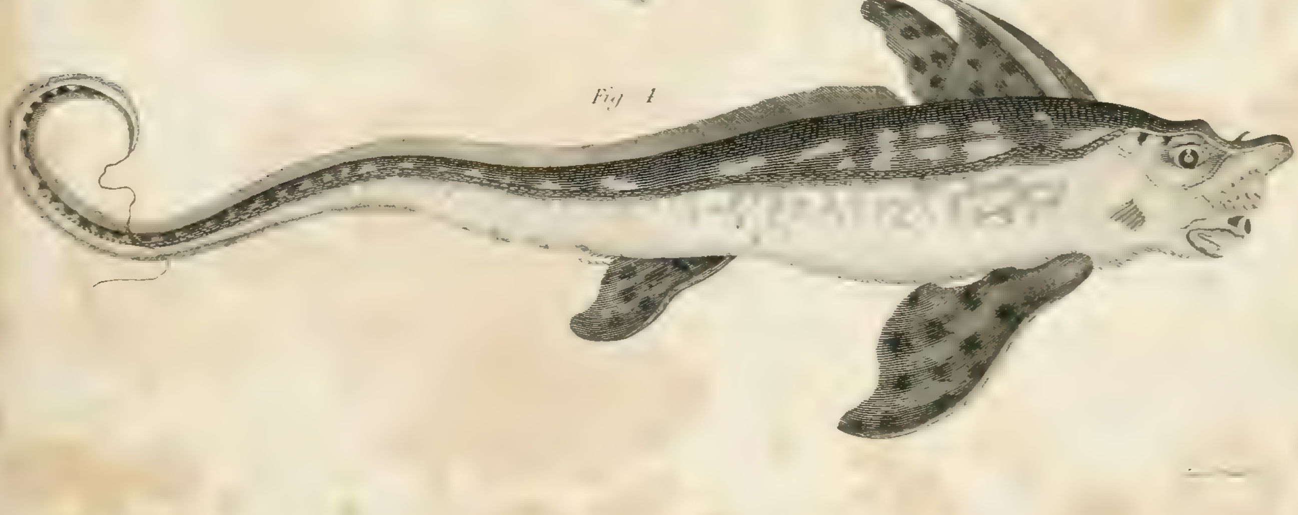


Fig 4



ICHTHYOLOGY.

PLATE CCCXXVIII.

Fig. 1

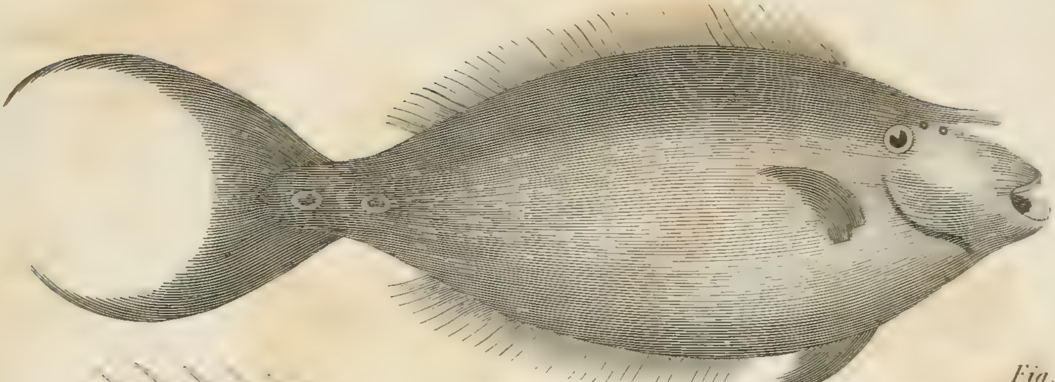


Fig. 2.

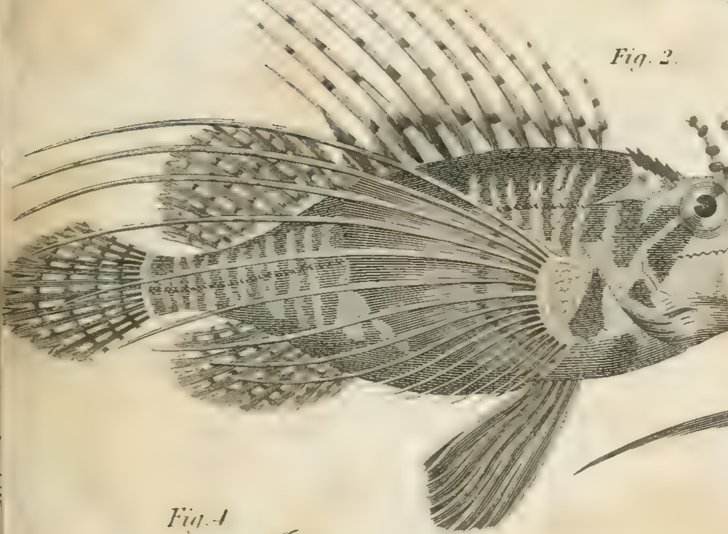


Fig. 6.

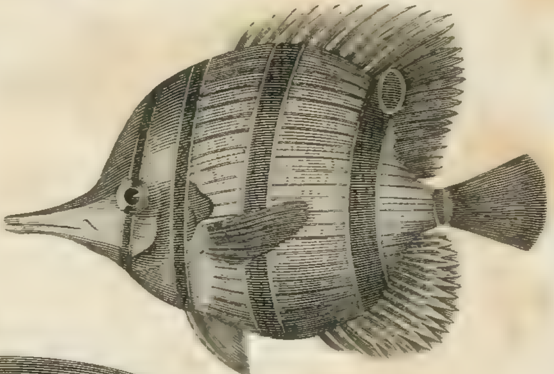


Fig. 4

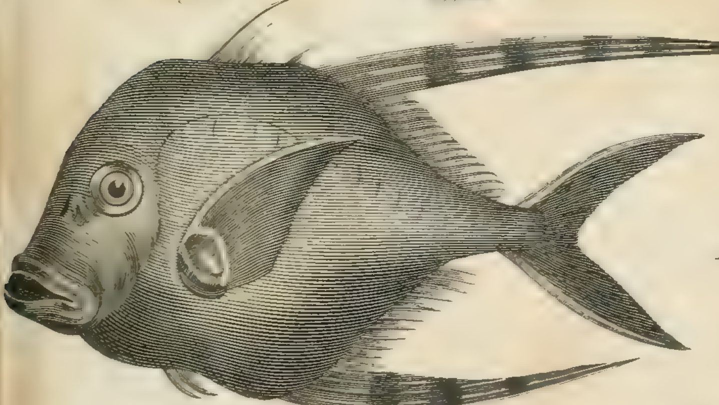


Fig. 5.

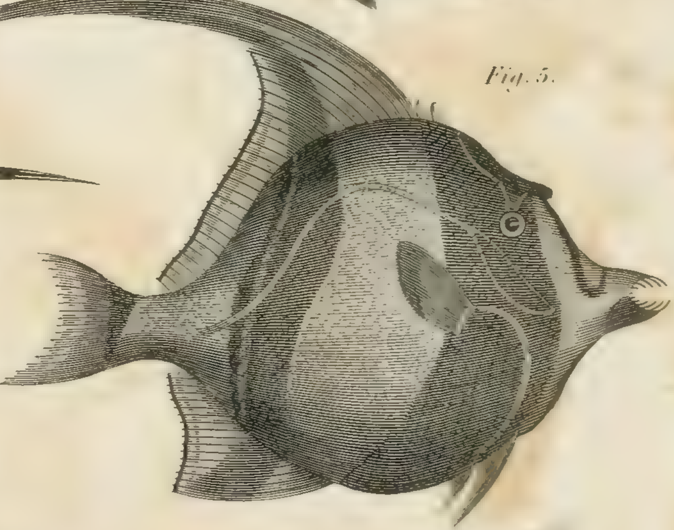
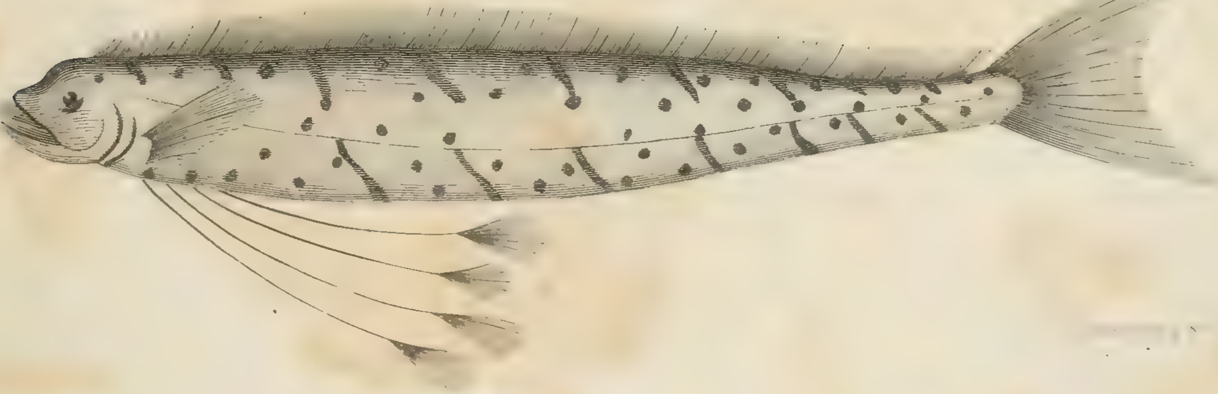


Fig. 3.



ICHTHYOLOGY. *PLATE CCCXXIX.*

Fig. 4.

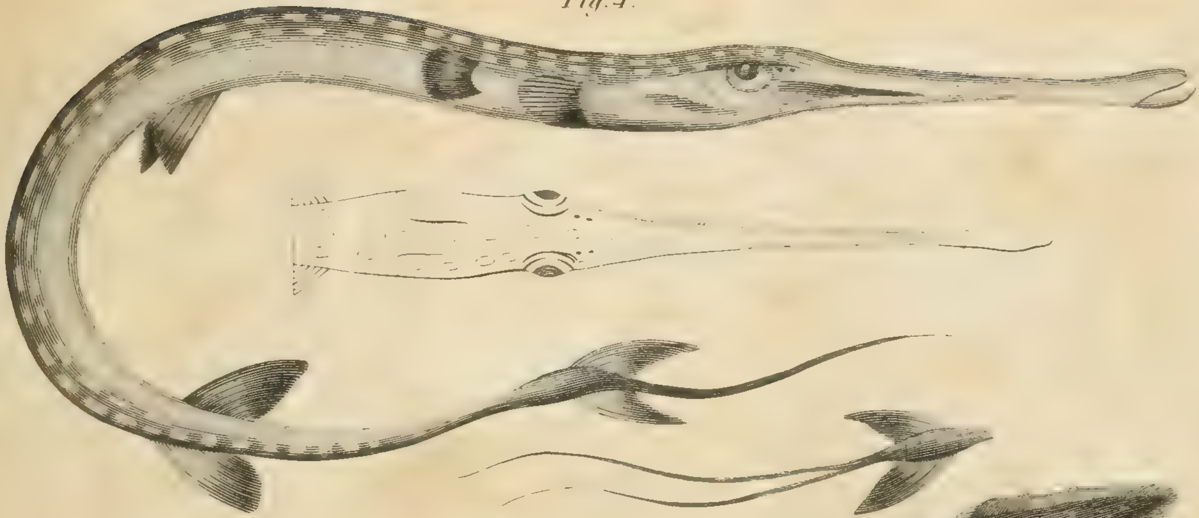


Fig. 5.

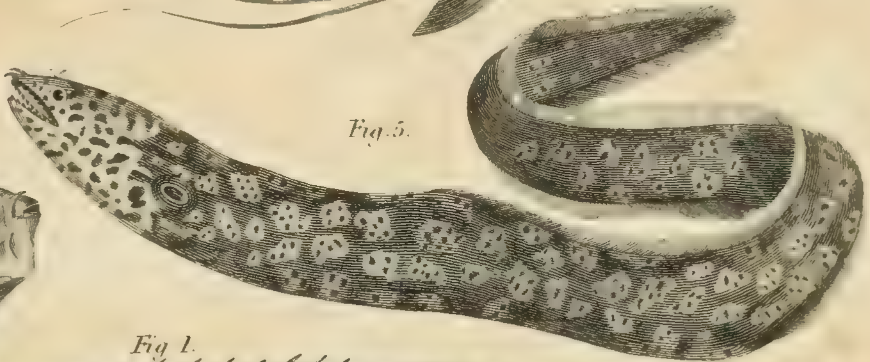


Fig. 2.

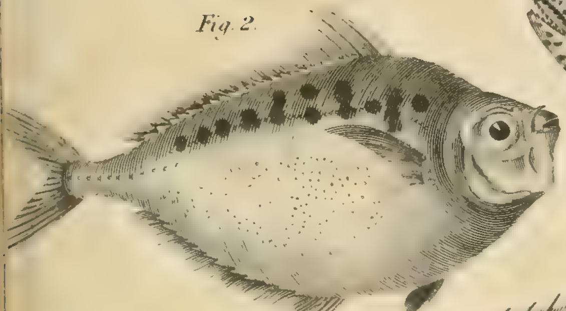


Fig. 1.

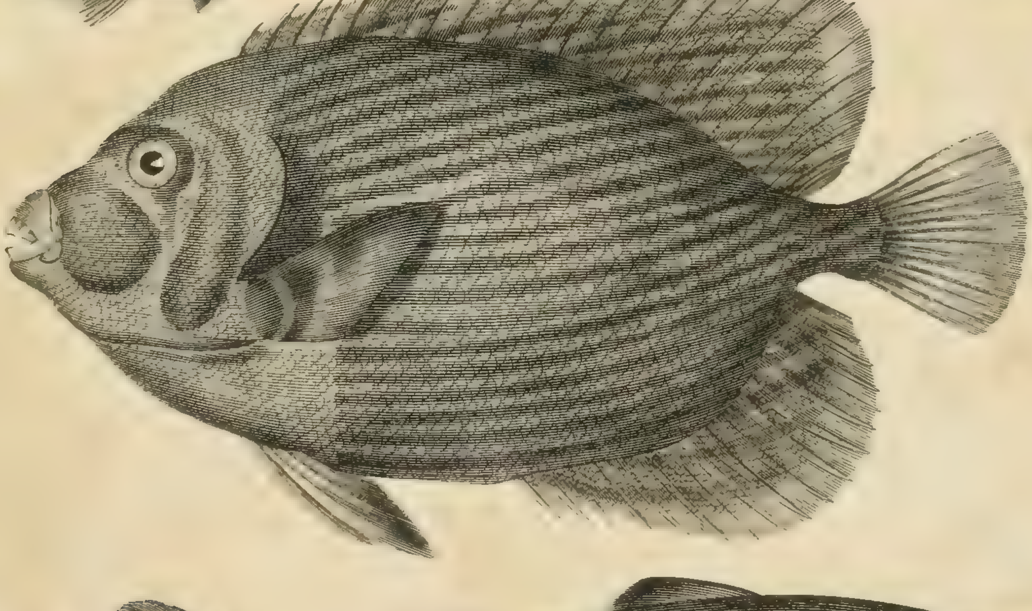
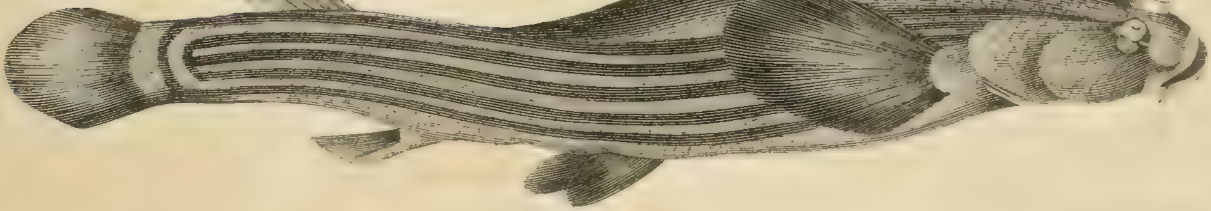


Fig. 3.

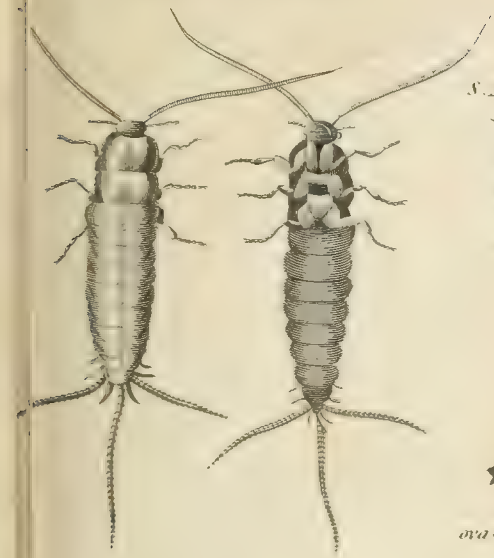


INSECTS.

PLATE CCCXX.

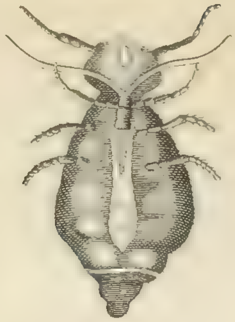
O. THYSANOURA.

Lepisma Saccharina Mag.d



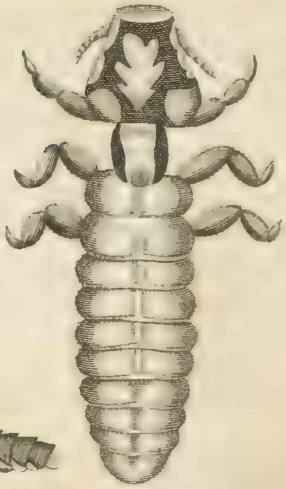
S. Nat. Size

Podura



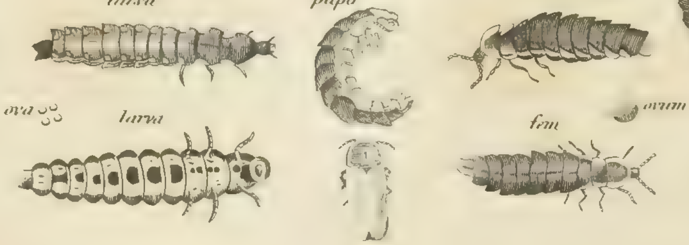
O. ANOPLURA.

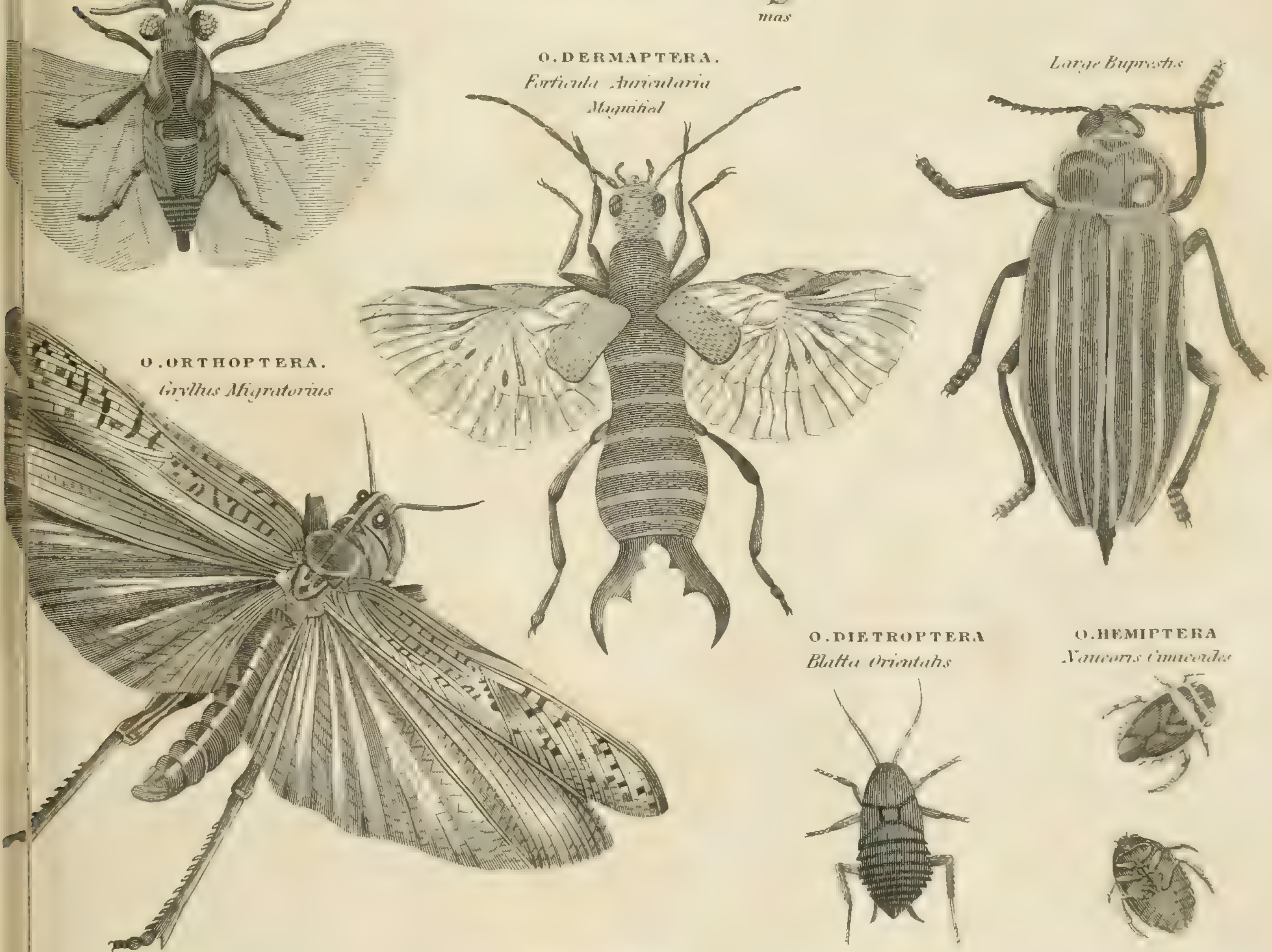
Pediculus of the Goose Mag.d



O. COLEOPTERA.

Common Glow Worm





O. STREPSIPTERA.

Stylops Kirbii

O. DERMAPTERA.

Forficula Auricularia

Magnified

O. ORTHOPTERA.

Gryllus Migratorius

Large Buprestis

O. DIETROPTERA

Blatta Orientalis

O. HEMIPTERA

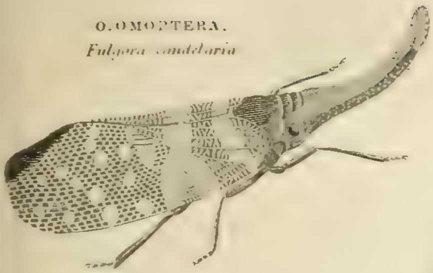
Naucoris Cimicoides

Engraved by R. Campbell

INSECTS. *PLATE CCCXXXI & CCCXXXII.*

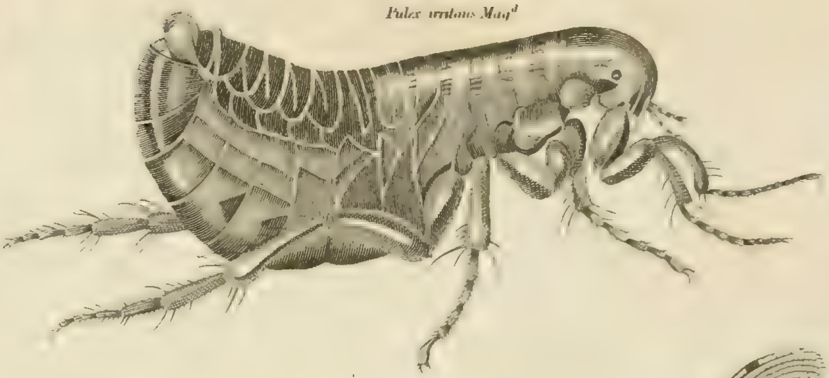
O. OMOPTERA.

Fulgora candelaria



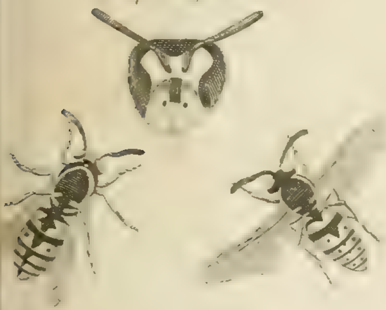
O. APTERA

Pulex irritans Mag^{d}

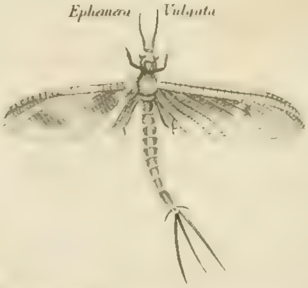


O. HYMENOPTERA.

Vespa Vulgaris

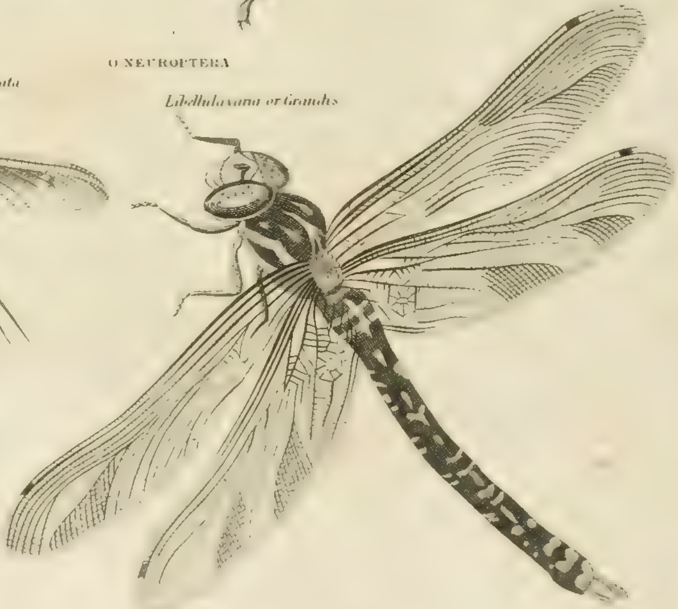


Ephemera Vulgata

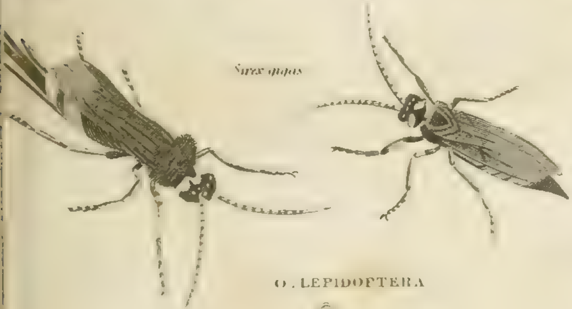


O. NEUROPTERA

Libellula varia or Grandis

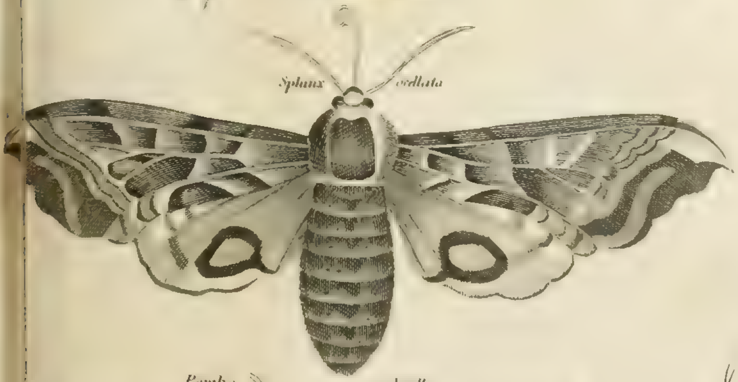


Sirex gigas

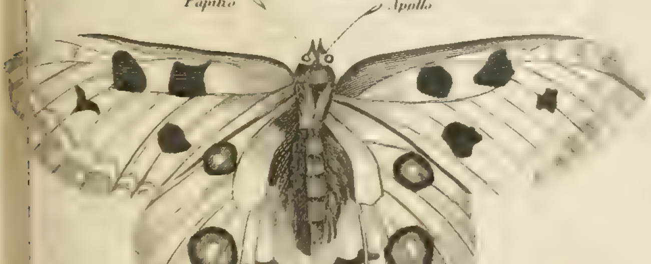


O. LEPIDOPTERA

Sphinx ocellata



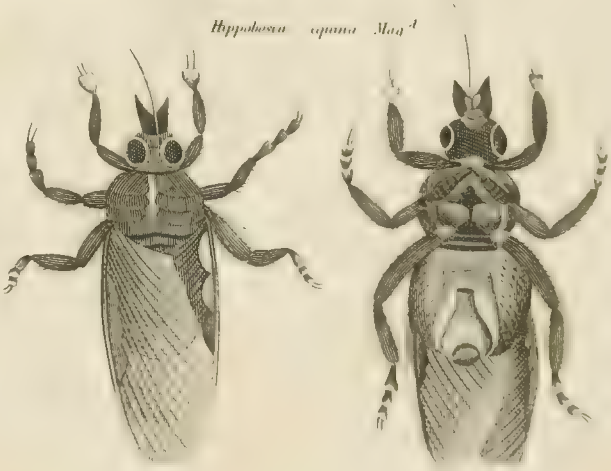
Papilio Apollo



O. DIPTERA

Hippobosca equina Nat^{l} size

Hippobosca equina Mag^{d}



Engraved by E. Compton

JOINERY.

PLATE CCCXXXIII.

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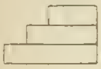

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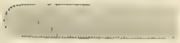
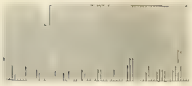


Fig.3.



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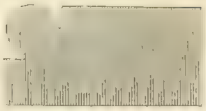
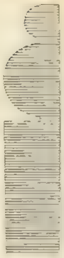


Fig.5.



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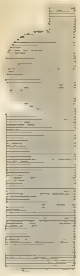

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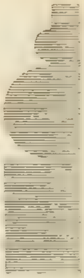

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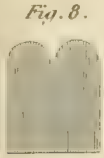
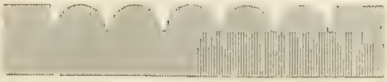


Fig.9.



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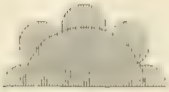

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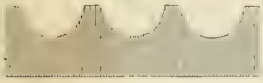

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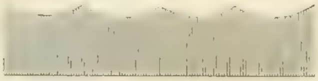

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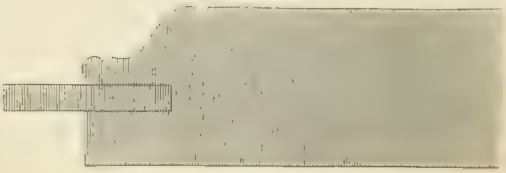

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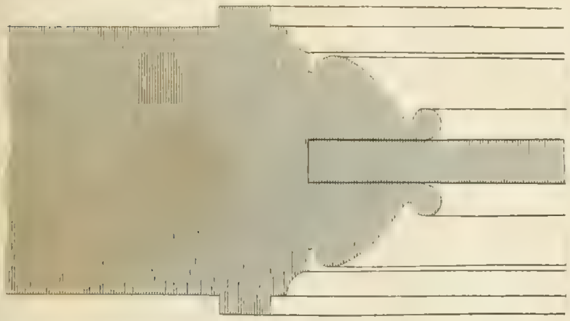

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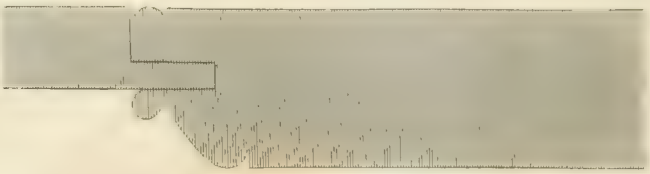

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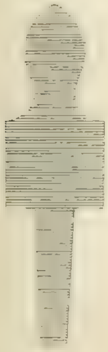

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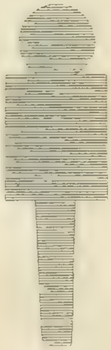

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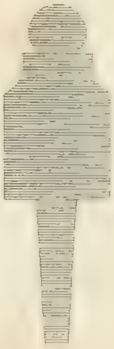

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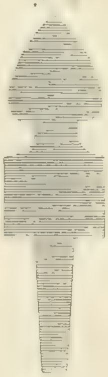

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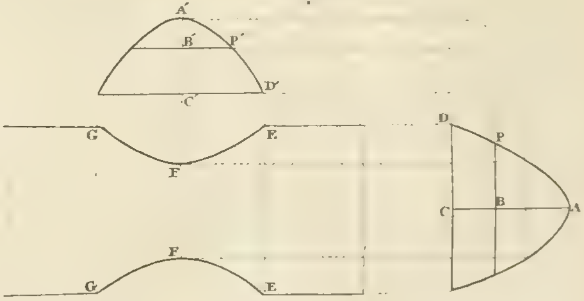

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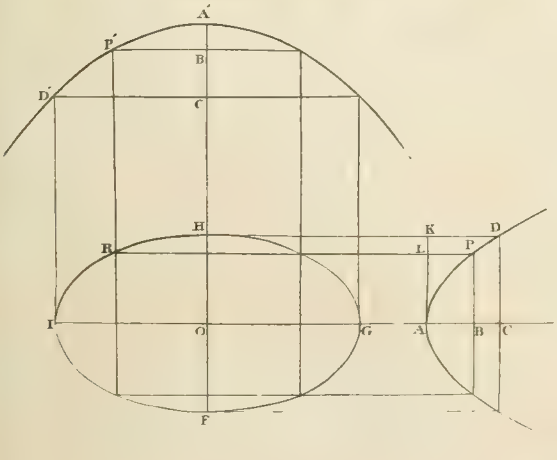

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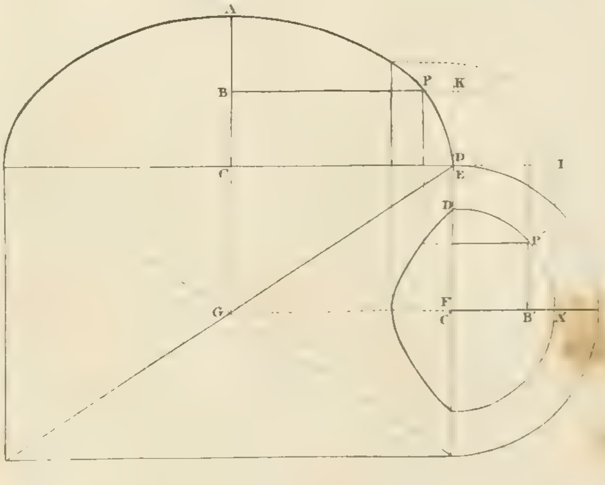


H.A. [illegible] sc.

JOINERY.

PLATE CCCXXXIV

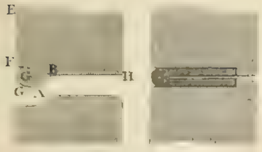


Fig.1.Nº I. Fig.1.Nº III.

Fig.1 Nº II.

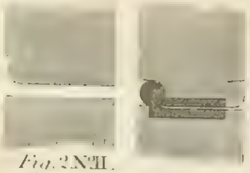


Fig.2.Nº I. Fig.2.Nº III.

Fig.2.Nº II.

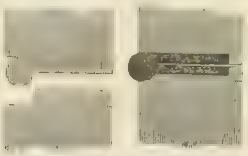


Fig.3.Nº I. Fig.3.Nº III.

Fig.3.Nº II.

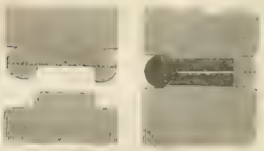


Fig.4.Nº I. Fig.4.Nº III.

Fig.4.Nº II.

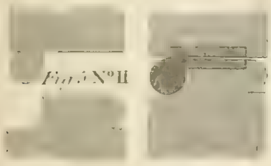
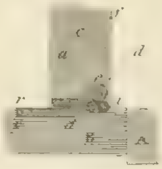


Fig.5.Nº I. Fig.5.Nº III.

Fig.5 Nº II



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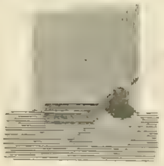

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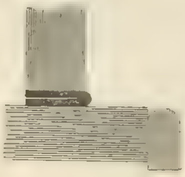
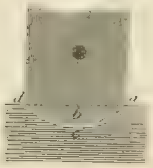


Fig 8



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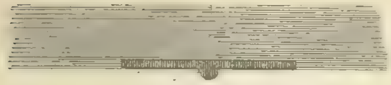

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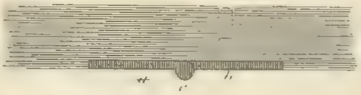

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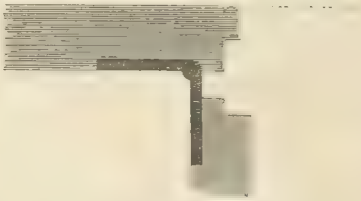

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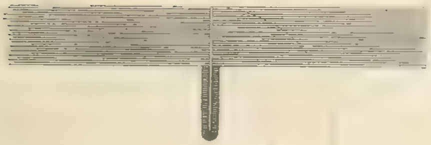

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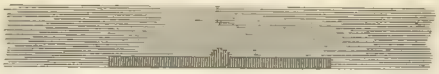

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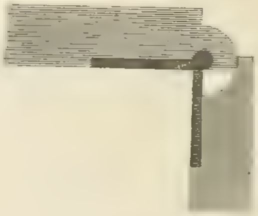

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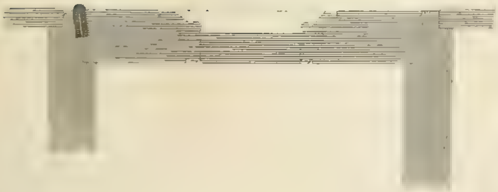

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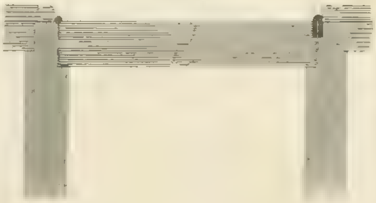

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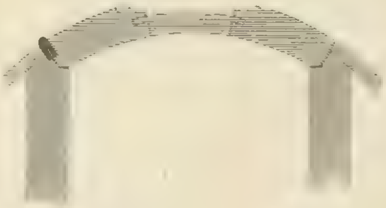

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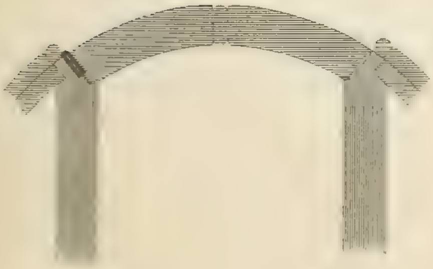

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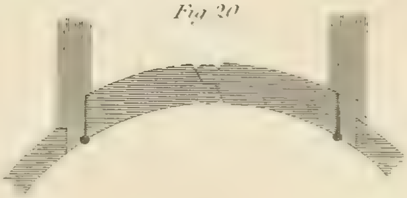

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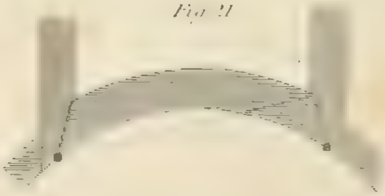

Fig.21.

H. Anderson sc.

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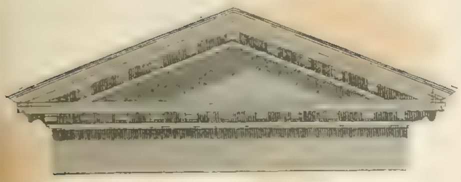

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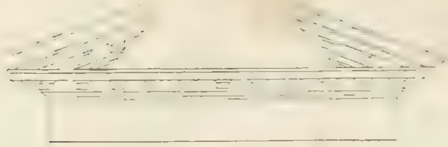

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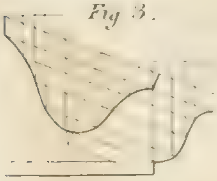

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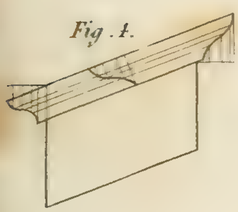

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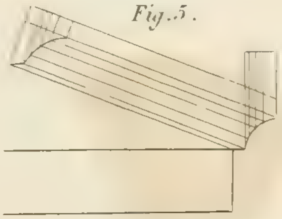

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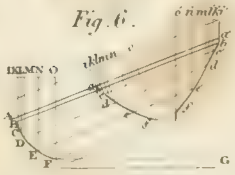

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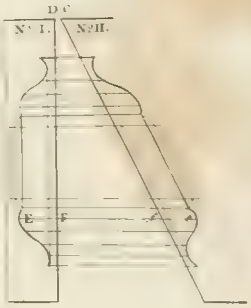

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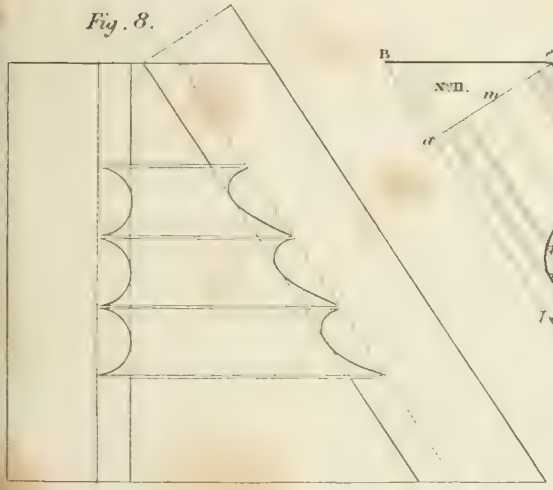

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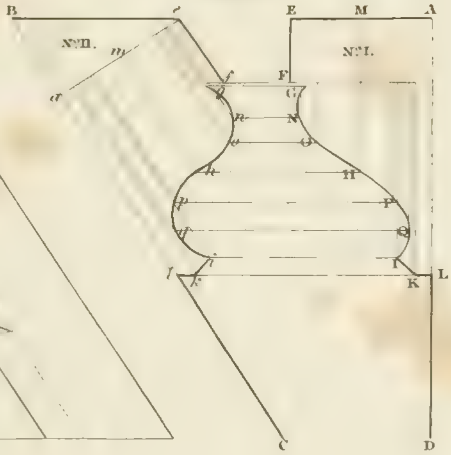

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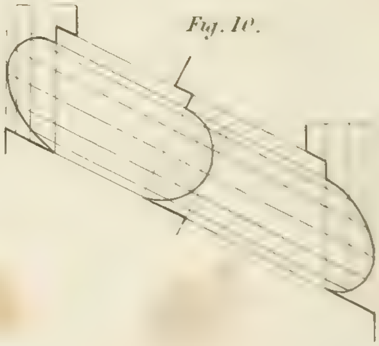

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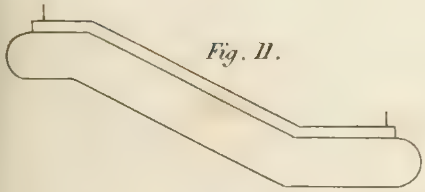

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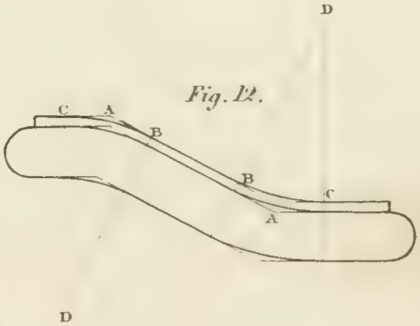
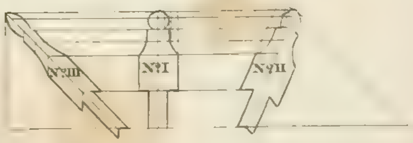


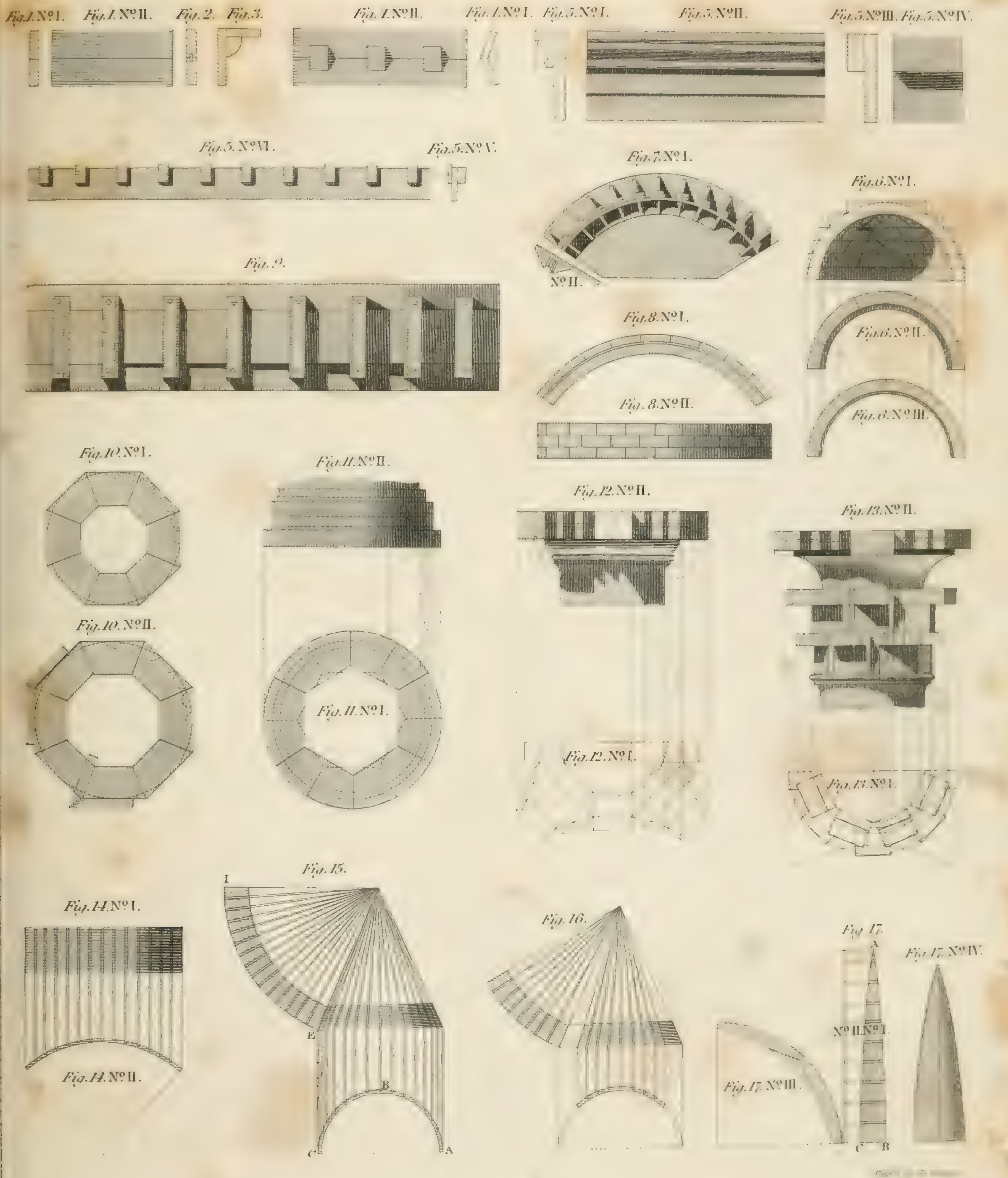
Fig. 13.



Engd by R. Carswell

JOINERY.

PLATE CCCXXVI.



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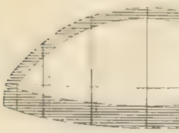
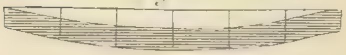


Fig. 8.



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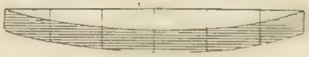
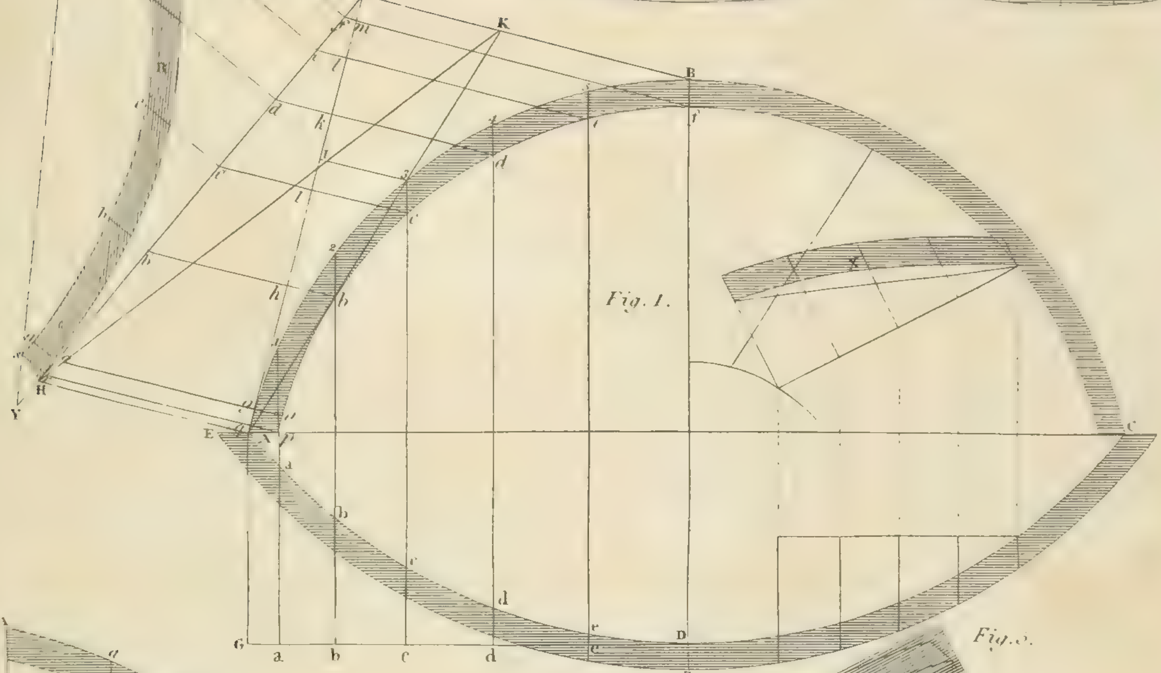


Fig. 1.



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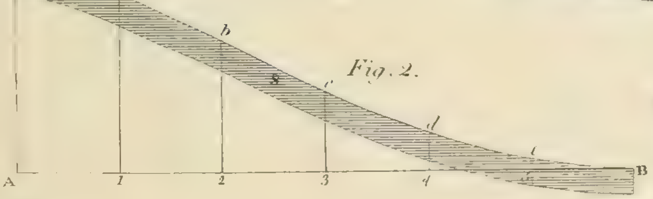

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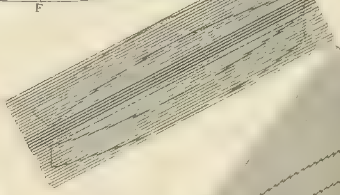

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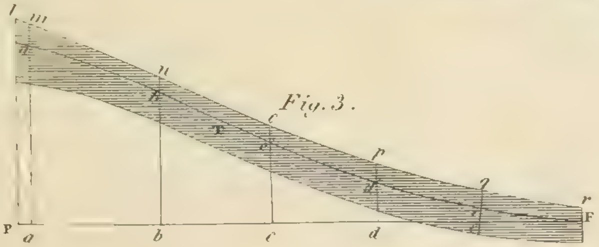

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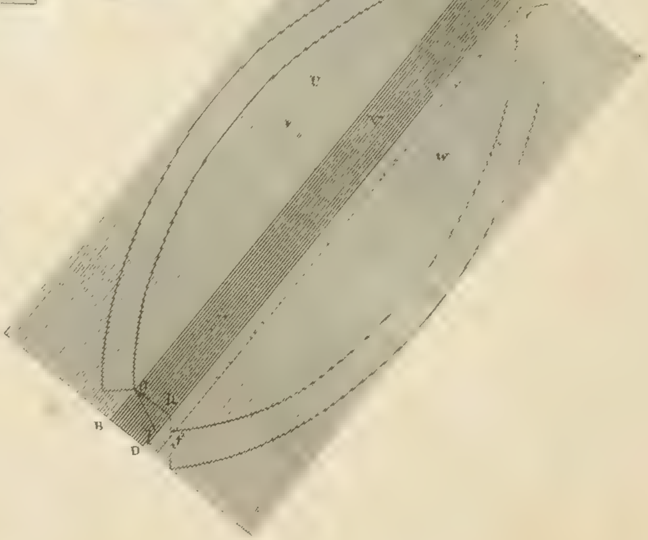

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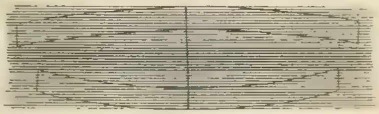


H. Anderson sc.

Fig 1

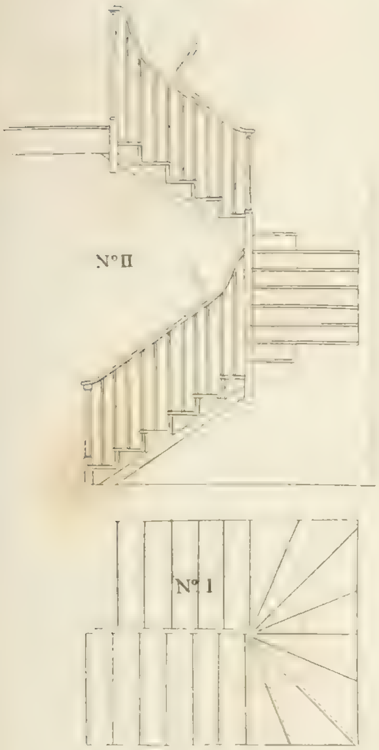


Fig 2.

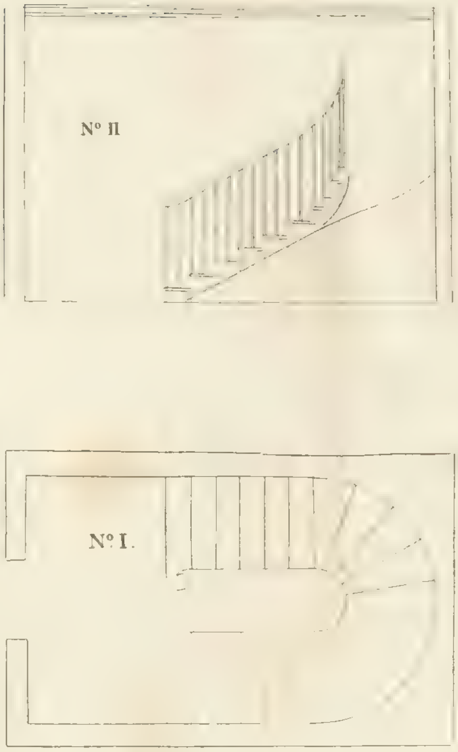


Fig 3

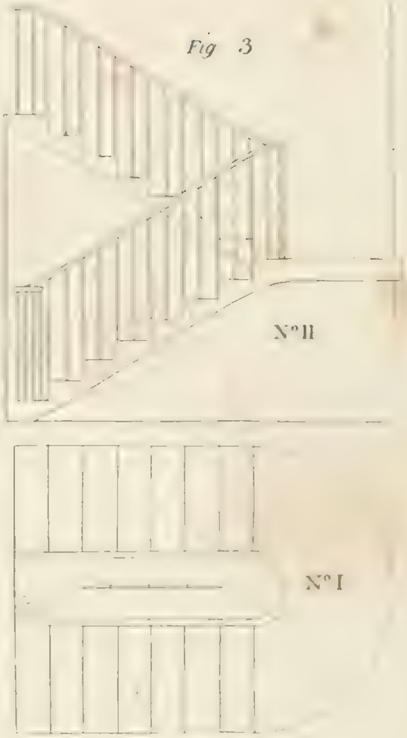


Fig 8

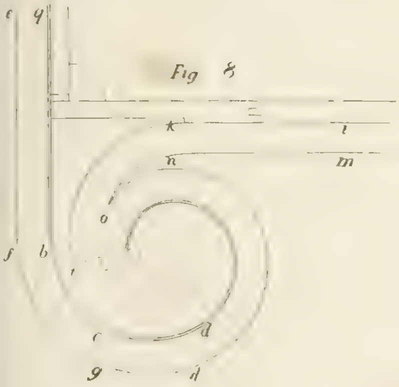


Fig 5

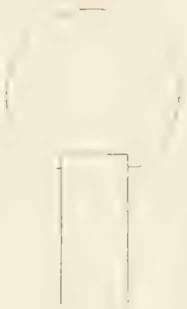


Fig 4

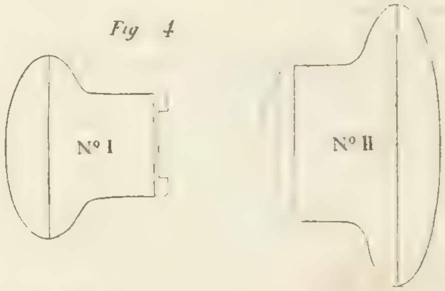


Fig 7

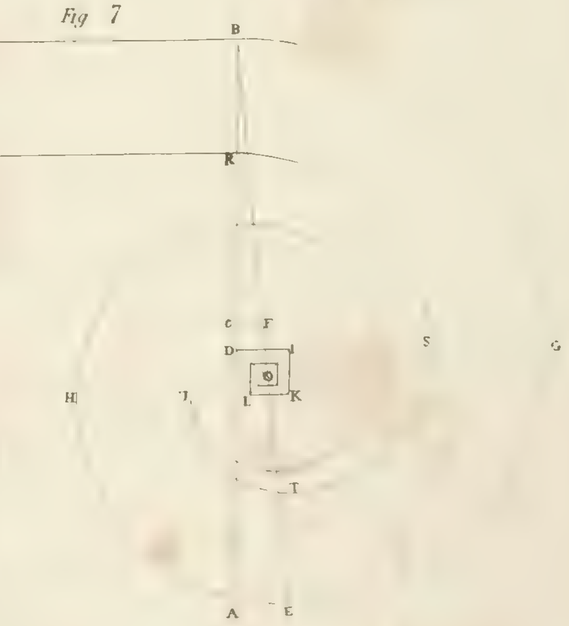


Fig 9

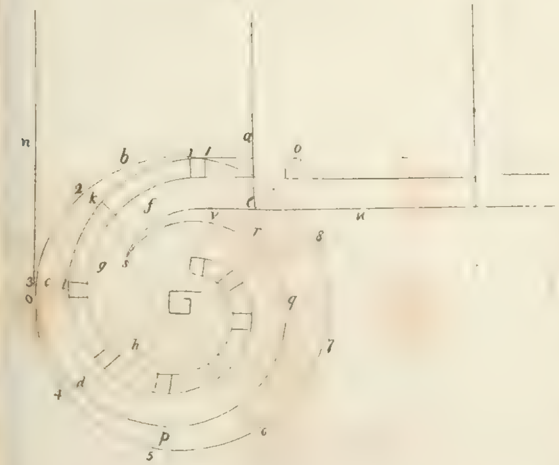
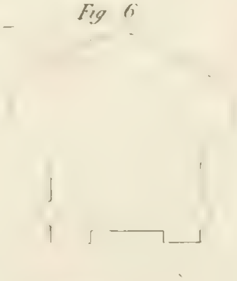


Fig 6



H Plecher .

JOINERY.

PLATE CCCXXXV.

Fig 1

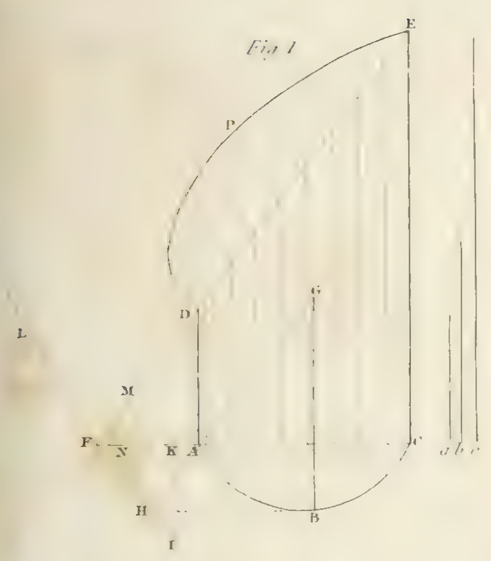


Fig 2

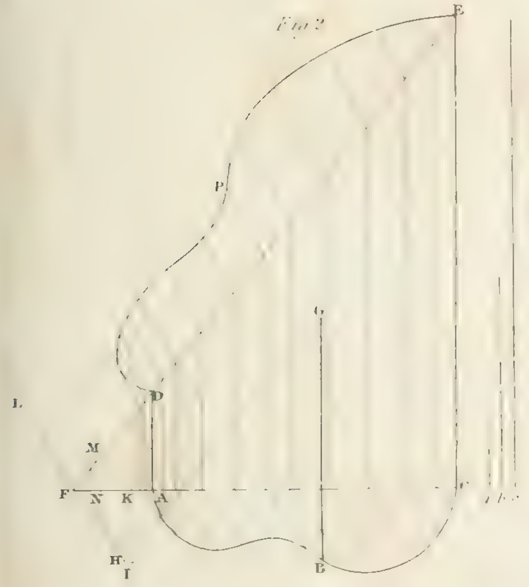


Fig 1 Nº IV.

Fig 1 Nº III.

Fig 1 Nº II

Fig 1 Nº I

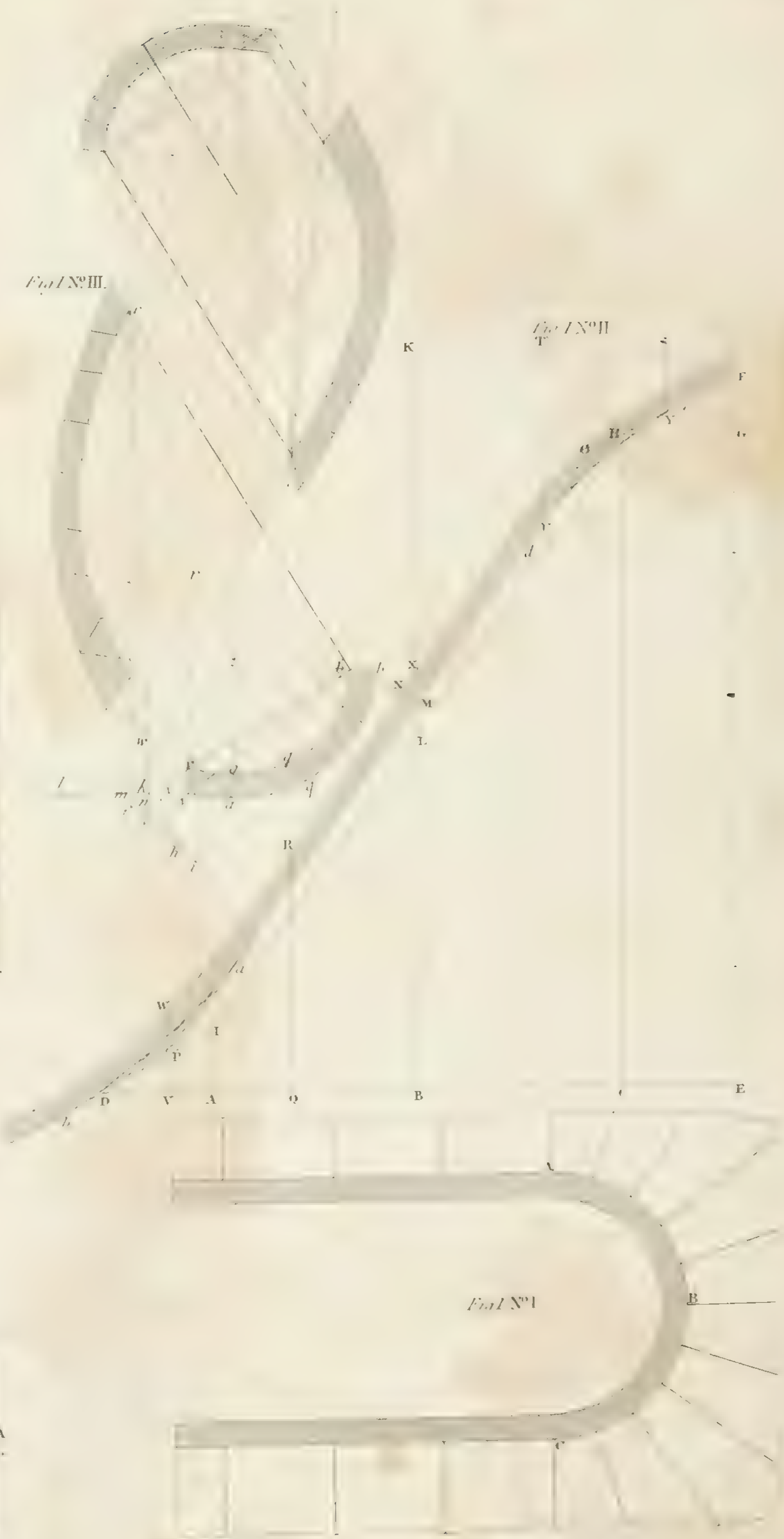
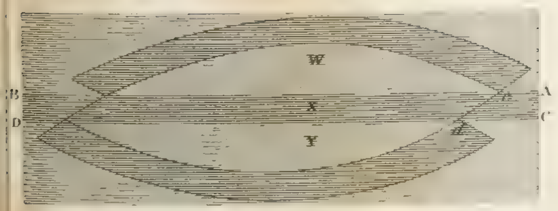


Fig 1 Nº V.



[illegible]

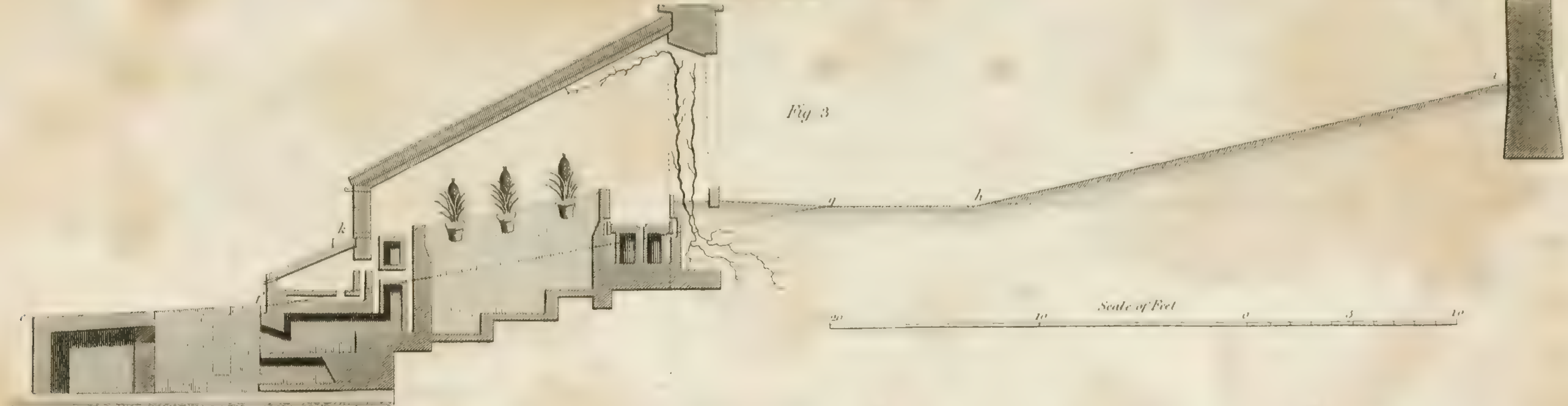


Fig 3

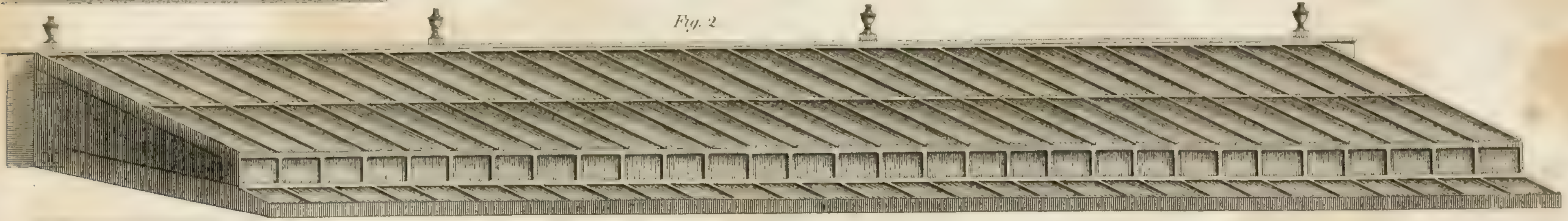


Fig. 2

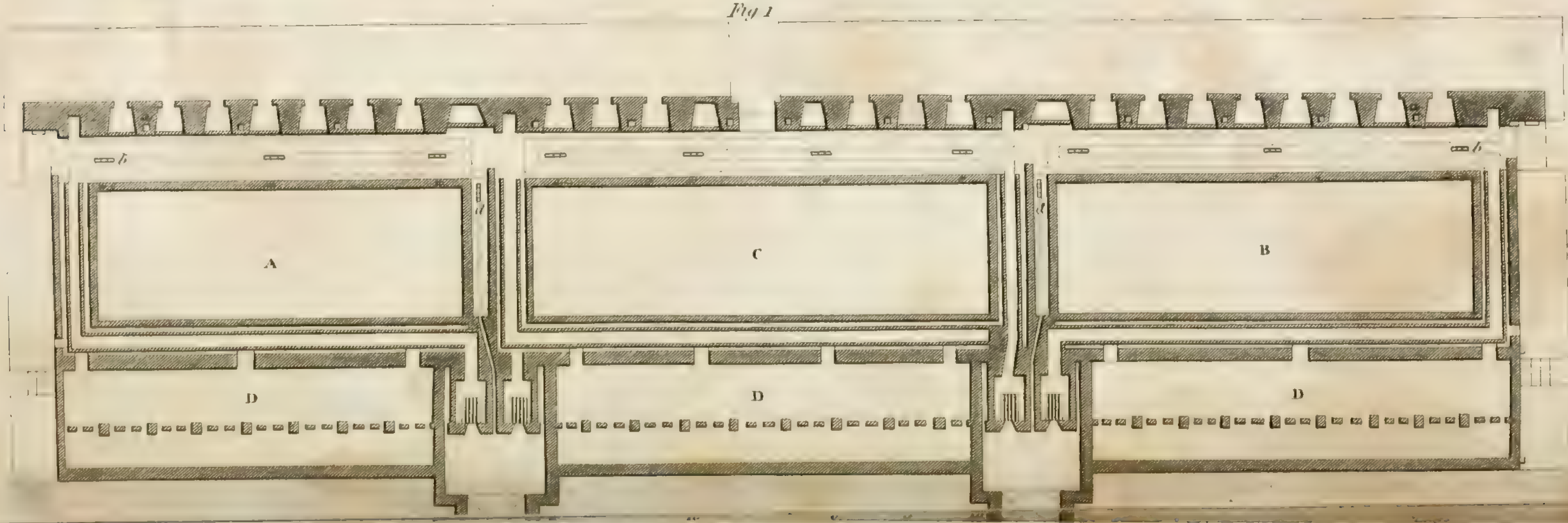
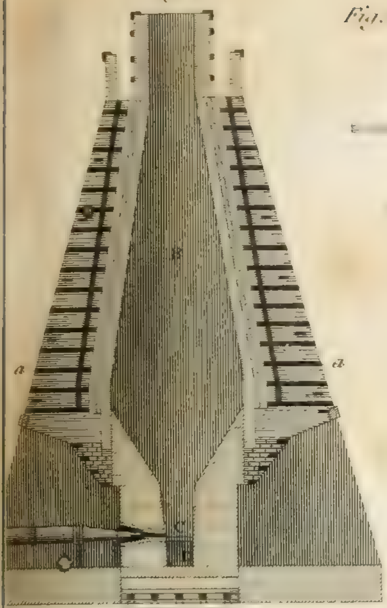


Fig 1

IRON.

PLATE CCCXL.

Fig. 1.



Tymp Plates

Fig. 6.

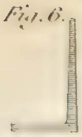
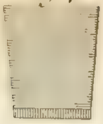


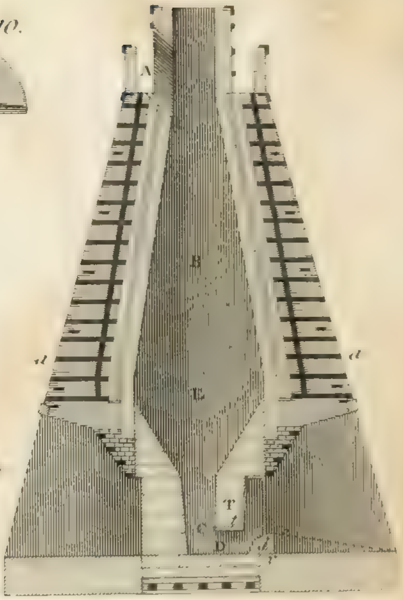
Fig. 7.



Dam Stone

Fig. 10.

Fig. 2.



Dam Plate

Fig. 8.

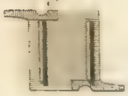


Fig. 11.

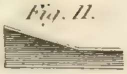
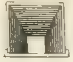
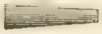


Fig. 15.



Nose Pipes

Fig. 12.



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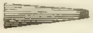

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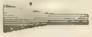

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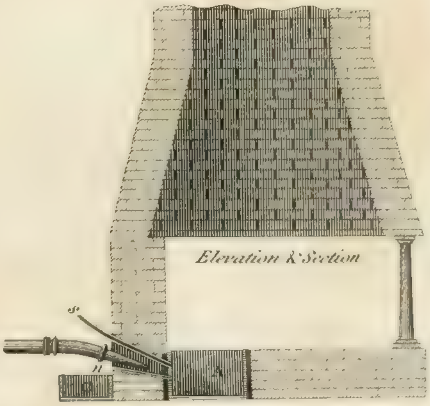
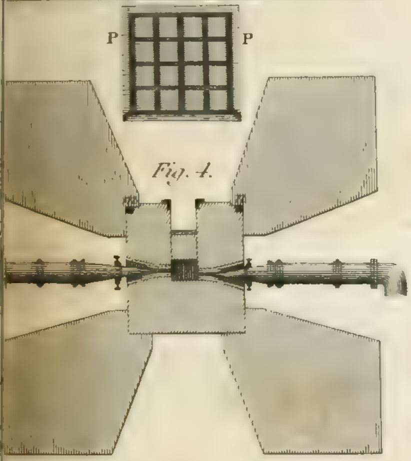

Elevation & Section

Fig. 4.



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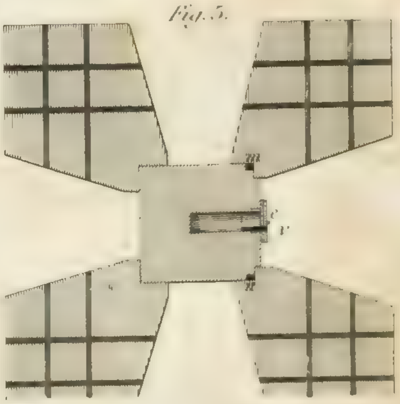


Fig. 17.

Refinery

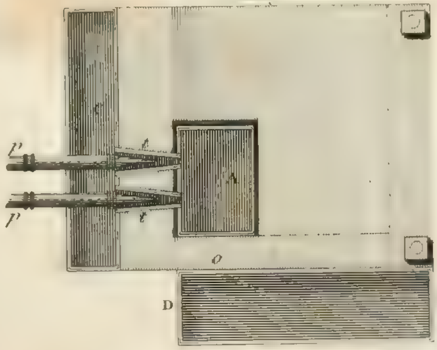


Fig. 3.

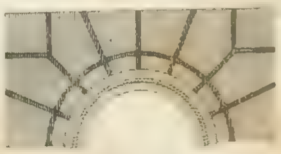
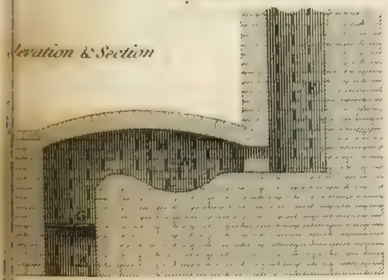


Fig. 18.

levation & Section



Puddling Furnace

Fig. 19.

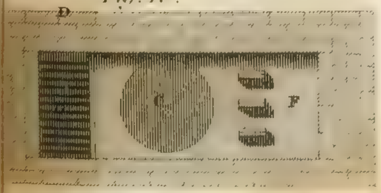


Fig. 20.

Rollers for Flat Bars

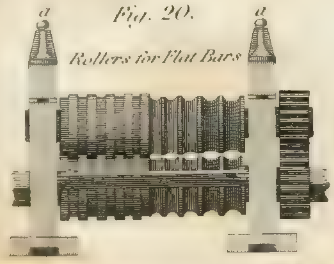


Fig. 21.

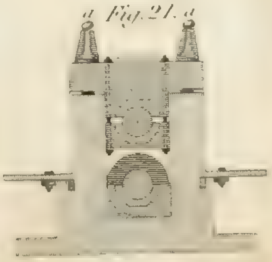
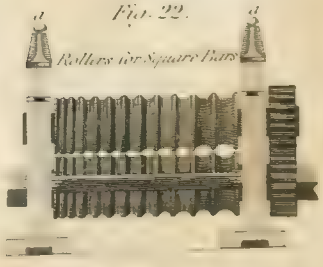


Fig. 22.

Rollers for Square Bars



Scale of feet for Figs 1,2,3,4,5,6,7,8,9,10,11,12,13,14 & 15

0 15 30 45

Scale of feet for Figs 16,17,18 & 19

0 1 3 5 7 9 11

Scale of feet for Figs 20,21 & 22

0 1 3 5 6

Engd. by D. Haynes

KALEIDOSCOPE.

PLATE CCCXLI.

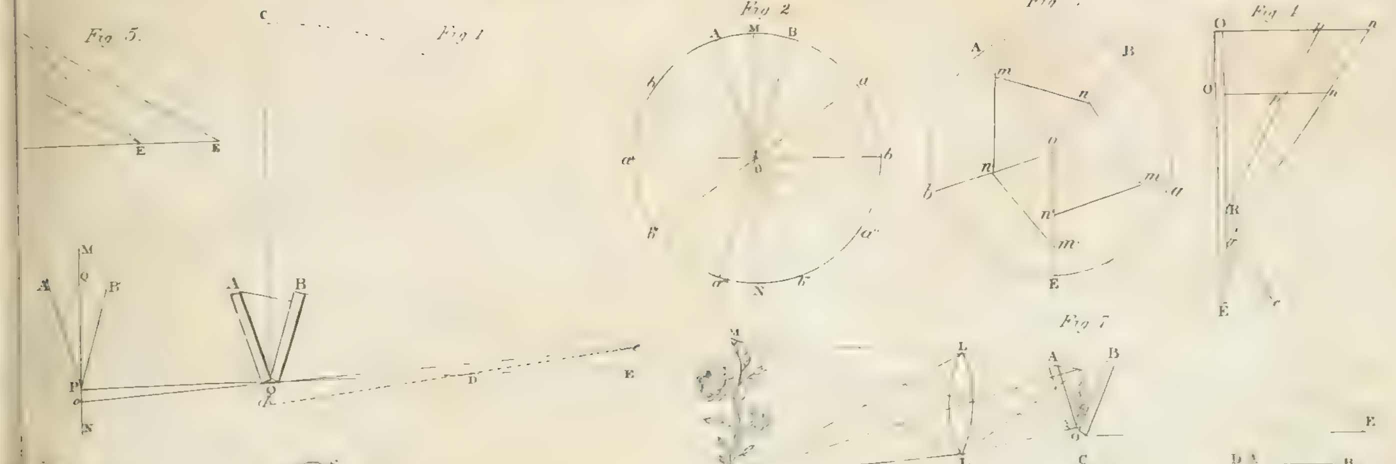
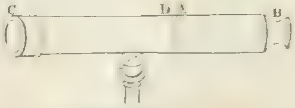
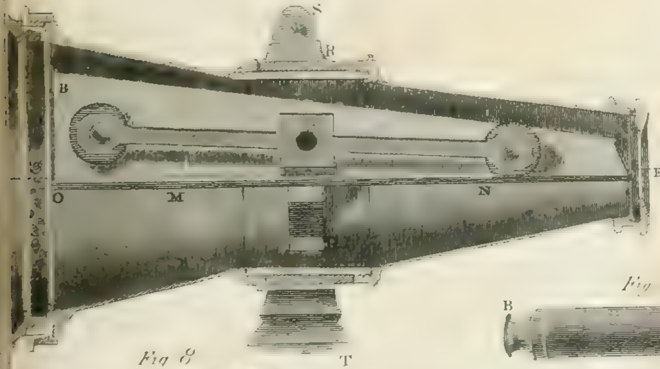


Fig 5. Fig 1 Fig 2 Fig 3 Fig 4 Fig 7





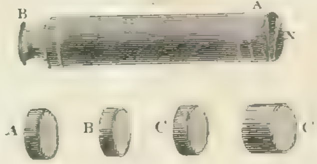


Fig 6

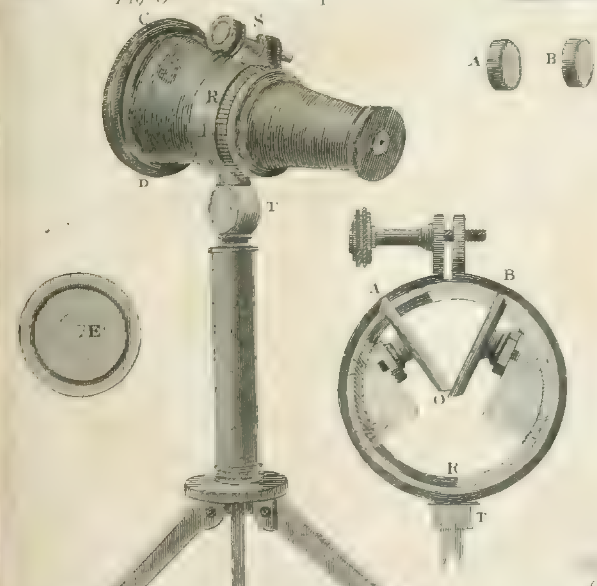


Fig 8

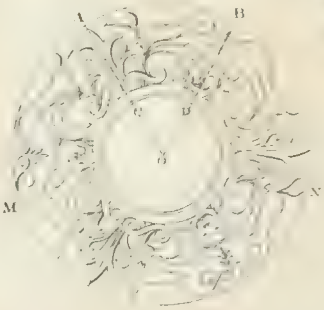


Fig 10

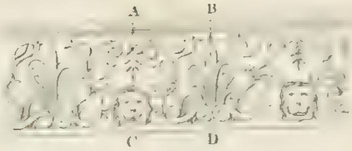


Fig 11

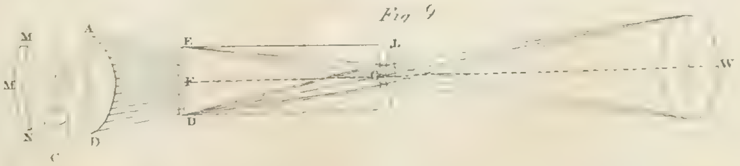
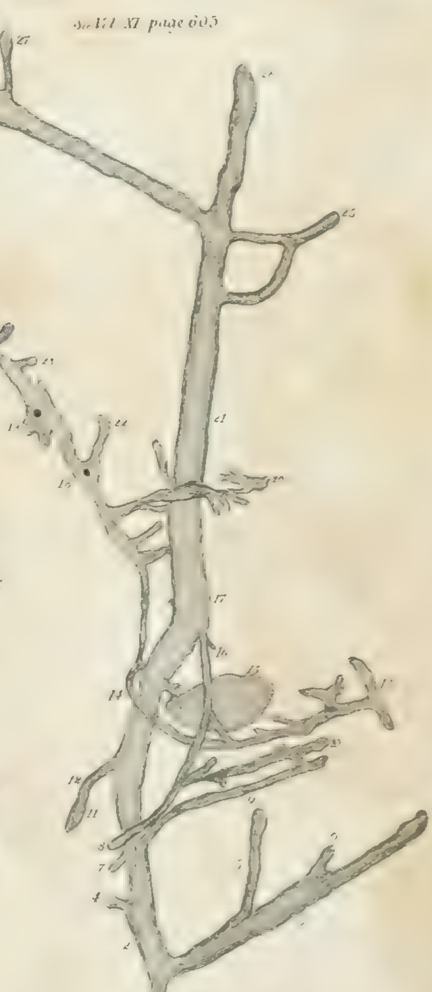


Fig 9

GREEN RIVER OR MAMMOTH CAVE IN KENTUCKY

See Vol. XI page 605



LAMPS.

PLATE CCCXLII.

Fig. 1.

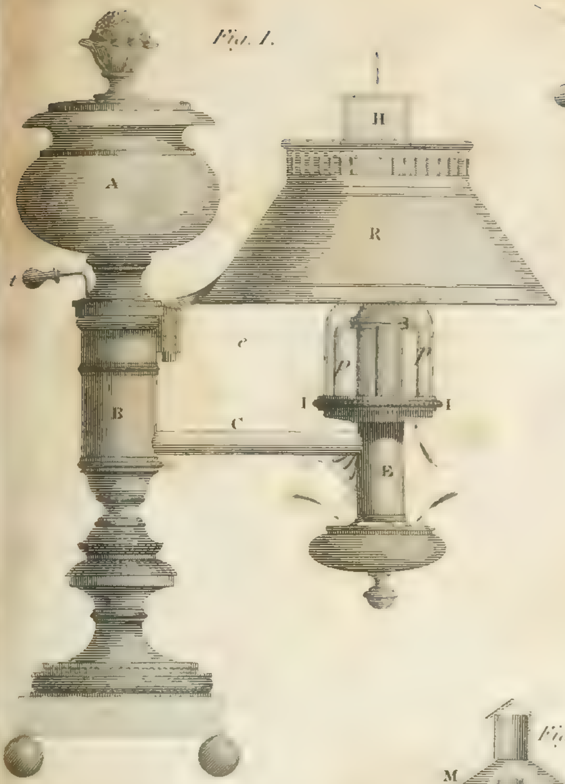


Fig. 2.

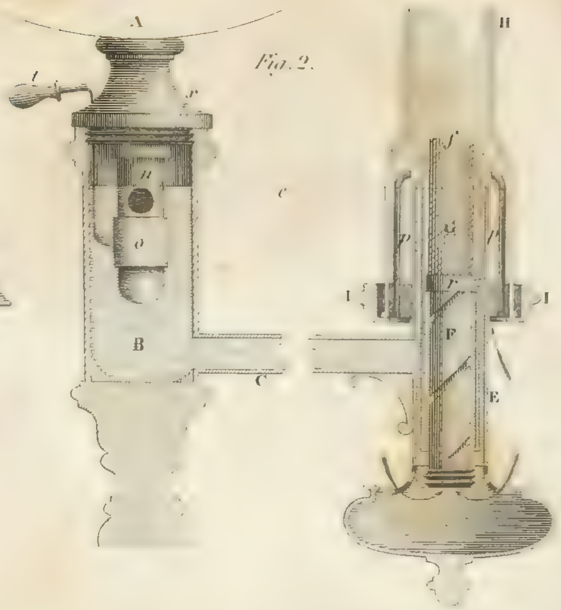
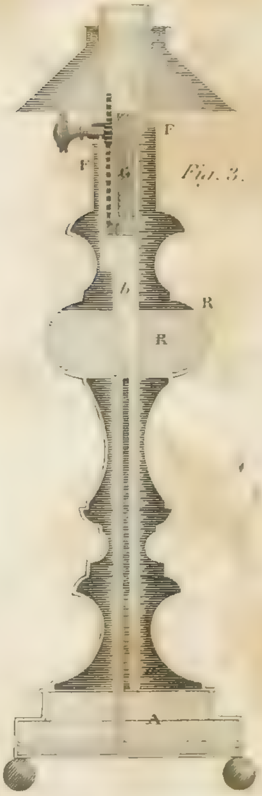


Fig. 3.



LORD COCHRANES LAMP

Fig. 8.

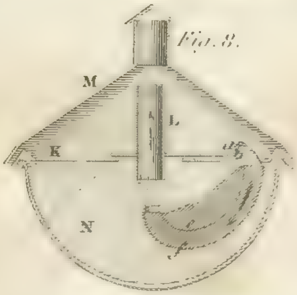


Fig. 9.

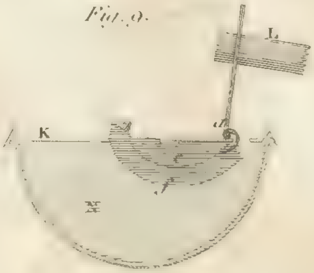


Fig. 4.

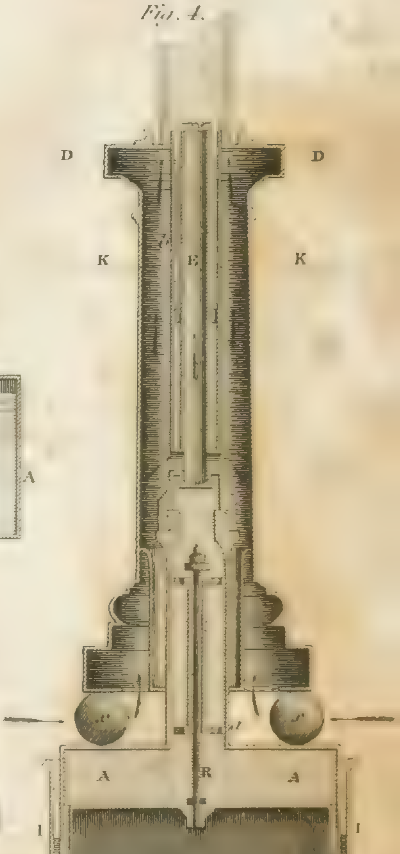


Fig. 5.

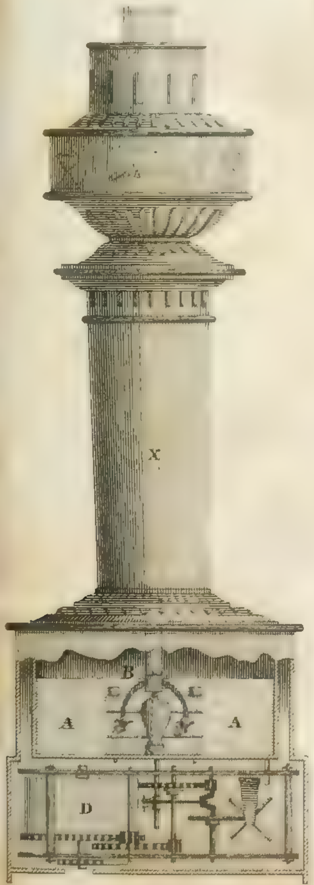


Fig. 7.

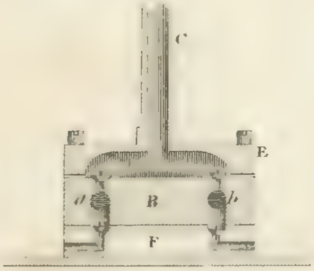


Fig. 10.

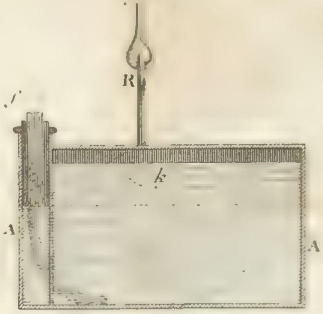


Fig. 6.

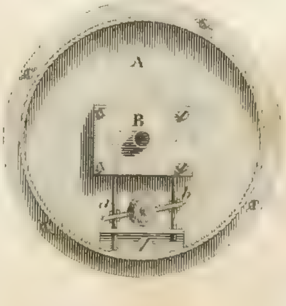
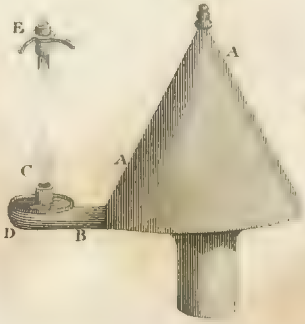


Fig. 11.



LANDSCAPE GARDENING. *PLATE CCCXLIII.*

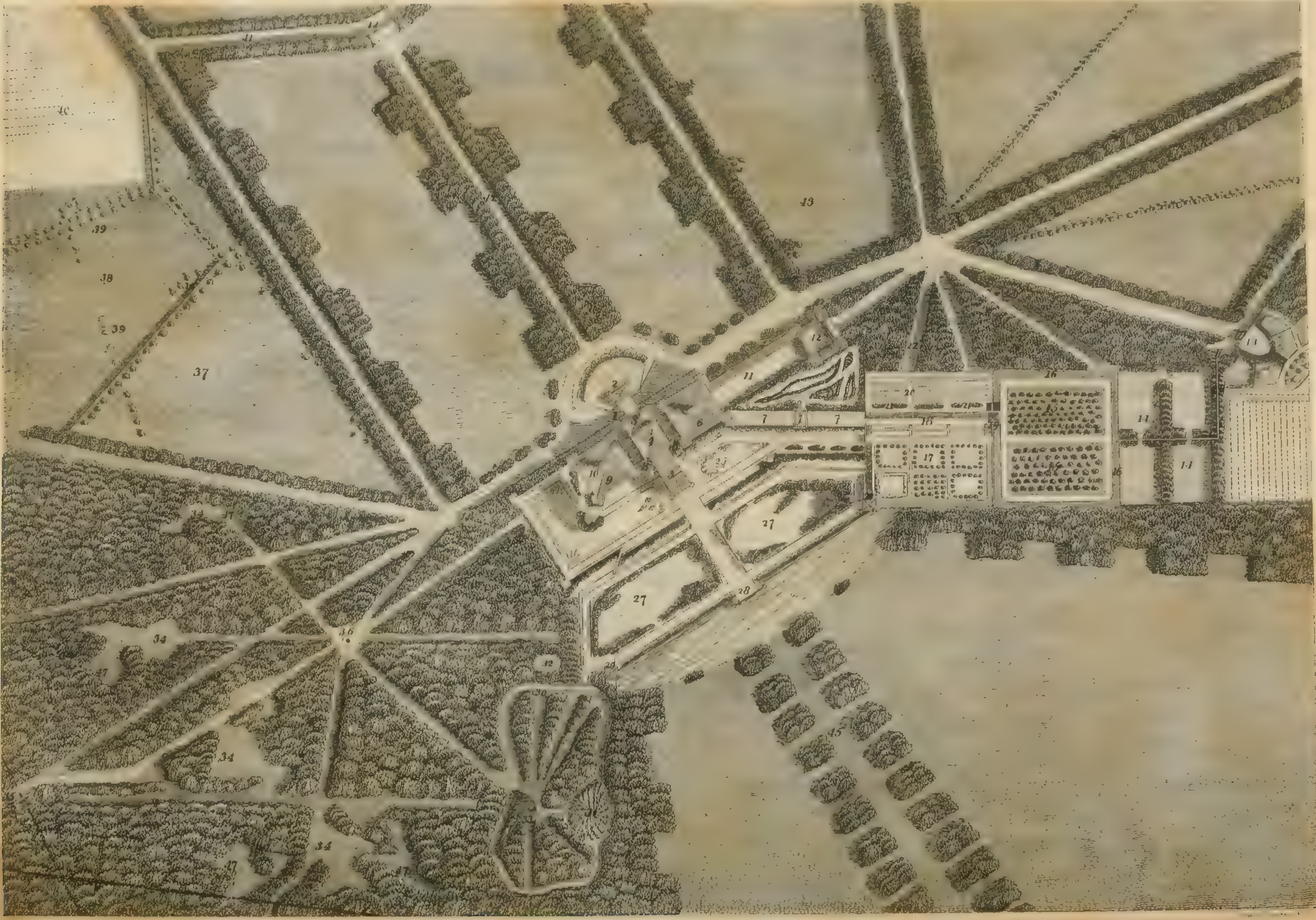
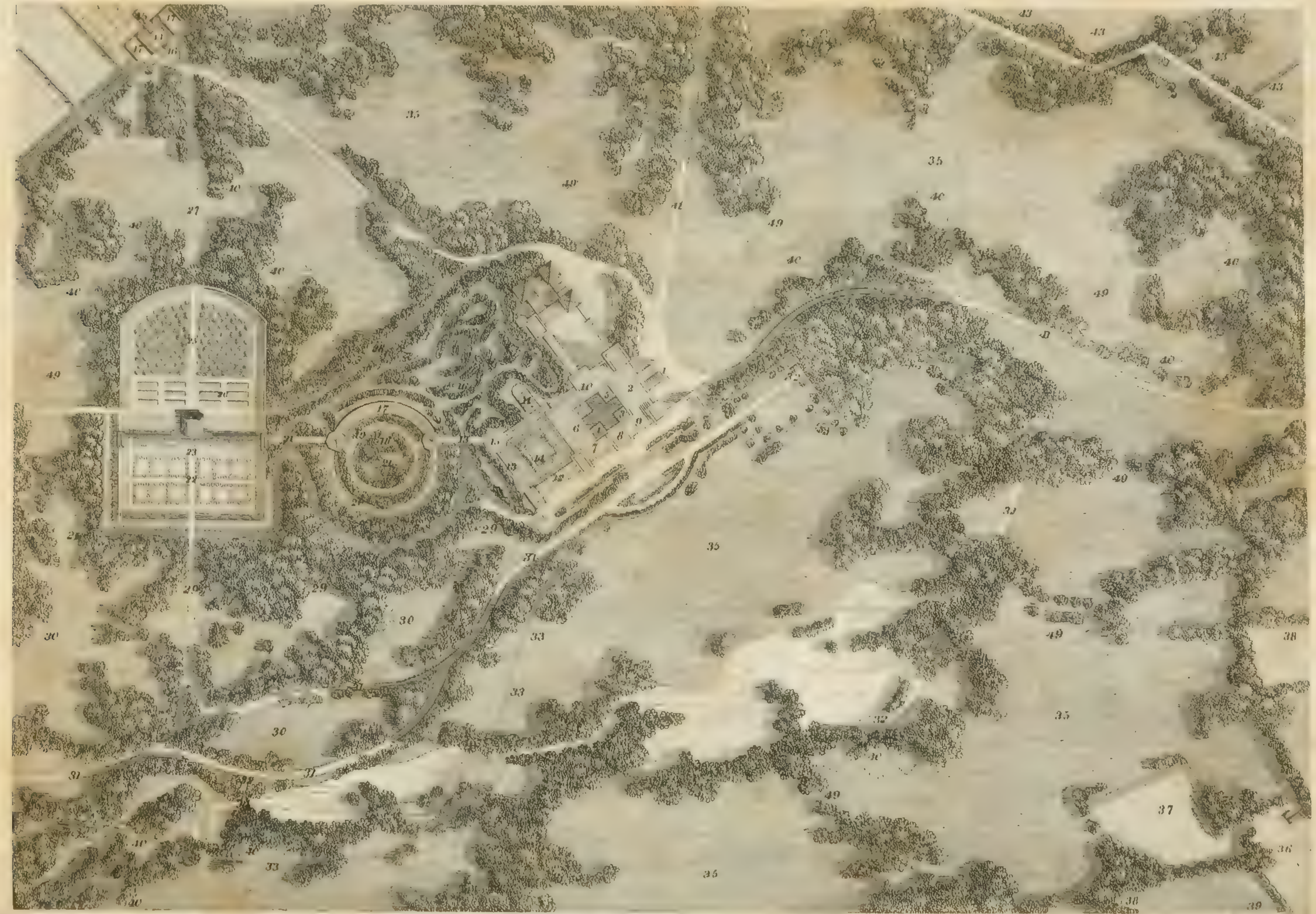


PLATE CCCXLIV.



LANDSCAPE GARDENING. *PLATE CCCXLV.*

Fig. 1.

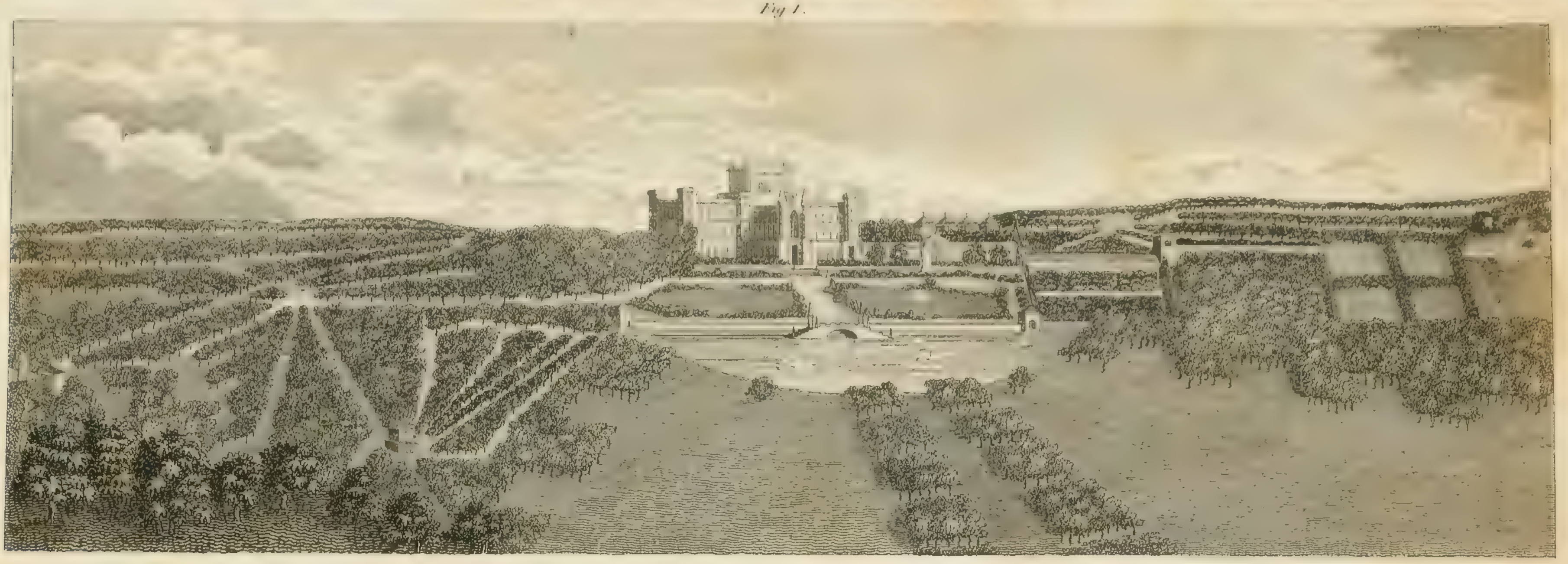
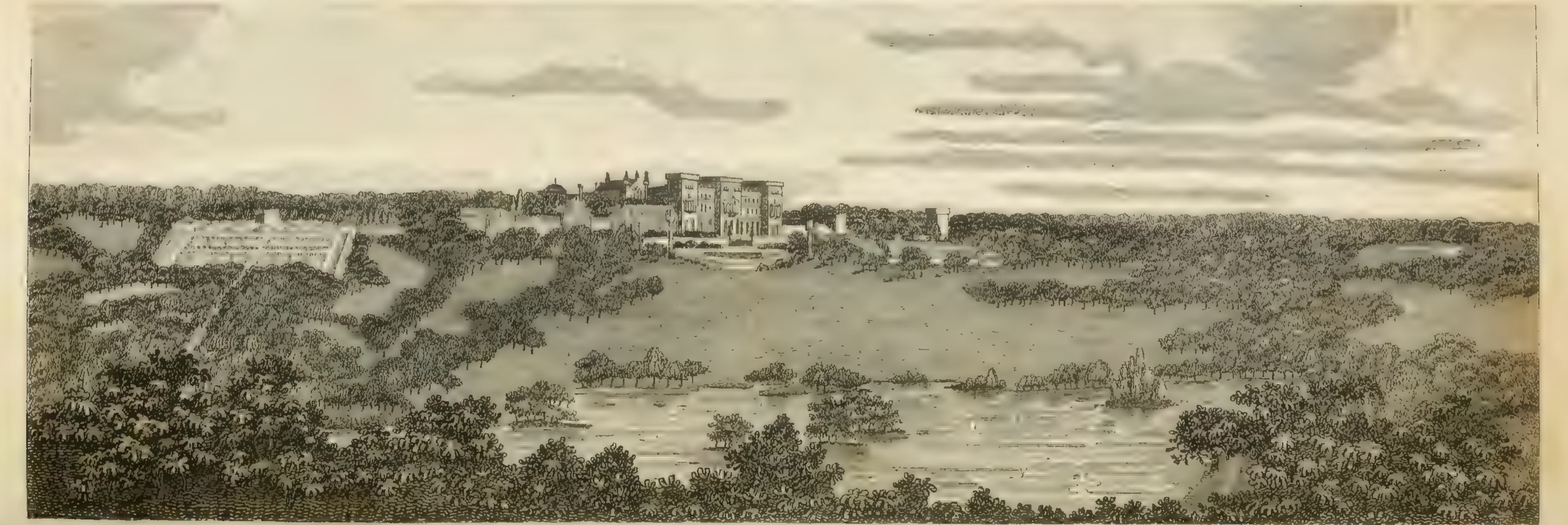
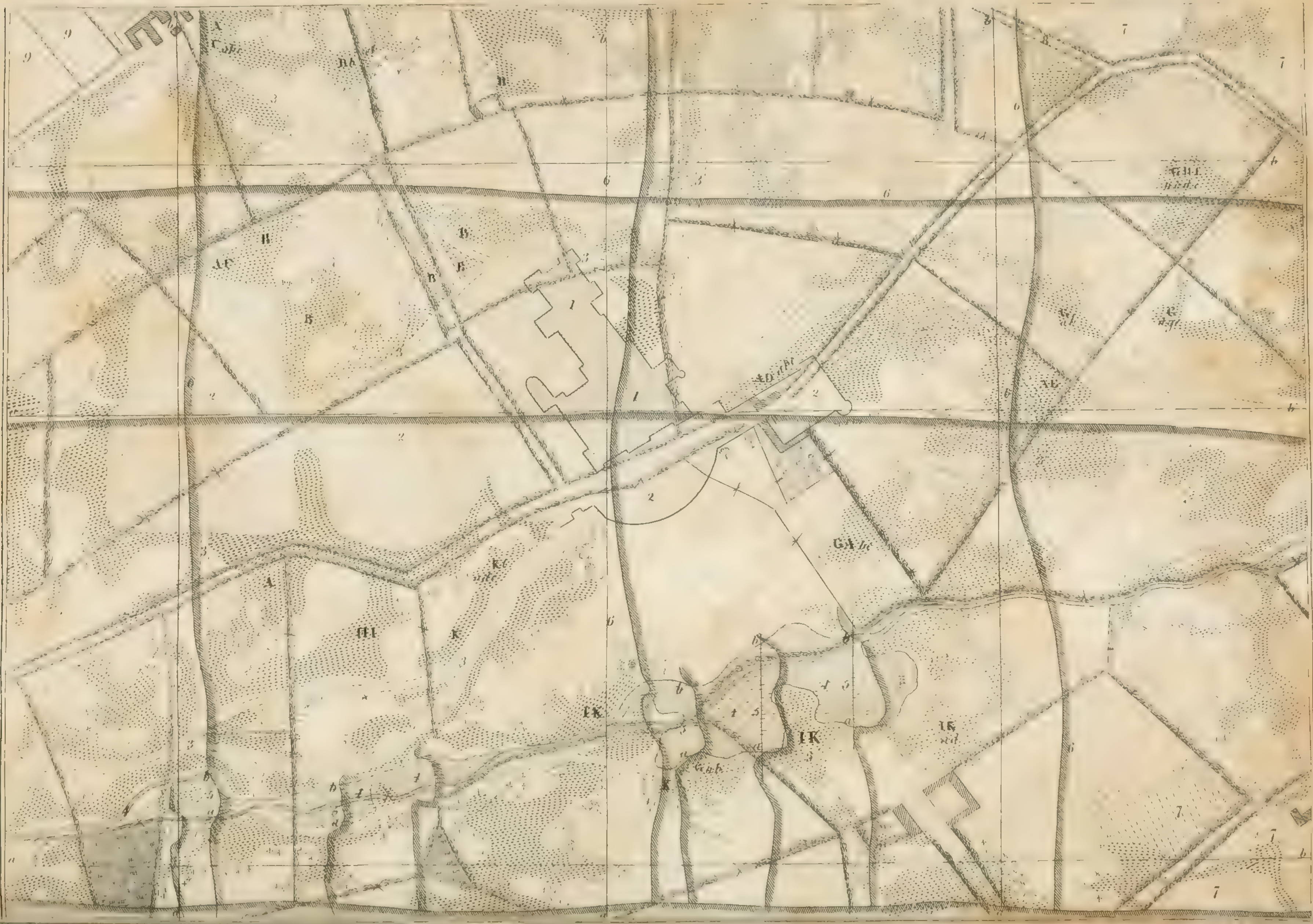


Fig. 2.

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